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Work from Home Likely to Remain Elevated Post Pandemic

After the COVID-19 pandemic ends, 20 percent of all labor in the United States may be satisfied by remote workers, up from 5 percent before the virus struck, according to **Why Working from Home Will Stick** (NBER Working Paper 28731) by Jose Maria Barrero, Nicholas Bloom, and Steven J. Davis. The researchers estimate that productivity will increase and that spending in city centers will decrease relative to pre-COVID levels.

The findings are based on interviews with major employers and on monthly surveys from May 2020 to March 2021 of persons aged 20–64 who earned at least $20,000 in 2019. Respondents report better-than-expected work-from-home experiences, along with higher productivity.

Workers invested an average of 15 hours of time and $560 to upgrade their home work spaces, equivalent in aggregate terms to an estimated 0.7 percent of annual GDP, the researchers find. Added to that are investments made by employers in cloud computing and other technology to accommodate remote workers. The number of patents for technological innovations to accommodate a home-based workforce more than doubled from January to September 2020. Innovative regulatory policies, such as those allowing a wide range of health workers to work remotely, will also change the post-COVID-19 workplace.

Based on respondents' self-assessments, the researchers estimate that the hybrid workforce will boost productivity in the post-pandemic economy by 4.6 percent. Most of that gain will come from a reduction in commuting time.

Fewer than 30 percent of respondents say they will return fully to pre-COVID activities; the rest remain wary of mass transit, crowded elevators, and indoor dining. The researchers estimate that the drop in the number of commuters will result in a 5 to 10 percent drop in spending on meals, entertainment, and personal services in major city centers. That spending will be redirected to business establishments closer to workers' homes.

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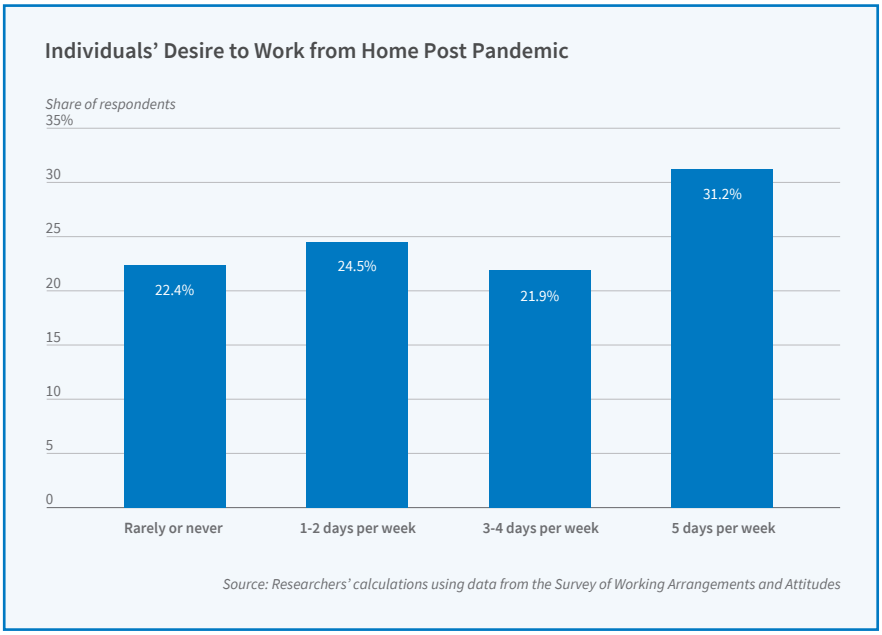


While workers across all demographic groups express a desire to continue working from home, the highly educated and high earners will have a much greater opportunity to do so. The share of survey respondents who worked from home ranged from 10 percent for those without high school degrees to 50 percent for those with graduate degrees. The share was more than twice as large among those who

earned above $150,000 than among those in the $20,000–$50,000 range. Respondents were more likely to work from home if they worked in the service sector, were raising children, and lived in Democratic-leaning states.

The study projects that overall, 20 percent of full workdays will be supplied from home after the pandemic ends. Remote work is feasible for half of the employees, and the typical business plan calls for that half to spend two days — 40 percent — of the work week at home. Business leaders told the researchers that they wanted employees on site at least three days a week for reasons involving motivation, collaboration, and workplace culture.

"For most workers, the post-pandemic economy will entail more WFH [work from home] than in the pre-COVID economy but considerably less than they would like," the researchers conclude. "The benefits of a persistent shift to WFH will be broadly felt but flow mainly to the better-educated and the highly paid."

—Steve Maas

Workplace Worries Take a Toll on Chief Executive Officers

How does work-related stress affect health outcomes? To explore this much-discussed issue, Mark Borgschulte, Marius Guenzel, Canyao Liu, and Ulrike Malmendier analyze the experiences of 1,605 CEOs who entered the C-suite between 1975 and 1991. The CEOs in the study — **CEO Stress, Aging, and Death** (NBER Working Paper 28550) — led large, publicly-listed US firms. The researchers chose to study CEOs, as opposed to other workers, because CEOs are unlikely to be affected by financial hardships, so the health effects of work-related stress can be separated from those of financial stress. They examine two sources of stress: the risk of a hostile takeover, and the challenges of a financial downturn.

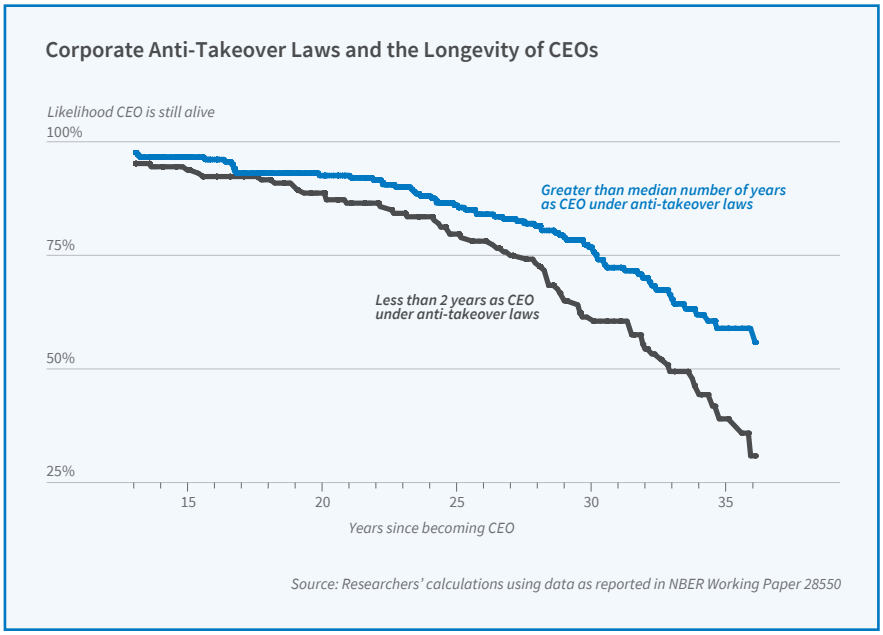
To study the stresses associated with takeover risk, they examine the enactment of state anti-takeover laws and, in particular, business combination (BC) statutes. Thirty-three states enacted BC laws between 1985 and 1997. These laws made hostile takeovers more difficult, thereby reducing the extent to which market discipline created job stresses for CEOs. Building on existing literature, the researchers argue that these laws constituted a significant shift in CEOs' perceptions of their work environment.

The median CEO in the sample served for 4.4 years under a BC law regime, conditional on BC exposure. Working for more years with anti-takeover protection was associated with longer CEO life expectancy. Working an additional year in a legal environment with greater takeover protection lowered the annual mortality rate by about 5 percent for a typical CEO, increasing his or her lifespan by just over two years. The mortality reduction seemed driven by the initial years of BC law exposure, perhaps because CEOs adapted to the new environment and, after a few years, had exhausted most of the opportunities for modifying their activities.

> CEOs of firms that are more subject to risk of hostile takeover and experience industry distress appear to age faster, and to die younger, than those in less stressful circumstances.

The researchers also study how industry-wide distress — defined as a 30 percent drop in the stock price of the median firm in the industry, persisting for at least two years — affects CEO longevity. Forty percent — 648 out of 1,605 of CEOs in the sample — experienced at least one period of industry distress. Fewer than 20 percent experienced two or more shocks, and fewer than one in ten faced three or more shocks. CEOs who were in office during an industry-wide distress, on average, died 1.4 years earlier than those who did not experience such shocks. This effect is smaller than the estimated effect of BC laws, perhaps because the latter apply to much longer periods.

The study also considers stress associated with the 2008 financial crisis. The researchers analyze the evolution of the "apparent age" of corporate leaders (how old they look), comparing those who led firms that were hard-hit by the crisis with those at firms that were less affected. They measured CEOs' "apparent age" using visual machine-learning software, which was applied to about 3,000 pre-and post-crisis facial images of a recent CEO sample consisting of the 2006 Fortune 500 CEOs. Prior to the financial crisis, the software generally returned estimates of apparent age that did not



systematically vary depending on whether CEOs would subsequently be hit hard by the crisis. During and after the crisis, however, there was a substantial increase the "apparent aging" of CEOs leading firms in distressed industries compared with other CEOs. The apparent age of CEOs in industries that suffered the most during the crisis rose by about 1.2 years more than that of the CEOs in non-distressed businesses.

The researchers conclude that "stricter governance and economic downturns constitute a substantial personal cost for CEOs in terms of their health and life expectancy."

—Brett M. Rhyne

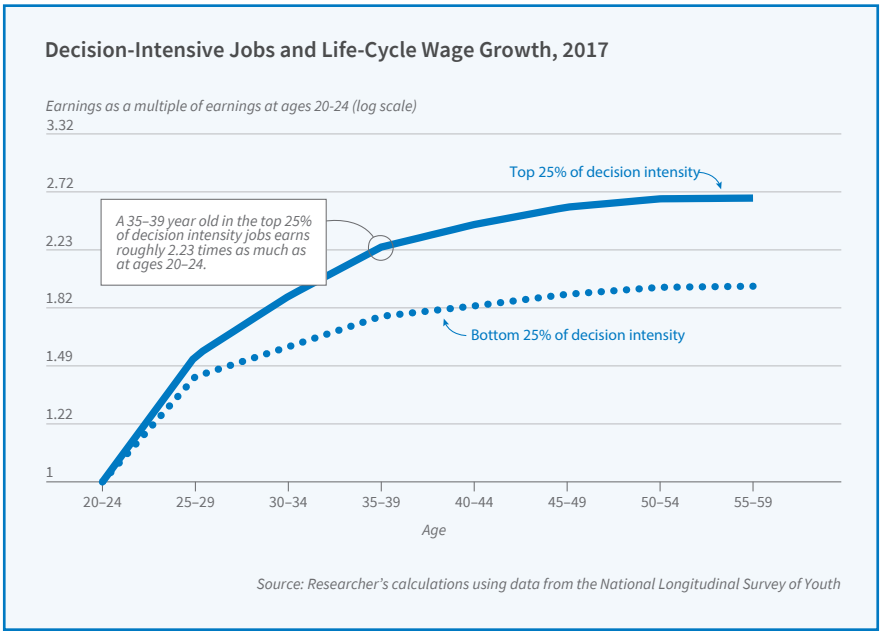
The Increasing Earnings of Workers Who Can Make Good Decisions

As automation has improved, machines increasingly have substituted for workers in jobs involving routine tasks predictable enough to be scripted ahead of time. The tasks required of those in the remaining jobs are increasingly open-ended, and doing good work requires the ability to make good decisions. In **The Growing Importance of Decision-Making on the Job** (NBER Working Paper 28733), David J. Deming calculates that the share of jobs requiring employees to be able to make these good decisions rose from 6 percent in 1960 to 34 percent in 2018. Nearly half of the increase occurred after 2007. He also explains why the increase in open-ended work has produced substantial changes in employee compensation and lifetime earnings growth.

Peak annual earnings relative to early-career earnings more than doubled between 1960 and 2017, largely due to an economy-wide shift toward jobs that place workers in decision-making roles.

Employers have become more willing to pay a premium for experienced, higher-skilled employees with greater cognitive ability because jobs now require more, and more accurate, decisions. More experienced employees have more data on which to base their decisions, reducing decision errors. Better cognitive ability enables better learning in new environments and reduces susceptibility to behavioral biases like overweighting the outcomes of successful past decisions and underestimating the extent to which various sources of information may be correlated.

In 1960, cumulative earnings growth for workers aged 20–59 peaked at just over 40 percent, relative to age 20. This peak occurred at ages 35–39, and total wage and salary income fell slightly each year thereafter. As work became more open-ended, the total growth in earnings to the peak increased substantially, rising to 50 percent by 1980, 90 percent by 2000, and almost 100 percent by 2017. Changes in the age at which wage income peaks also suggest that experience became more highly valued. In 2000, earnings peaked between the ages of 50 and 54, and by 2017, the peak occurred between the ages of 55 and 59.



The shift away from routine jobs explains about half of the shift in US age/earnings profiles from 1980 to 2017 and nearly all of the change since 2000. Using Burning Glass Technologies' database of job vacancy announcements to classify jobs by decision intensity, Deming shows that earnings growth after age 35 is much greater in decision-intensive occupations such as management, engineering, and business operations, compared to less decision-intensive but still high-paying occupations such as sales representatives, healthcare practitioners, and financial specialists.

Data from various years of the decennial census and the American Community Survey suggest that in 1960 workers in decision-intensive jobs enjoyed more than 15 percentage points of cumulative earnings growth after age 35, while workers in less decision-intensive jobs experienced small declines. Similarly, in 2017 wage growth after age 35 was twice as fast in decision-intensive jobs.

Earnings data from various waves of the National Longitudinal Survey of Youth show a congruent pattern, with no growth after age 40 for workers in 25th percentile decision-intensive jobs, and a 4 percentage point increase between the ages of 35 and 55 for each 10 percentile increase in occupation decision intensity. Decision-making, rather than general analytical skills, is the key predictor of life-cycle wage growth.

The earnings of high-ability workers in decision-intensive jobs diverge from those

of other workers as they age. A one standard deviation increase in cognitive skills, as measured by Armed Forces Qualification Test scores, increases earnings between the ages of 24 and 27 by 5.3 percent, substantially less than the 8.2 percent increase at ages 56 to 59. The returns to cognitive ability are also greater in decision-intensive occupations. A 10 percentile increase in decision intensity increases earnings by 0.7 percent at ages 24–27 and 6.3 percent at ages 56–59.

—Linda Gorman

Changing Returns to Education and the Black-White Earnings Gap

The return to education in the US labor market has increased in recent decades, raising the importance of disparities in educational attainment between Black and White men in accounting for the earnings gap between these two groups.

In **Human Capital and Black-White Earnings Gaps, 1966–2017** (NBER Working Paper 28586), Owen Thompson compares earnings outcomes for men born between 1941 and 1952, between 1957 and 1964, and between 1980 and 1984. The youngest member of the last cohort would be 34 in 2021. These cohorts correspond to three waves of the National Longitudinal Survey of Youth. He examines each cohort's earnings outcomes between the ages of 21 and 37, excluding years when respondents reported they were in school.

Earnings are defined as the total of all income from wages, salaries, and farm and business income for the previous calendar year. The average earnings of Black men in the first cohort, $30,973 in 2017 dollars, were 64 percent of the $48,489 average for White men. The gap widened in the second cohort, when Black men's earnings averaged 57 percent of Whites', then declined slightly in the most recent cohort, when Black men's earnings were 61 percent of White men's. Average earnings trended down for both groups, and were $23,949 for Blacks and $39,415 for Whites in the latest cohort. The study considers how racial disparities in educational attainment contribute to these gaps.

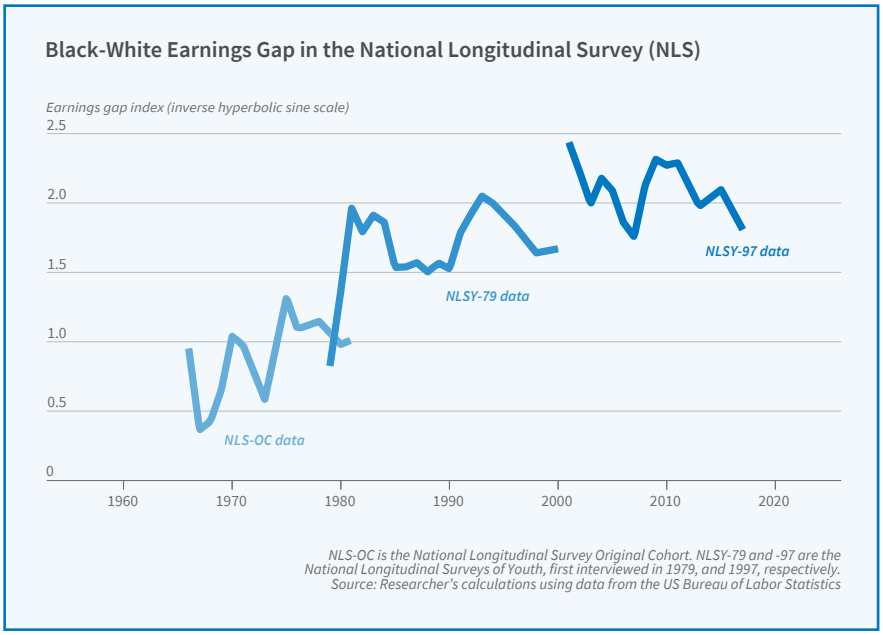
The share of the racial earnings gap that can be accounted for by educational differences is 10 percent for the first cohort, 15 percent for the second, and 30 percent for the third cohort. This pattern is primarily the result of growing differences between the earnings of those with high and low levels of education, not to a widening of the racial disparity in educational attainment. In the first birth cohort, the average White man had 1.01 more years of schooling than the average Black man. That difference narrowed to 0.83 years in the second cohort, before widening again to 1.12 in the third cohort. Thompson finds that the "increasing explanatory power of human capital was overwhelmingly due to growth in the returns to human capital, rather than changes in racial gaps in formal schooling or test scores."

The explanatory power of educational attainment with respect to earnings comes primarily from schooling-related differences in whether an individual is in the labor force and reports positive earnings, rather than from education-related differences in the earnings of those with jobs. In the first birth cohort, the probability of reporting positive earnings is about 5 percentage points higher for White than for Black men, and there is no statistically significant impact of an additional year of schooling on this probability. By the third cohort, the disparity in the probability of reporting positive earnings had increased to 14.9 percentage points, and an extra year of education raised the chance of positive earnings by 1.2 percentage points. The role of educational attainment in explaining differences in the hourly wages of Black and White men with positive earnings has increased much less than its role in explaining total earnings.

The study concludes that "in the contemporary US labor market, rather than working in a low-wage job, less-skilled Black men are now frequently incarcerated, unemployed, or have withdrawn from the labor force during their prime working years." The growing correlation between these zero-earnings outcomes and educational attainment is the essence of the growing explanatory power of schooling disparities.

—Steve Maas

> Rising labor market returns to education and a stable disparity in educational attainment led to a doubling in the share of the earnings gap between Black and White men that is attributable to the education gap.



A New Approach to Lending in Low- and Middle-Income Countries

While microfinance has not broadly succeeded in relaxing credit constraints for the poor in low- and middle-income countries, a new form of credit using "digital collateral" is effective, a study by Paul Gertler, Brett Green, and Catherine Wolfram finds.

Digital collateral allows a person to borrow in order to buy an asset, such as a smartphone, and use the phone to collateralize the loan. If the borrower fails to make payments, the lender can lock the phone remotely until payments are resumed.

In **Digital Collateral** (NBER Working Paper 28724), the researchers find that extending loans in this manner significantly reduces default rates and raises lenders' rates of return. That's due in part to the fact that bad borrowers are less inclined to sign up for a secured loan, but mostly due to an increase in the incentive to repay the loan so that borrowers can continue to enjoy the flow of services. Disabling the flow of services is cheap and easily reversible, without the need for costly and inefficient physical repossession of collateral.

The researchers partnered with Fenix International, a large provider of solar-home systems in Africa that offers financing with digital collateral for their solar system and extends follow-up loans to good payers, with the solar system reused as digital collateral to secure the follow-up loans. They examined the effects of digital collateral in connection with Fenix's most popular follow-up product, a cash loan offered to customers near the beginning of each school term, when school fees are due.

Customer interest in the loans was high. More than 12 percent of the company's 27,000-plus customers who got a text message about the deal expressed interest in the loan. Digital collateral served to screen out higher credit risks. Of those who were offered a loan secured with digital collateral 45 percent signed up compared to 51 percent of those offered an unsecured loan.

> When small loans secured with "digital collateral" are in arrears, lenders can shut off the benefits of the collateralized asset without physically repossessing it.

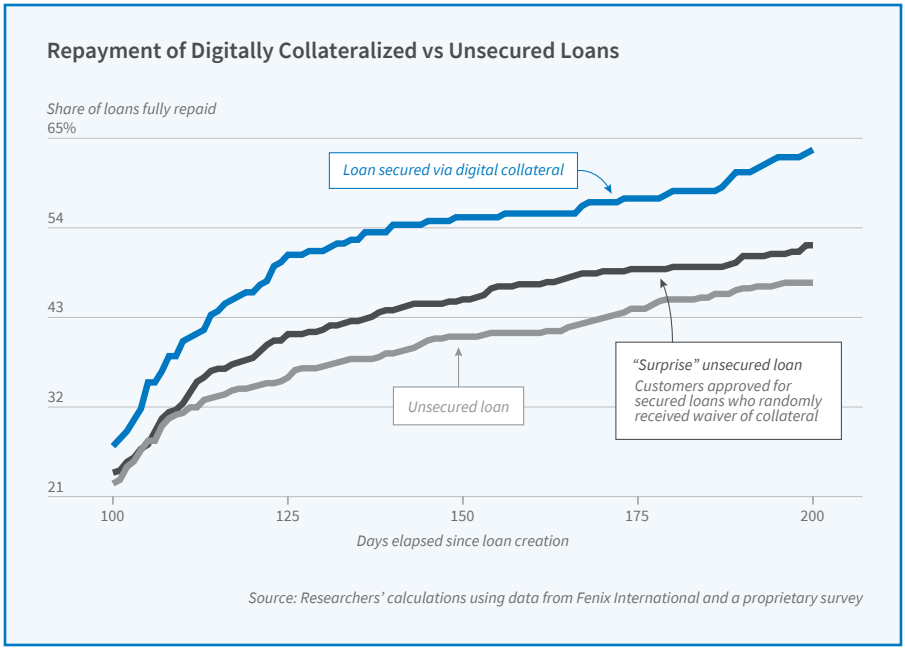
Collateralized loans were repaid at a higher rate than their uncollateralized counterparts. The repayment rate of digital collateral loans was 11 percentage points greater than the repayment rate of unsecured loans, and the share of households that fully repaid the secured loans was 19 percentage points higher than the share of those repaying unsecured loans. The researchers calculate that only a third of this repayment effect was because the digital collateral loans screened out more high-risk borrowers than the unsecured loans did; the other two-thirds came about because the structure of the secured loans encouraged repayment.

The school loans themselves had a positive impact. Children in households that were offered a school-fee loan were more likely to be enrolled in school than the control group of children in the study. The non-enrollment rate fell from 12 percent to 6 percent. On average, households with loans boosted their school-related expenditures by 44 percent.

Finally, the loans did not hurt household balance sheets. Purchases of assets rose only slightly and borrowing was mostly unchanged.

Even for collateralized loans, the lender can face inconsistent repayments. The median household in the study's sample had its home solar system locked for 50 of the first 200 days of the loan. On one hand, this could be viewed as a feature of the digitally collateralized contract; customers need not make payments on days in which they do not require or have a low value for electricity, whereas borrowers face permanent repossession if they fail to repay a traditional secured loan. On the other hand, it suggests that there is potential room for improvement in the contract design. "Incentives to avoid nonpayment and screening remain important components of a sustainable lending business," the researchers conclude. They posit that lending with digital collateral could be extended to purchases of other devices such as laptops, refrigerators, and televisions, and more broadly could facilitate investments that might help households to escape from poverty.

—Laurent Belsie



An Australian Lesson in Preventing Teenagers' Driving Mishaps

A policy in Australia that banned first-year drivers from carrying multiple passengers from 11 pm until 5 am more than halved crashes, casualties, and deaths during those hours, Timothy J. Moore and Todd Morris report in **Shaping the Habits of Teen Drivers** (NBER Working Paper 28707). It also lowered crashes earlier in the evening, and seems to have had persistent effects on driving behavior. The estimated gains from this targeted intervention are comparable to those from broader policies that delay teenagers' chances to drive.

Because driving is one of the riskiest activities that teens undertake, policymakers often impose restrictions on teen drivers to improve safety. Examples include graduated driver licensing laws, passenger restrictions, nighttime curfews, and cellphone bans. While some restrictions have been found to reduce accidents, three issues limit their effectiveness.

First, the safety gains primarily come from reducing the number of teens who get licenses. This delays the acquisition of driving experience and the benefits of driving independently, which may be substantial. Second, risky driving practices continue to account for a large fraction of teen deaths. For example, US teen drivers' fatality rates per mile driven are over 50 times higher for late-night driving with multiple peers than daytime driving alone, and this ratio is largely unaffected by current teen driving restrictions. Third, the restrictions do not improve safety once a driver is no longer affected by them.

Targeted driving restrictions appear to overcome these issues. The researchers study a July 2007 measure in the Australian state of New South Wales that prohibited first-year drivers from carrying two or more passengers under the age of 21 in the late evening and early morning. Using administrative data on drivers' licenses linked to detailed crash data, they estimate that the nighttime passenger restriction reduced reported crashes by 57 percent. Crashes that were the target of the restriction went from representing 18 percent of traffic fatalities involving first-year drivers to just 4.3 percent once it was in place. The restriction saved 5 lives per 100,000 drivers in the first year of driving, and a further 0.9 lives per 100,000 drivers in subsequent years.

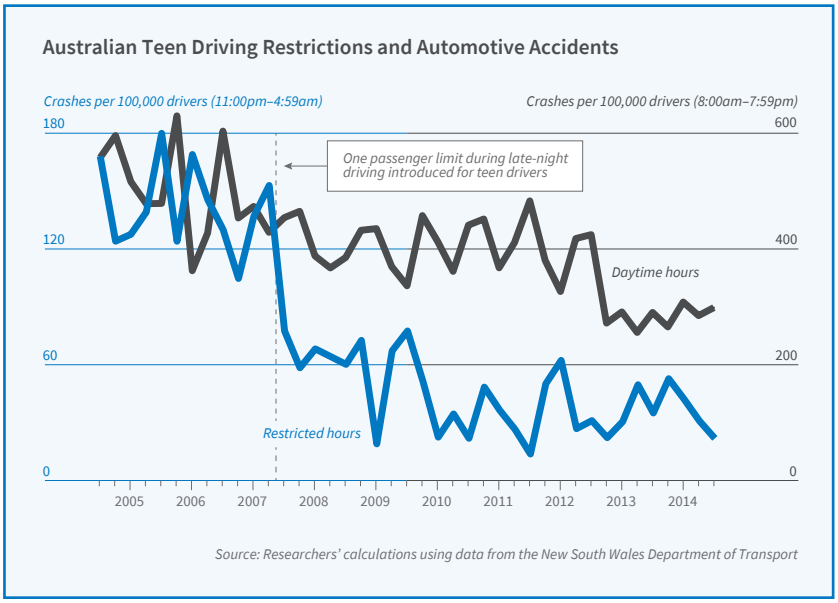
The researchers also find reductions in property damage and in major physical trauma suffered by teens involved in crashes. They estimate that the restriction reduced reported hospitalizations and fatalities by 58 percent, with 41 fewer hospitalizations, 98 fewer other injuries, and 164 fewer crashes with property damage per 100,000 first-year drivers. The improvements over the first four years of driving are valued at A$412 million (US$320 million), or A$738 (US$570) per driver.

> A ban on late night and early morning driving by first-year drivers reduced crashes and fatalities, and had ongoing benefits in later years.

The restrictions appear to have had effects beyond the first year of driving, significantly reducing nighttime multi-passenger crashes in the second and third years after drivers received their licenses. There were no discernible differences beyond the third year, but by that time drivers are much safer, with underlying crash rates that are just one-fifth those of first-year drivers.

Overall, the findings suggest that targeted policies that place limited restrictions on teens' driving behavior can markedly improve traffic safety while allowing teens to develop driving skills and retain most of the benefits of independent driving.

—Lauri Scherer



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