A rising share of employees now regularly engage in working from home (WFH), but there are concerns this can lead to ‘‘shirking from home.’’ We report the results of a WFH experiment at Ctrip, a 16,000-employee, NASDAQ-listed Chinese travel agency. Call center employees who volunteered to WFH were randomly assigned either to work from home or in the office for nine months. Home working led to a 13% performance increase, of which 9% was from working more minutes per shift (fewer breaks and sick days) and 4% from more calls per minute (attributed to a quieter and more convenient working environment). Home workers also reported improved work satisfaction, and their attrition rate halved, but their promotion rate conditional on performance fell. Due to the success of the experiment, Ctrip rolled out the option to WFH to the whole firm and allowed the experimental employees to reselect between the home and office. Interestingly, over half of them switched, which led to the gains from WFH almost doubling to 22%. This highlights the benefits of learning and selection effects when adopting modern management practices like WFH. Working from home (WFH; also called telecommuting or telework) is becoming an increasingly common practice. In the United States, the proportion of employees who primarily work from home has more than tripled over the past 30 years, from 0.75% in 1980 to 2.4% in 2010 (Mateyka, Rapino, and Landivar 2012). 1 At the same time, the wage discount (after controlling for observables) from primarily WFH has fallen, from 30% in 1980 to 0 in 2000 (Oettinger 2011). Home-based workers now span a wide spectrum of jobs, ranging from sales assistants and realtors to managers and software engineers, with a correspondingly wide range of incomes (Figure I). 2 Internationally, working from home also appears to be common. Figure II shows the share of managers allowed to work from home during normal working hours, from a major telephone survey we ran on over 3,000 medium-sized (50–5,000 employee) manufacturing firms during 2012–2013. 3 This is a broader measure of WFH as it covers managers who are allowed to WFH occasionally, for example, one day a week. We find two interesting findings. First, the share of managers in the United States, United Kingdom, and Germany allowed to WFH during normal hours is almost 50%, signaling that this is now a mainstream practice. Second, the share in many developing countries is surprisingly high, at 10% or 20%. Survey respondents from developing countries told us that WFH is becoming increasingly common because of rising traffic congestion and the spread of laptops and cell-phone connectivity. Having employees work from home raises two major issues. First, is it a useful management practice for raising productivity and profitability? This is an important question that lacks systematic evidence or consensus. Even within a single industry, practices vary dramatically. For example, at JetBlue Airlines call center employees all work from home, American Airlines does not allow any home work, and United Airlines has a mix of practices. More generally, Bloom, Kretschmer, and Van Reenen (2009) reported wide variation in the adoption rates of managers and employees of WFH within every three-digit SIC industry code surveyed. The second issue relates to the concerns over deteriorating work-life balance and the potential of WFH to help address this. The share of U.S. households with children in which all parent(s) were working has increased from 40% in 1970 to 62% by 2012 (Council of Economic Advisors 2014). The increasing pressure for parents to work is leading governments in the United States and Europe to investigate ways to promote work-life balance, again with a shortage of evidence (Council of Economic Advisors, 2010). The efficacy of WFH as a management practice was what concerned Ctrip, China’s largest travel agency, with 16,000 employees and a NASDAQ listing. Its senior management was interested in allowing its Shanghai call center employees to work from home to reduce office rental costs, which were increasing rapidly due to the booming real estate market in Shanghai. They also thought that allowing WFH might reduce the high attrition rates the firm was experiencing by saving the employees from long commutes. But the managers worried that allowing employees to work at home, away from the direct oversight of their supervisors, would lead to a large increase in shirking. The call center workforce was mainly younger employees, many of whom might well have been expected to struggle to remain focused when WFH without direct supervision. Given the uncertainty surrounding the effects of WFH in the

research literature as well as in practice, the firm's senior management decided to run a randomized controlled trial. The authors assisted in designing the experiment and, essentially whenever feasible, our recommendations were followed by management. We had complete access to the resulting data, as well as to data from surveys conducted by the firm. We also conducted various surveys ourselves and numerous interviews with employees, line supervisors, and senior management. In summary, Ctrip decided to run a nine-month experiment on WFH. They asked the 996 employees in the airfare and hotel departments of the Shanghai call center whether they would be interested in working from home four days a week, with the fifth day in the office. 4 Approximately half of the employees (503) were interested, particularly those who had less education and tenure, their own rooms, and faced longer commutes. Of these, 249 were qualified to take part in the experiment by virtue of having at least six months' tenure, broadband access, and a private room at home in which they could work. After a lottery draw, those employees with even-numbered birthdays were selected to work from home, and those with odd-numbered birth-dates stayed in the office to act as the control group. Office and home workers used the same IT equipment, faced the same work order flow from a common central server, carried out the same tasks, and were compensated under the same pay system, which included an element of individual performance pay. Hence, the only difference between the two groups was the location of work. This allows us to isolate the impact of working from home versus other practices that are often bundled alongside this practice in attempts to improve work-life balance, such as flexible work hours. We found several striking results. First, the performance of the home workers went up dramatically, increasing by 13% over the nine months of the experiment. This improvement came mainly from a 9% increase in the number of minutes they worked during their shifts (i.e., the time they were logged in to take calls). This was due to reductions in breaks, time off, and sick days taken by the home workers. The remaining 4% improvement came from home workers increasing the number of calls per minute worked. In interviews, the workers attributed the increase in time worked to the greater convenience of being at home (e.g., the ease of getting tea, coffee, or lunch or using the toilet) and the increased output per minute to the relative quiet at home. Second, there appear to be no spillovers to the rest of the group. Comparing the control group to similar workers in Ctrip's other call center in the city of Nan Tong, which was not involved in the experiment, we see no performance drop despite the control group's having lost the treatment lottery. Third, attrition fell sharply among the home workers, dropping by 50% versus the control group. Home workers also reported substantially higher work satisfaction and had more positive attitudinal survey outcomes. Fourth, one down side of WFH appears to be that, conditional on performance, it was associated with reduced rates of promotion of about 50%. There are some obvious concerns with these results. First, was quality sacrificed for quantity by the home workers? Using two different quality metrics we found no impact on quality of home working. Second, could the results be driven by the control workers' becoming frustrated by losing the randomization lottery and then performing worse? To examine this, we compared the Shanghai-based control group to similar employees in Nan Tong and found no almost identical results. Third, perhaps our results are driven by attrition bias. It turns out that in fact our results probably are biased by attrition, but biased downward, so the true impact of WFH is probably substantially larger. The overall impact of WFH was striking. The firm improved total factor productivity by between 20% to 30% and saved about $2,000 a year per employee WFH. About two thirds of this improvement came from the reduction in office space and the rest from improved employee performance and reduced turnover. This led Ctrip to offer the option to work from home to theentire firm. It also allowed members of the treatment and control groups to reselect their working arrangements. Surprisingly, over half of all the employees changed their minds, indicating the extent of employees' learning about their own suitability for working from home. In particular, two thirds of the control group (who initially all had volunteered to work from home 10 months earlier) decided to stay in the office, citing concerns over the loneliness of home working.