NERA
ECONOMIC CONSULTING

30 April 2020

Hey Google: When Did People Stop Going to Work?

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Social distancing has been a key factor in the fight against the COVID-19 pandemic and the subject of public policy debates. Decisions of when and how to reopen the economy in certain areas could be informed by an empirical analysis of the impact of social distancing.

In this whitepaper, we answer two questions: (1) Did San Francisco start social distancing much earlier than New York City, as measured by Google's data on the frequency of travel to workplaces? And (2) did people stop commuting to work before or after stay-at-home orders across different states? Our analysis shows that people in San Francisco started to reduce traveling to work a few days to a week—*not* several weeks—earlier than New York City.[2] In addition, about two-thirds of the decline in travel to workplaces had already occurred by or shortly before the states' announcements of their stay-at-home orders.

We use recently released mobility trends data from Google to address these questions. This is a new database that Google released on 3 April and it will only remain available for a limited time.[3] Using Google Maps, Google is able to identify location types and classify them into categories including workplaces, retail and recreation, groceries and pharmacies, transit stations, parks, and residential. It then measures the number of users who visit a particular place, such as a park or a workplace, and the length of stay at each location. Finally, Google reports the change in the visits to each location relative to the median trend during the period from 3 January to 6 February 2020. We refer to this period as the "baseline period."

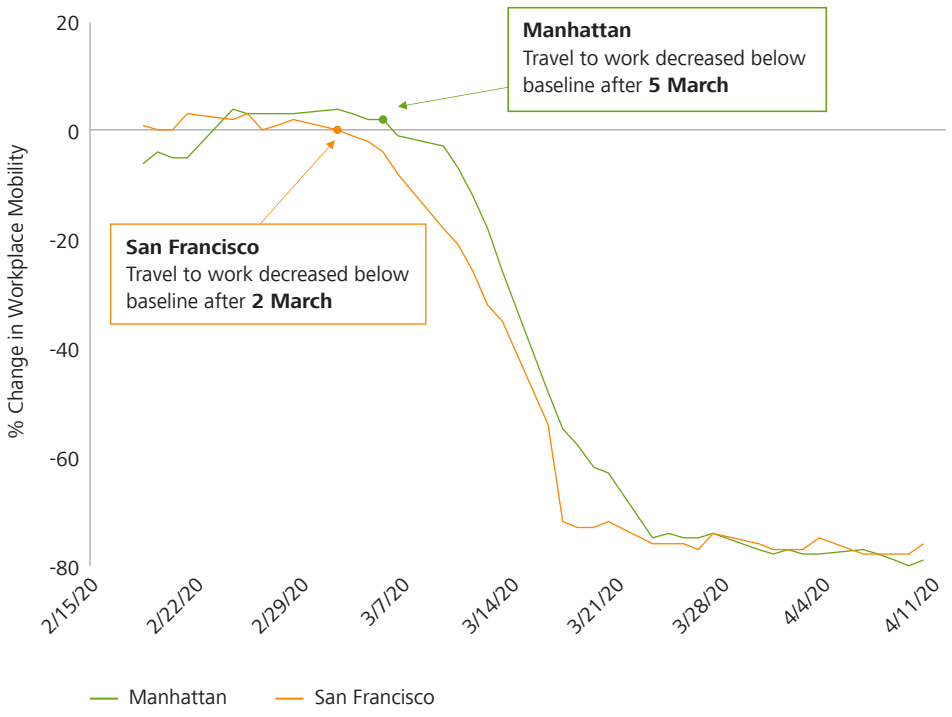
We use Google's data on the change in the frequency of visits to workplaces on a daily basis as a proxy for social distancing. For example, the data document that on Wednesday, 1 April 2020, the number of visits and length of stay at workplaces in Manhattan was 77% lower than the median visits and stays at these places on any given Wednesday between 3 January to 6 February 2020. Lower mobility to public places such as workplaces, transit stations, or retail stores could be a proxy for social distancing. The data present only the percent change in visits

to places as compared to the baseline period. Google does not report the absolute levels of visits for any given day. Google calculates these changes using the same kind of aggregated data used to show "popular times" for locations in Google Maps.

Various news reports suggested that the differences in the severity of COVID-19 exposure between San Francisco and New York City may be partly explained by the differences in when residents started social distancing.[4] In this whitepaper, we focus on mobility trends for workplaces. First, we examine whether activities at workplaces in San Francisco decreased earlier than in New York City. Figure 1 presents the mobility trends for workplaces in Manhattan and San Francisco between 15 February and 10 April 2020, excluding weekends and federal holidays. The data show that activities at workplaces in San Francisco started to decline about three days earlier than in Manhattan.

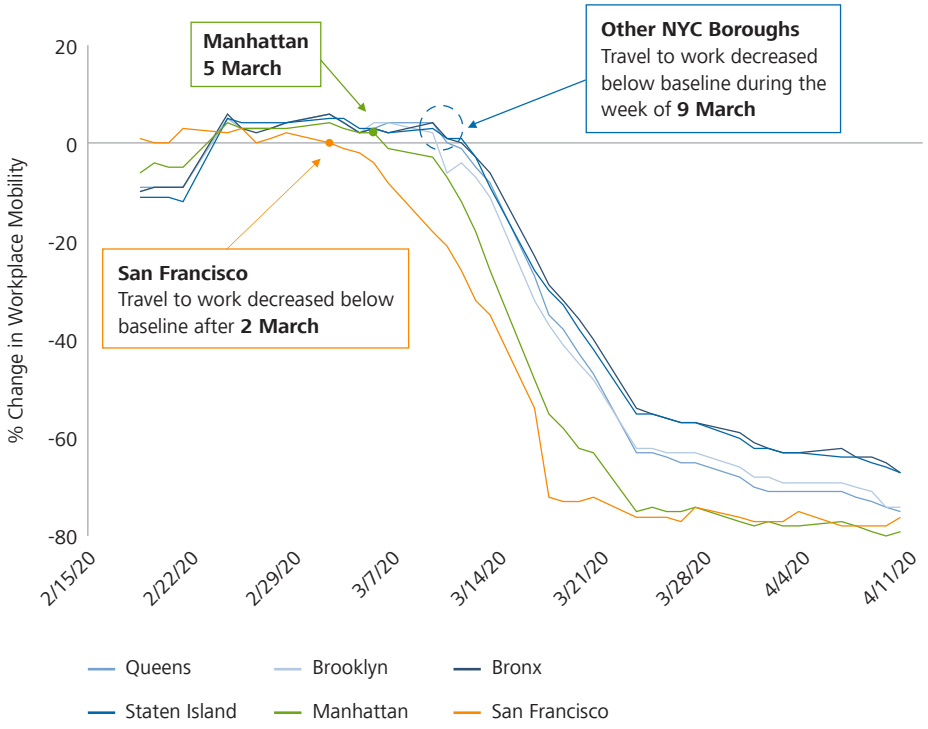
Specifically, on Monday, 2 March, the mobility at workplaces in San Francisco dropped to the baseline level, which means that activities on that day were similar to other Mondays in January and early February 2020. Mobility at workplaces in San Francisco has been on a declining trend since then. Meanwhile, the mobility at workplaces in Manhattan remained higher than the baseline level until 5 March, declining below the baseline level on 6 March and continuing to drop further since then. San Francisco's decline in mobility continued to lead the decline in Manhattan in the following weeks. For example, San Francisco's workplace mobility dropped by 26% as of 11 March, while Manhattan did not experience a similar decline until 13 March. These findings suggest that the reduction in travel to workplaces in San Francisco led Manhattan by a few days, but *not* weeks. Eventually, mobility trends in Manhattan and San Francisco converged, starting the week of 23 March, following the announcements of stay-at-home orders in New York State (20 March).

Figure 1. **Workplace Mobility Trends in Manhattan and San Francisco (Business Days Only)**



For other boroughs in New York City—the Bronx, Brooklyn, Queens, and Staten Island—the downward trends in workplace mobility started around 9 March, four days later than Manhattan and about a week later than San Francisco (see Figure 2). The effect of this time difference is unclear.[5]

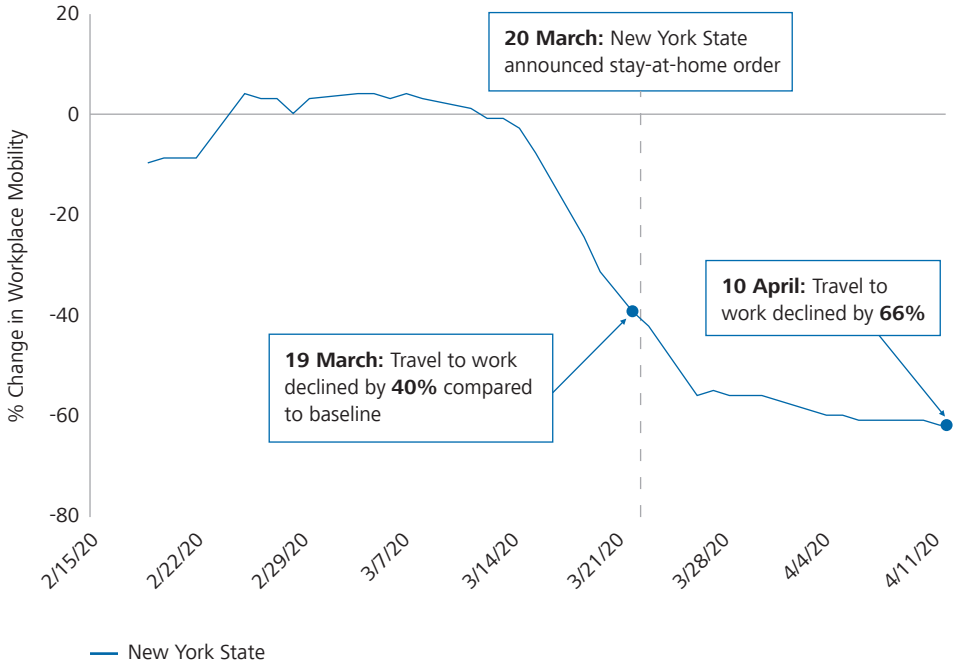
Figure 2. **Workplace Mobility Trends in the Bronx, Brooklyn, Queens, Staten Island, Manhattan, and San Francisco (Business Days Only)**



"Reduced travel to workplaces in San Francisco started about three days earlier than in Manhattan, and about a week earlier than the Bronx, Brooklyn, Queens, and Staten Island."

Second, we examine whether mobility trends for workplaces started to decline at or before the stay-at-home orders in different states.[6] Our analysis shows that about two-thirds of the total decline in travel to workplaces had already occurred by the time the states announced stay-at-home orders. For example, Figure 3 presents workplace mobility trends for the state of New York. By Thursday, 19 March, the last business day before Gov. Andrew Cuomo announced the state's stay-at-home order, workplace mobility across the state was 40% lower than its level in the January-to-early-February baseline period. The latest data, as of 10 April, show that workplace mobility in New York State declined further to 66% below baseline. A large part of the workplace mobility decline in New York State took place prior to the state's stay-at-home order.

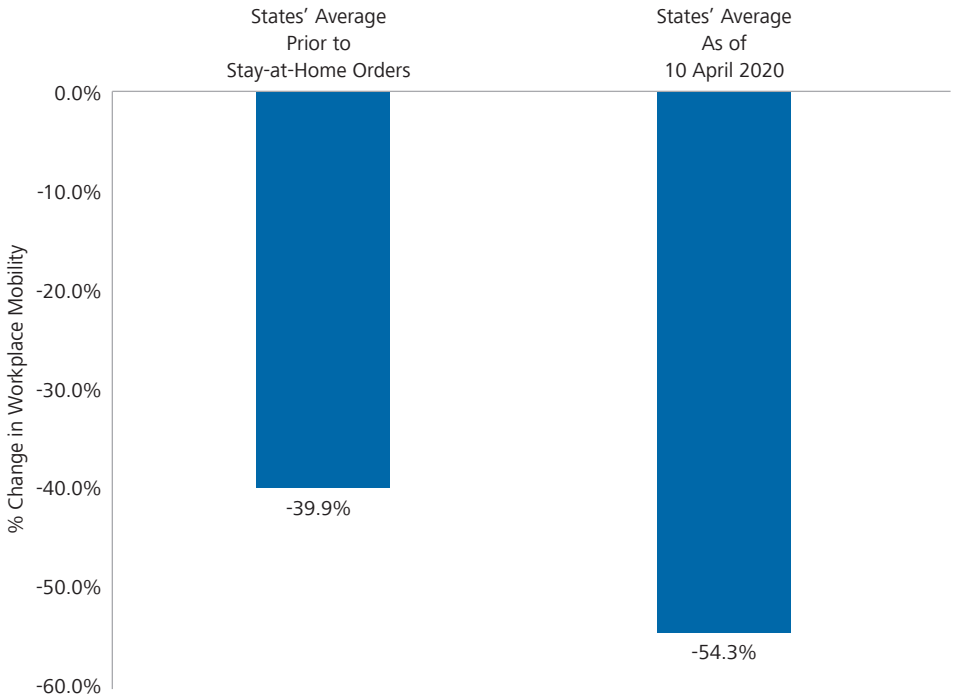
Figure 3. **Workplace Mobility Trends in New York State (Business Days Only)**



A similar analysis for the other states shows that workplace mobility had, on average, declined by about 40% prior to the announcement of the states' stay-at-home orders. Meanwhile, workplace mobility across states with stay-at-home orders declined by about 54% as of 10 April 2020—the last business day with available data (see Figure 4).[7] This result suggests that mobility at workplaces in different states had already declined substantially prior to the announcements of the states' stay-at-home orders. This could be due, in part, to the decisions of many companies to allow their employees to work remotely before the state-level decisions. For example, Google advised its employees in North America and other regions to work from home starting 12 March.[8]

"Our analysis shows that about two-thirds of the total decline in travel to workplaces had already occurred by the time the states announced stay-at-home orders."

Figure 4. **States' Average Change in Workplace Mobility**



In summary, our analysis shows that the timing of the decline in workplace mobility in New York City and San Francisco differs by several days, *not* several weeks. Reduced travel to workplaces in San Francisco started about three days earlier than in Manhattan, and about a week earlier than the Bronx, Brooklyn, Queens, and Staten Island. We also observe similar trends in travel to transit stations. In addition, workplace mobility as measured by Google data had already declined noticeably by or before the announcements of the stay-at-home orders. On average, more than two-thirds of the total decline in workplace mobility to date had already taken place prior to the states' stay-at-home orders.

Our research is ongoing and is subject to change as the data is updated. Stay tuned for more analysis of COVID-19-related economic issues.

Our analysis demonstrates that this newly released Google data can be used to assess the timing and effectiveness of social distancing. The results of such analyses can be informative in shaping public policy and in potential disputes and litigation. For example, a dispute may arise over the timing of a stay-at-home announcement and its impact on a given product or company. The type of analysis in our whitepaper may help assess these allegations. It may also be used in a damages analysis or event study as a benchmark for customer demand for certain types of goods or services. There are categories of the data—such as groceries and pharmacies, or retail and recreation mobility—that could be used in such matters.

For more information on how NERA's global roster of experts can assist clients facing COVID-19-related disputes and business challenges, please contact the authors.

Notes

[1] Linh Nguyen is a Senior Analyst, Aakash Bhalothia is a Research Associate, and Dr. Faten Sabry is a Managing Director at NERA Economic Consulting.

[2] We obtained mobility data from Google Community Mobility Reports, available at https://www.google.com/covid19/mobility/.

[3] See https://www.google.com/covid19/mobility/.

[4] See German Lopez, "Why New York has 14 times as many coronavirus deaths as California," *Vox*, 13 April 2020, available at https://www.vox.com/2020/4/7/21205890/coronavirus-covid-19-pandemic-new-york-california; Geoffrey A. Fowler, Heather Kelly, and Reed Albergotti, "Social distancing works. The earlier the better, California and Washington data show," *Washington Post*, 1 April 2020, available at https://www.washingtonpost.com/nation/2020/04/01/lockdown-coronavirus-california-data/; and Russell Berman, "The City That Has Flattened the Coronavirus Curve," *The Atlantic*, 12 April 2020, available at https://www.theatlantic.com/politics/archive/2020/04/coronavirus-san-francisco-london-breed/609808/.

[5] We note that some experts suggest that a relatively small difference in the timing of social distancing could have an impact. See Carolyn Y. Johnson, Lena H. Sun, and Andrew Freedman, "Social distancing could buy U.S. valuable time against coronavirus," *Washington Post*, 10 March 2020, available at https://www.washingtonpost.com/health/2020/03/10/social-distancing-coronavirus/. According to Yvonne Maldonado, an infectious-disease epidemiologist at Stanford University, "That's really important, because instead of preventing 1,000 cases, you might be preventing 100,000 cases—and a matter of days can make a difference."

[6] We obtained the dates of the stay-at-home and shelter-in-place orders by state from FINRA, "State 'Shelter-in-Place' and 'Stay-at-Home' Orders," available at https://www.finra.org/rules-guidance/key-topics/covid-19/shelter-in-place.

[7] We also note that workplace mobility in five states without state-wide stay-at-home orders declined, on average, by 44% as of 10 April 2020.

[8] Gerrit De Vynck and Nate Lanxon, "Google Tells Staff to Work From Home In North America and Europe," *Bloomberg*, 10 March 2020, available at https://www.bloomberg.com/news/articles/2020-03-10/google-tells-all-north-america-staff-to-work-from-home.

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