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Wisconsin
Economy

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Protest Dynamics: Evidence from Foot Traffic Data

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June 26, 2020

Abstract

Following the killing of George Floyd in Minneapolis on May 25, there have been substantial protests in many cities around the country, and indeed around the world. These protests have brought significant numbers of people into the streets to protest police brutality, racism, and structural inequality. In this brief I use foot traffic data to analyze the dynamics of the protests at different locations around the United States.

In both Minneapolis and Washington, DC, I find protests growing in scale to a peak, and diminishing thereafter. In Minneapolis, activity increased in the days following the killing, leading to a peak on May 28. Early on, activity increased most at night, but later protests shifted to daytime. Since early June, overall activity has dropped substantially in the zip code in Minneapolis that was at the heart of the protests, likely due to sustained damage at area businesses. In Washington, protest activity around the White House started later, growing to a peak on June 6. Activity has declined since then, but remains elevated relative to April and May, and has spiked on weekends.

Overall, I find that the protests led to isolated spikes in activity at particular locations. But the protests did not substantially impact overall measures of activity in the metro areas where they took place. This was true in both Minneapolis and DC. In addition, in Wisconsin both Madison and Milwaukee were home to the largest protests in the state, but both lagged the rest of the state in activity. I do find a couple of isolated locations in Milwaukee and Madison where the foot traffic increases seem to correspond to protests, but these are isolated and do not impact the overall statistics for the metropolitan areas.

Overview

Following the killing of George Floyd in Minneapolis on May 25, there have been substantial protests in many cities around the country, and indeed around the world. These protests have brought significant numbers of people into the streets to protest racism, police brutality, and structural inequality. In this brief I use foot traffic data to analyze the dynamics of the protests at different locations around the United States.

In particular, I use anonymized data from GPS locations of cellphones to analyze visits to commercial locations adjacent to protests in different locations around the country. While in other work I have used this data to [measure economic activity](#), here I use this data to measure the timing and magnitude of protest activity. That is, the data records “visits” to locations when people pass nearby the commercial point of interest, whether people actually enter the location, and whether it is open or not.

For example, one of the locations I study is the Hay Adams hotel in Washington, DC. This hotel has been closed since March 20, but its location on Lafayette Square across from the White House means that it captures foot traffic from protestors who pass nearby. Using this foot traffic data, I show that the protests in Washington grew in size during the first week of June. Activity rose to a peak on June 6, diminishing thereafter but remaining elevated relative to April and May and spiking on weekends.

In addition, I analyze activity in Minneapolis in the days following the killing of George Floyd, with a particular focus on one zip code which was the epicenter of the initial wave of protests. Using hourly data, I show that in the early days of protests, activity increased most at night time, leading up to night of May 28 when a police station was burned and a nearby Target store was looted. Foot traffic at that Target store shows a spike on that night, then later dropping to roughly zero. The protests later in May were peaceful, and occurred during the daytime. Since the beginning of June, overall activity in that zip code has declined substantially, likely due to the damage local businesses sustained.

While the protests show up as additional foot traffic unrelated to regular economic activity in particular locations, there seems to be little evidence of protests significantly affecting overall foot traffic patterns. This is true for both Minneapolis and Washington, where the protests led to spikes in isolated locations, but had no measurable impact overall activity in the those cities. In addition, in Wisconsin both Madison and Milwaukee were home to the largest protests in the state, but both lagged the rest of the state in activity. I do find a couple of isolated locations in Milwaukee and Madison where the foot traffic increases seem to correspond to protests, but these are isolated cases and do not impact the overall statistics for the metropolitan areas.

Data Source

The foot traffic data in this brief was provided by SafeGraph, a data company that aggregates anonymized location data from numerous applications in order to provide insights about physical places. To enhance privacy, SafeGraph excludes census block group information if fewer than five devices visited an establishment in a month from a given census block group. In particular, I use the SafeGraph Patterns dataset, which

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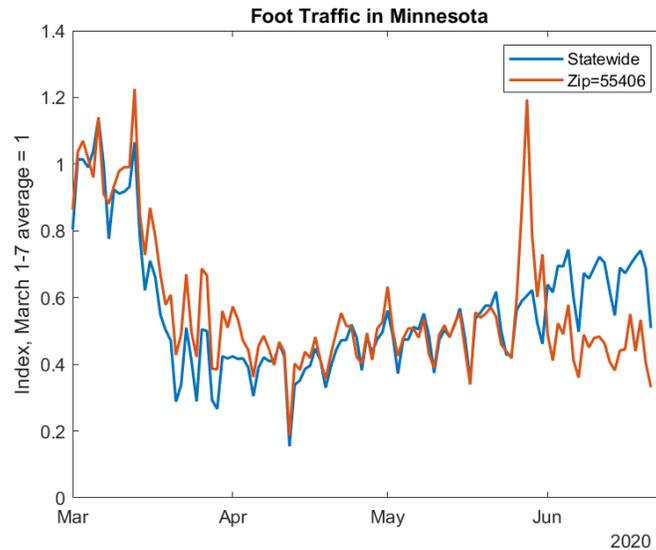


Figure 1: Relative same-location visits for locations in Minnesota and the 55406 zip code in Minneapolis.

measures foot-traffic patterns to 3.6 million commercial points-of-interest from over 45 million mobile devices in the United States. The population sample is a panel of opt-in, anonymized smartphone devices, and is well balanced across USA demographics and geographies. In addition to the individual data being anonymized, SafeGraph only reports certain place traffic and data aggregations. The patterns data describe how many people visit a location, how long they stay, where they came from, where else they go, and more. This data provides incredible detail on the activity of a sample of roughly 10% of the US population.

SafeGraph provides daily observations on an evolving panel of locations that include at least 5 visits from the sample of devices. The data is typically released monthly, but has been released weekly starting in March 2020 (which also includes hourly data). The most recent release covers foot traffic through June 21, 2020. To deal with changes in the panel over time, I focus on same-location changes in foot traffic. To make the absolute numbers more interpretable, I generally look at relative levels, with average foot traffic over the first week of March as the base.

Minneapolis

The killing of George Floyd by police in Minneapolis on May 25 sparked mass protests, which grew over time and spread across the country and around the world. In Minneapolis itself, the early wave of protests was centered on Lake Street in Minneapolis, not far from the location of Floyd's arrest and killing.

Figure 1 shows the overall foot traffic in Minnesota, as well as the zip code (55406) covering this section of Lake Street in Minneapolis. In particular, the figure plots the ratio of same-location visits each day relative to the first week of March. We see that from March until mid-May activity in the whole state and this particular zip code followed each other very closely. Both experienced a sharp drop with the onset of the COVID-19

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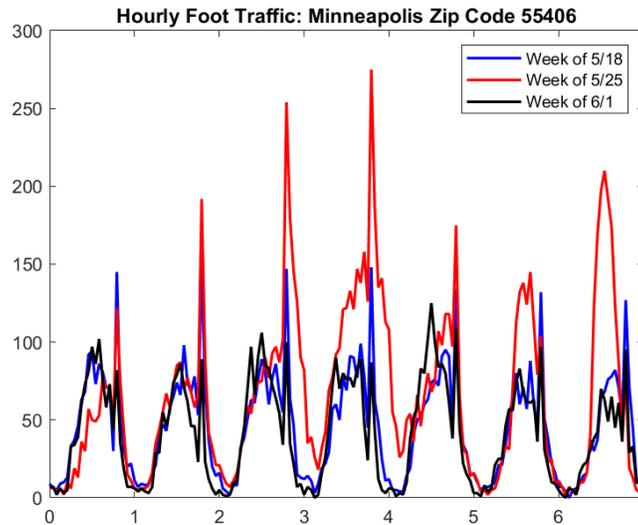


Figure 2: Hourly foot traffic in the Minneapolis 55406 zip code for select weeks.

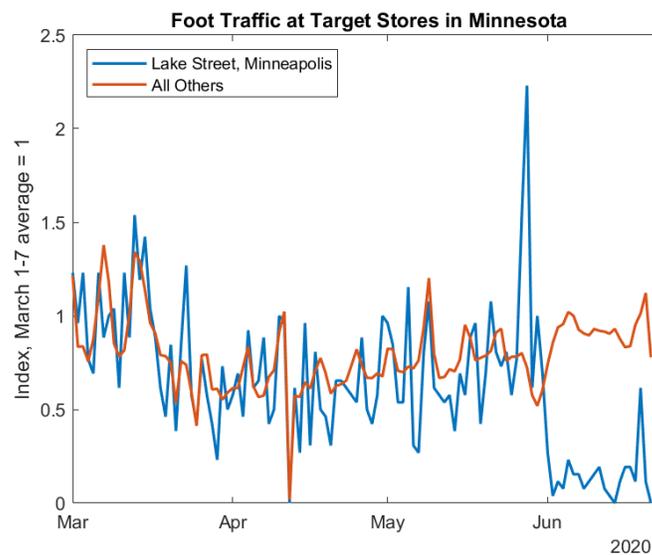


Figure 3: Relative same-location visits at the Lake Street Target in Minneapolis and other Target stores around the state

pandemic in mid-March, with activity dropping roughly 60% through April, before recovering slightly in early May. The spike in activity in this zip code with the protests during the last week of May is evident in the figure, as well as the subsequent decline during June. That is while the rest of the state of Minnesota experienced a rebound in economic activity, activity dropped in this section of Minneapolis. In particular, where activity had previously been roughly the same in the area as in the rest of the state, by mid-June there was a gap of roughly 25 percentage points. While overall activity in Minnesota had recovered to now be down only 30% since March, activity in the Minneapolis zip code was down 55%.

Figures 2 and 3 provide more detail about activity in the key area of Minneapolis during the protests. In particular, Figure 2 shows hourly data on visits to locations in the 55406 zip code in Minneapolis for three different weeks. Clearly the key week is the week of May 25, immediately following the killing of George Floyd. Activity starts increasing on May 26, and growing over the next couple of days to a spike on May 28. Activity was high throughout that whole day, but with a particularly notable increase during the night. This was also the peak date of the violence in Minneapolis, as on the night of May 28 a police station was burned and a nearby Target store was looted. Figure 3 shows the foot traffic at that Target store on Lake Street. The data shows a spike on the night of May 28, with activity later dropping to roughly zero in early June. Another spike in activity is notable on June 19, with activity commemorating Juneteenth.

Figure 2 also shows how the protests changed over time. After the night of May 28, the protests in that area later in May were peaceful, and occurred during the daytime. In particular, the spike in activity on May 31 happened around noon rather than the late night spikes early in the week. As we saw in Figure 1, overall activity in the area declined in June. For example, Figure 2 shows that activity the week starting June 1 had returned to roughly the same level as the week before the protests.

Washington, DC

Although the protests began in Minneapolis, they soon spread across the country and around the world. In Washington, DC, many of the protests have been centered at Lafayette Square across from the White House. Figure 4 shows the overall foot traffic in the District of Columbia, as well as the zip code (20006) covering the section of Northwest DC which includes the surrounding area. In particular, the figure plots the ratio of same-location visits each day relative to the first week of March. We see that both the whole district and this particular zip code experienced a sharp drop with the onset of the COVID-19 in mid-March. But the drop was more pronounced in this zip code, which contains a number of office buildings and other locations that have been largely empty as the city has been on lockdown.

However starting in late May, we see a surge in activity in this zip code, rising to a peak on June 6. Activity in the zip code fell thereafter, but has remained elevated relative to levels in April and early May. However note as well that there has been relatively little change in overall activity in the district since April. Washington, DC has had stricter lockdown policies and had a much slower reopening than most of the rest of the country. Through mid-June activity in DC was still down roughly 60% from the beginning of March. The spike in activity due to the protests appears to have been localized and in small enough scale that it has not altered overall activity levels in the district.

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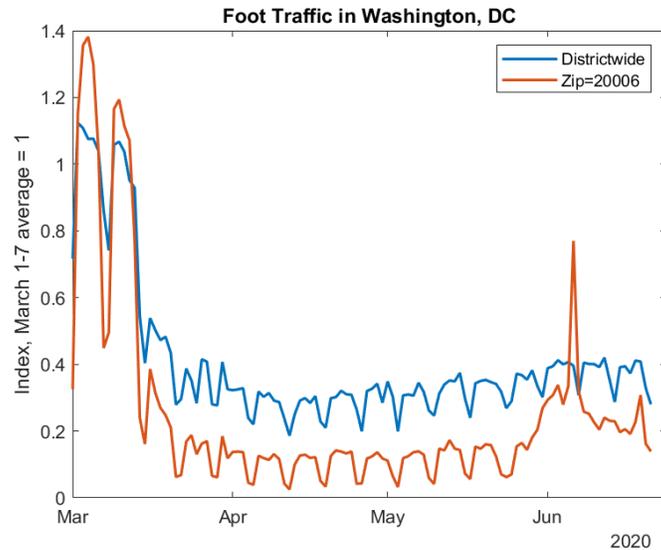


Figure 4: Relative same-location visits for locations in the District of Columbia and the 20006 zip code in Washington.

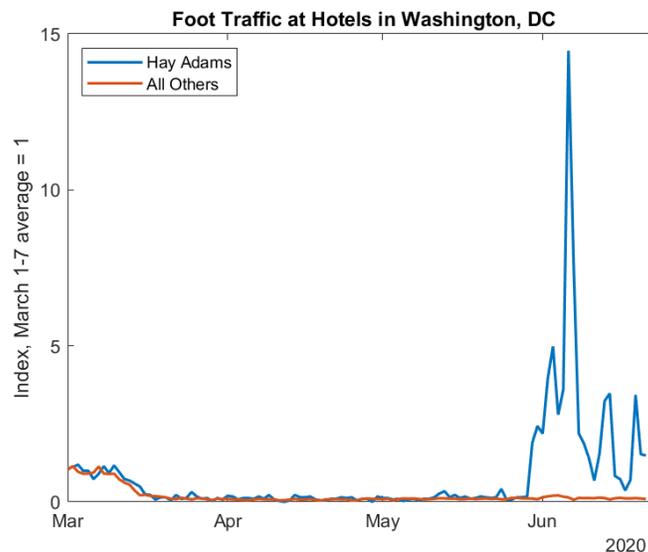


Figure 5: Relative same-location visits at the Hay Adams hotel in Washington and other hotels in the District of Columbia.

Figures 5 and 6 provide more detail about activity in the key area of Minneapolis during the protests. In particular, Figure 5 shows daily data on visits to one particular location very near the center of protest activity. The Hay Adams hotel in Washington closed due to the COVID-19 pandemic on March 20, and has remained closed. However its location on Lafayette Square across from the White House means that it captures foot traffic in the protests nearby. The figure shows that the protests grew in size during the first week of June. Activity rose to a peak on June 6, when activity was 100 times the previous week's level and nearly 15 times levels in early March. The data on visits to all other hotels in Washington in included for references. Activity at these hotels fell in min-April

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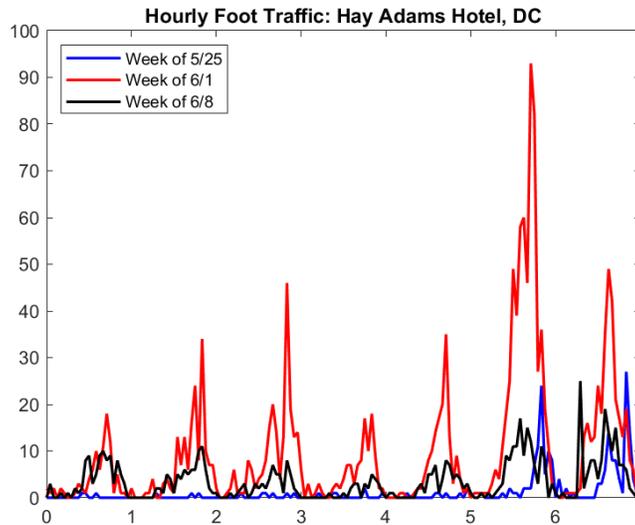


Figure 6: Hourly foot traffic at the Hay Adams hotel in Washington for select weeks.

and have remained very low. Protests in Lafayette Square diminished after June 6, but activity remained elevated relative to April and May, and protests have spiked on the weekends.

Figure 6 shows hourly data on visits to the Hay Adams for three different weeks. There we see protests growing in size during the week of June 1 up to the peak on the 6th. The protests were largely from mid-day until the evening, tapering off overnight into the early mornings. Activity on the week of June 8 was lower than the previous week, but protests on the weekends are visible as increased activity at the end of the week.

(Lack of) Impact of Protests on Aggregate Activity

Thus far we have seen substantial impact of protests on activity in insolated locations, but these were not large enough to impact on overall activity measures, or perhaps had offsetting decreases by reduced activity of those not protesting. This was clear in both Minneapolis and Washington, and we now illustrate the same impacts in Wisconsin.

In particular, Figure 7 shows the relative activity trends for the two largest metropolitan areas in Wisconsin -- Milwaukee and Madison -- as well as the remainder of the state. Both metro areas and the remainder of the state all show very similar overall trends, but with varying magnitudes of changes. The declines in total traffic were somewhat larger in these metro areas than in the state overall. The shutdown of UW-Madison and the absence of thousands of students drove an especially large decline in Madison, where traffic was down roughly 70% from late March through mid-April, before recovering later in the month into early May.

Moreover, following the Supreme Court decision which invalidated the statewide stay at home order, while much of the state went without any mandated restrictions, both

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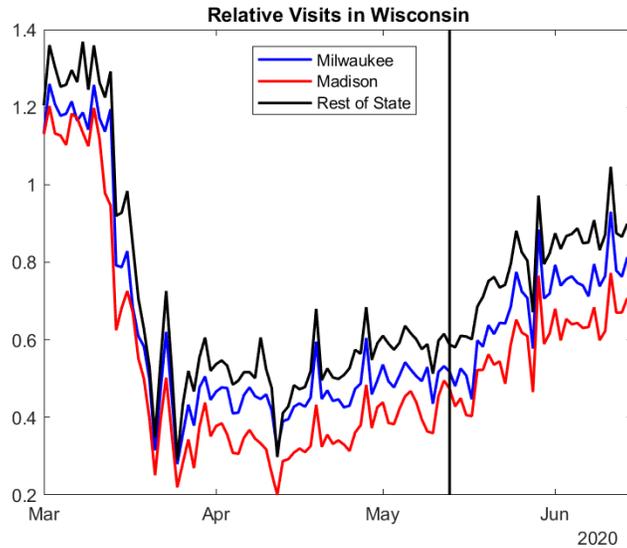


Figure 7: Relative same-location visits for Milwaukee MSA, Madison MSA, and the rest of the state.

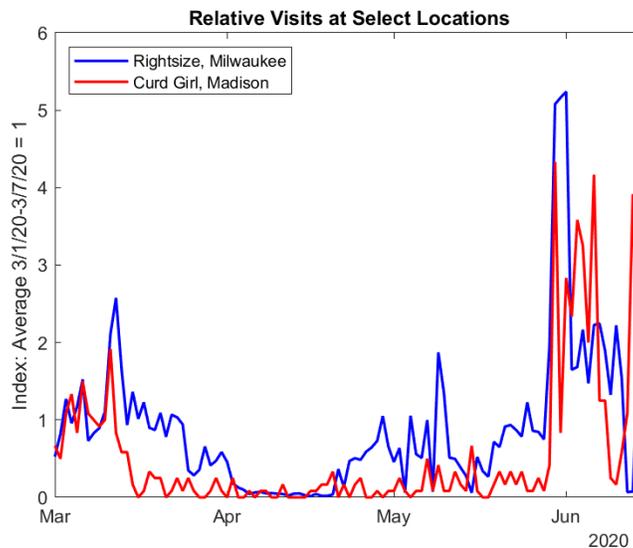


Figure 8: Relative visits at locations in Milwaukee and Madison near protest activity.

Milwaukee County and Dane County imposed county-level orders that kept much of the statewide order in place. Both metro areas have eased restrictions recently, but under their slower reopening plans significant restrictions remain (particularly in Dane County). Thus while both metro areas have recovered, they have done so at a slower rate than the rest of the state, and the gap in activity to the rest of the state has widened. In particular, since May 13, Madison has seen a recovery of 15 percentage points and Milwaukee 24 percentage points, while the recovery in the rest of the state has been 28 percentage points.

Both metro areas, like many cities around the country and indeed the world, have seen significant protest activity over the weeks following the killing of George Floyd in

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Minneapolis on May 25. These protests have brought significant numbers of people into the streets, and as we have seen elsewhere, give rise to additional foot traffic unrelated to regular economic activity. However there seems to be little evidence that the protest showed up significantly in the metro area data in Wisconsin.

By looking into the individual location data around the locations of most protest activity, I did find a couple of isolated locations in Milwaukee and Madison where the foot traffic increases seem to correspond to protests. Two examples are shown in Figure 8: Rightsize Facility, a furniture service company in downtown Milwaukee, and Curd Girl, a food cart near Capitol Square in Madison. The figure shows the daily visits for each location, indexed to the average during the first week of March. (Each location had one anomalous data point during the sample, which I replaced with an average on surrounding days. This did not affect the comparison.) Both locations show significant spikes in activity starting on May 30 that correspond to large protests which took place in their areas. However these are isolated cases, and I did not find any similar spikes even at locations in the same vicinity. Thus the protests do not seem to impact the overall economic activity statistics for the metro area, let alone for the state.