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DISCUSSION PAPER SERIES

IZA DP No. 13278

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ABSTRACT

COVID-19 Lockdowns and Decline in Traffic Related Deaths and Injuries*

This paper investigates the decline in traffic accidents, fatalities and injuries during the months that COVID-19 stay-at-home orders implemented in Turkey. Taking into account the decline in accidents in March and April together, these rates roughly translate to 200 traffic related deaths and 17,600 injuries avoided during the months that stay-at-home orders were in place. The Difference in Difference estimates that exploit variation in quarantine orders among small cities, I also show that stricter rules in April are responsible for the decline of accidents with death or injury by 35 percent, death by 72 percent and injuries by 19 percent.

JEL Classification: P48, Q53, Q58

Keywords: COVID-19, safer-at-home, lockdowns, traffic accidents, fatality, injury, Turkey

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Introduction

The decline in traffic accidents during COVID-19 lockdowns have been noted across the world in academic articles (see among others for Spain (Aloi et al 2020) , Brazil (Statista, 2020), India (Sarla, 2020), the US (Brodeur et al, 2020; Shilling and Watjen, 2020)), and in the media. In addition to decreasing the number of fatalities and injuries directly, the decline in traffic accidents also indirectly helped hospitals cope with the pandemic more effectively by freeing up resources. Chilet et al (2020) found that in Chile, the decline in mobility had a significant impact on non-respiratory emergency room visits, especially for visits related to trauma that could be traffic related. Moreover, given that up to 3% of developing countries' GDP is spent on emergency response and health care due to traffic accidents (WHO, 2018), in addition to productivity gain due to missing disabilities and loss of life, the decline in traffic accidents will make available much needed financial resources that can be allocated to fight post-pandemic recessions[1].

In this paper, I quantify the decline in traffic accidents, fatalities and injuries in Turkey using city-level accident reports from December 2018 to April 2020, and monthly country-level reports since January 2013. In response to a sharp increase in COVID-19 cases, Turkey imposed very strict stay-at-home orders since the middle of March which, among other measures, include travel restrictions, school and non-essential service closures, permanent quarantine for under 20 and over 65 year olds and individuals with co-morbidities, and curfews on weekends that apply to everyone in 31 cities. The decline in mobility in Turkey, especially in Istanbul, one of the most traffic-congested cities in the world (ranked 9 out of 416[2]), has been comparable to regions with severe outbreaks.

According to results using the entire sample of cities, the incidence rate of accidents that involve death or injuries, and accidents with material loss are estimated to have declined by 60 and 46 percent respectively in April. The average estimated decrease in incidence rates of injuries and deaths in April was 43 and 65 percent respectively. Taking into account the decline in accidents in March and April together, these rates roughly translate to 200 traffic related deaths and 17,600 injuries avoided during the months that stay-at-home orders were in place. The Difference in Difference estimates that exploit variation in quarantine orders among small cities, I also show that stricter rules in April are responsible for the decline of accidents with death or injury by 35 percent, death by 72 percent and injuries by 19 percent.

Brief Chronology of COVID-19 measures in Turkey

After the first case of COVID-19 infection was announced on March 11, the Turkish government implemented a series of measures restricting mobility. On March 12, all schools including universities seized operation. Shortly after, bars, night clubs, museums and picnic areas closed down, various sports leagues were suspended. On March 21, a curfew was imposed on persons

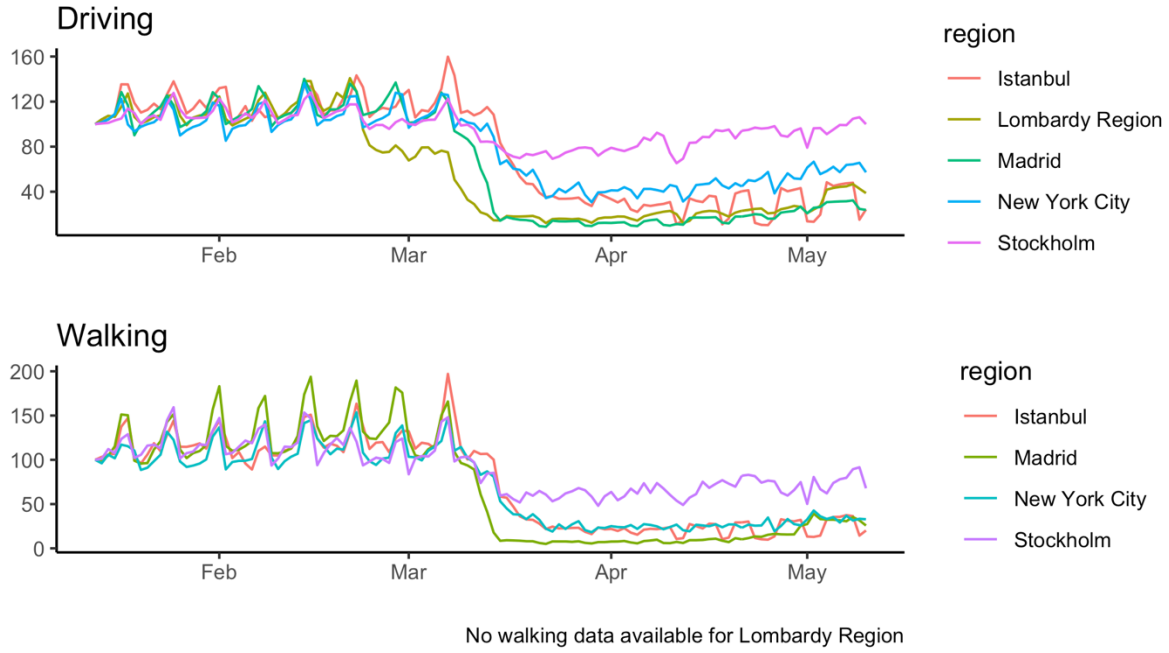
[1] For, the US, Brodeur et al estimate that benefits from avoided traffic accidents range from $7 billion to $24 billion.
[2] Other Turkish cities in global congestion rankings include Ankara (ranked 100), Izmir (133), Antalya (144), Adana (181), Bursa (208), Gaziantep (236), Mersin (246), Konya (329). For congestion rankings see: https://www.tomtom.com/en_gb/traffic-index/ranking/

age 65 and older and persons with chronic illnesses. Also, non-essential services such as hairdressers, barbershops and beauty salons were closed. Since March 27, individuals require travel permission for intercity bus travels. On March 30, the number of taxis allowed in traffic was limited. On April 3, the interior ministry quarantined 30 metropolitan cities and the city of Zonguldak. A curfew imposed on persons younger than 20 in the quarantined cities in addition to the curfew on persons 65 and older that was already in place[3]. On April 10, a 48 hours curfew imposed on everyone. Curfews were periodically re-introduced since then.

These rules have had a profound impact on the mobility patterns throughout the country. The rate of driving and walking dropped sharply in Istanbul, almost at a comparable magnitude to international regions with severe outbreaks such as Lombardy Region in Italy, New York City and Madrid (see Figure 1).

Figure 1: Mobility Trends

Data : Apple Mobility Trends



[3] For a more extensive coverage of COVID-19 measures see : https://www.duvarenglish.com/health-2/coronavirus/2020/04/09/ankara-vs-covid-19-chronology-of-turkeys-coronavirus-battle/

Data

Two data sources were used for the analysis that is presented in the next section. The first is the summary reports from the Ministry of Transport and Infrastructure (MTI) which provide monthly data on all accidents, fatalities and injuries starting from 2013 for the whole country[4]. The second data source is the monthly city-level traffic accident reports published on the Turkish General Directorate of Security's (TGS) website from December 2018 to April 2020[5]. The information included at the city level are city and month of the accidents, number of accidents broken down by type (accident with death or injury, accident with material loss), number of deaths and number of injured. Further details such as who was at fault (driver, pedestrian, vehicle, road), number of vehicles involved in the accident, type of crash…etc are also available, however, this information is provided for the whole country, not for individual cities. Reports do not include demographic information. Note that city-level reports only record deaths that occurred at the scene of the accident, while MTI reports include fatalities both at and after crash since 2015.

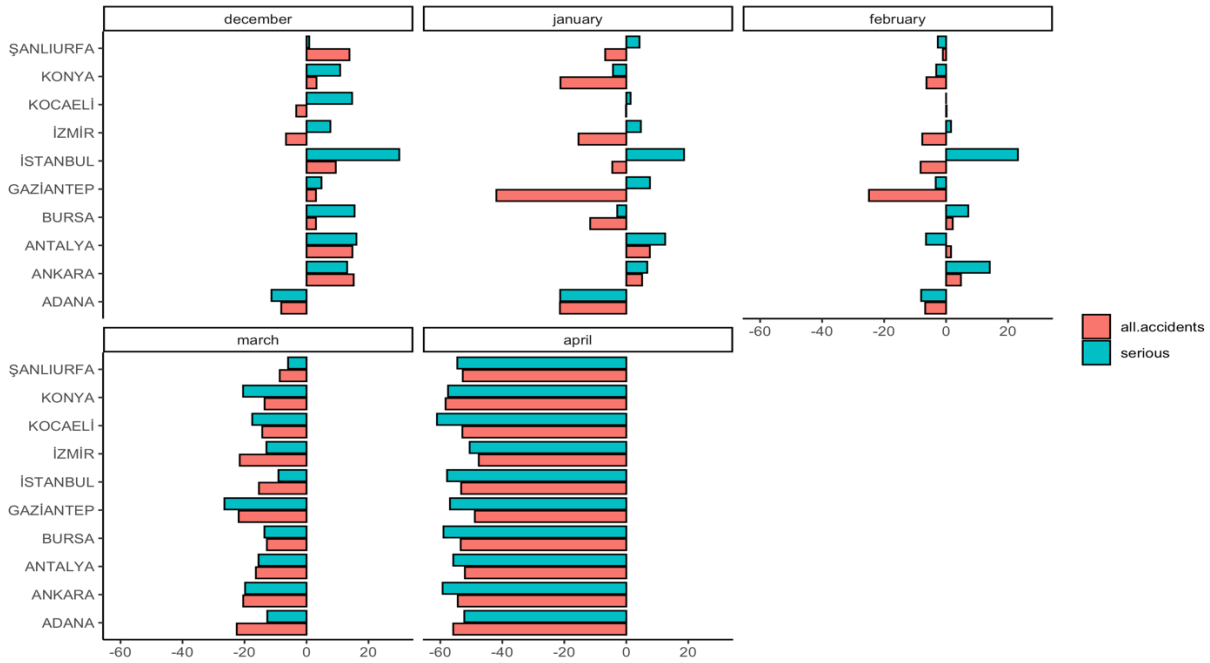
In 2019, 174,590 accidents with deaths or injuries occurred in Turkey where 285,638 people were injured, and 2524 people died at the crash scene which reflects only half of the fatalities that usually occur within 30 days of a crash. The per-city average for each month between December 2018 and February 2020 was 2.3 deaths at the crash scene and 260 injuries. There have been on average 150 accidents with deaths and/or injuries per city in a month and 232 accidents with material loss (see Table 1). These numbers dramatically declined during the lockdowns. Percentage change in all traffic accidents and accidents that involve injury or death compared to the previous year is reported in Figure 2 for the 10 most populous cities in Turkey. There is a sharp contrast between months where stay-at-home orders were in effect and months preceding them. Especially, the sudden drop in April, the first full month that the lockdown measures were in effect, is striking. Also, the effect has been more pronounced the more the city was congested (see Figure 3).

[4] Reports are downloaded from: Turkish Statistical Institute's Official Statistics Portal http://www.resmiistatistik.gov.tr/. Report for 2018 can be downloaded from MTI's website https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Trafik/TrafikKazalariOzeti.aspx

[5] Reports in PDF format for 2020 can be downloaded from following link http://trafik.gov.tr/istatistikler37. All past reports and full data used in the paper in csv format are available from the Author.

Figure 2: % Change in Traffic Accidents (Compared to Same Month Previous Year)

10 most populous city in Turkey

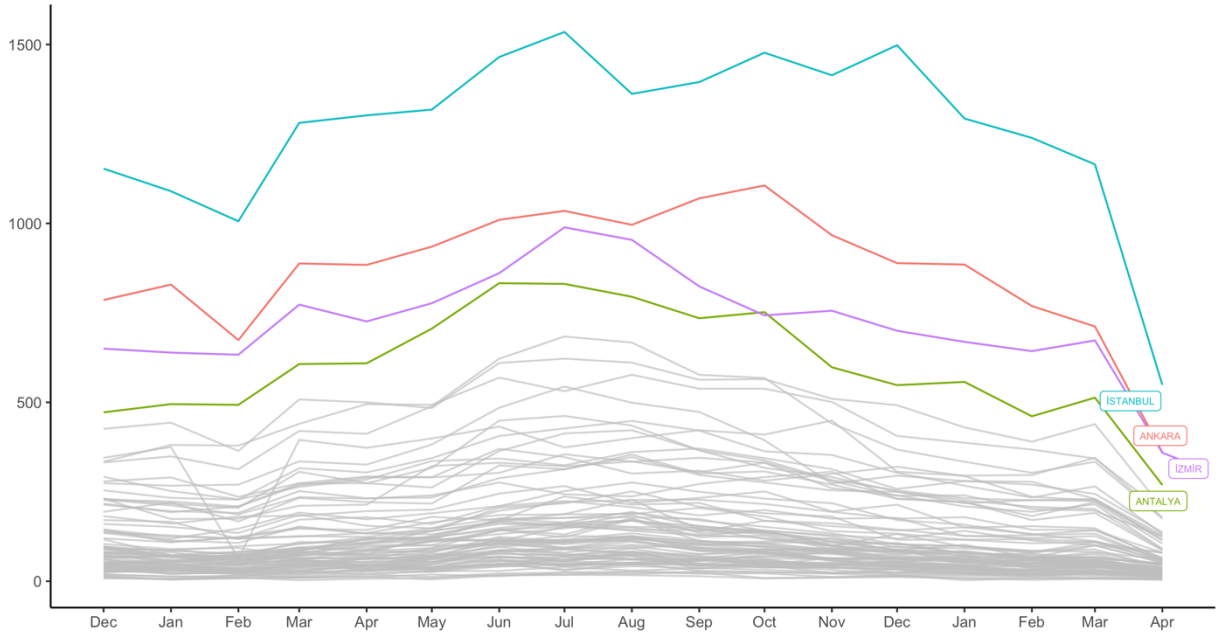


Data: Emniyet Genel Mudurlugu, Trafik Baskanligi

Note:Serious accidents involve death or injury.

Figure 3: Traffic Accidents with Death or Injury

Sample: All Cities: Dec 2018- Apr 2020



Data Source: Emniyet Genel Mudurlugu, Trafik Baskanligi. Highlighed are top 4 Turkish cities from Global Congestion Rankings

Methodology

The simple model that describes the city level accident outcomes for city i at month m can be characterised as follows:

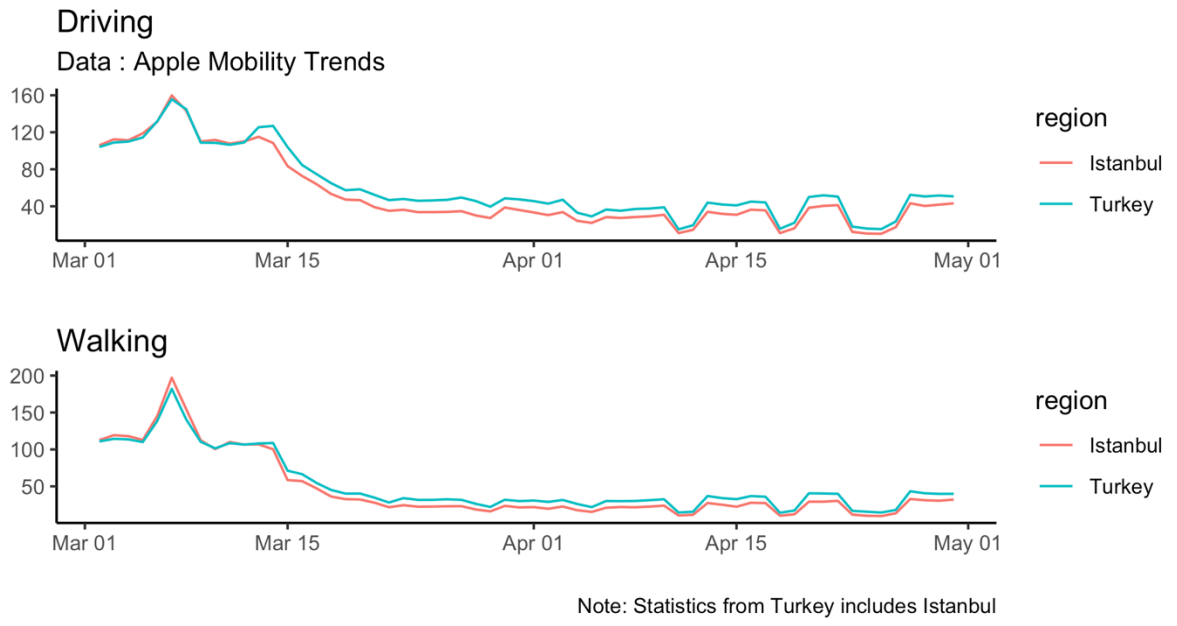
$$y_{im} = \beta_1 SocialDis_m + \alpha_i + \lambda_m + \lambda_y + \epsilon_{im}$$

where y_{im} is one of the following city level outcomes: number of accidents with death or injury, number of accidents with material loss, number of deaths, and number of injuries. $SocialDis_m$ identifies months that social distancing rules were in effect (individual dummies for March and April 2020), $\alpha_i, \lambda_m, \lambda_y$ are city, month and year fixed effects respectively.

Note that there has been no city level variation in the timing of initial stay-at-home rules[6]. However, a quarantine was imposed on only 31 cities in April. According to Apple Mobility data, declines in driving and walking in Istanbul (one of the quarantined cities) was more than the decline for the whole country (see Figure 3).

Figure 3: Mobility Trends : Turkey vs Istanbul

Data : Apple Mobility Trends



Note: Statistics from Turkey includes Istanbul

Note: Statistics from Turkey includes Istanbul

One can exploit this variation in policies to identify the impact of stricter measures by estimating a model with interaction for quarantined cities as in Brodeur et al (2020). However, 30 out of 31 cities that were quarantined are metropolitan municipalities. Since metropolitan city designation is primarily a function of the population (more than 750,000) and given that metropolitan

[6] City level variation in implementation of the measures is likely but is not observable, this variation is partly captured by city and month fixed effects.

municipalities are allocated more financial and administrative resources, they may not be directly comparable to other cities in terms of pre-pandemic traffic congestion or in their ability to enforce stay-at-home orders during the pandemic.

The only city that was in quarantine during April that is not a metropolitan municipality is Zonguldak. The reason behind Zonguldak's quarantine was not the population size but its high prevalence of respiratory illnesses (Zonguldak is a major coal producer). Zonguldak has a population of around 500,000 and is more likely to be a representative of non-metropolitan cities in the sample. Using this variation, it is possible to obtain a more accurate picture of the effect of the quarantine. I restrict the sample to only non-Metropolitan cities and estimate a Diff-in-Diff model with the interaction for Zonguldak for the month of April.

Results

Here, I focus only on the city level estimates that use data from December 2018 onwards. The country-level estimates that use a longer time period are reported in the Appendix. All models are estimated using Poisson models, coefficients presented in the tables are incidence rate-ratios (a value below one means a decrease in the incidence of the outcome variable).

According to Table 2, in March and April 2020, traffic accidents with death or injury declined approximately by 20 percent and 60 percent respectively, compared to the same months last year. The decline in accidents with material loss are 13 and 46 percent. This resulted in a decline in reported injuries by 13 and 75 percent. The decline in deaths at crash scenes are only in April, by 15 percent, and it is imprecisely estimated.

Next, I focus on the Diff-in-Diff estimates that use the city of Zonguldak as the treated group and the rest of the non-metropolitan cities as the control group. According to the results in Table 3, the decrease that can be attributed to the stricter measures in April are approximately 35 percent in accidents with death or injury, 32 percent in accidents with material loss and 19 percent in injuries. There has not been a significant decline in deaths at the crash scene due to stricter measures.

Adjusted Deaths and Injuries

The estimated decline in traffic fatalities reported above most likely to underrepresent the actual decline in lives lost due to traffic accidents. Since city-level reports only record deaths at the crash scene, the fatalities should be adjusted to reflect the actual traffic accident deaths. According to the latest available statistics in MTI reports, in 2018, 3368 people died at the scene of the accident while 3307 died within 30 days due to injuries caused by the accidents. Therefore, the actual number of deaths is likely to be twice the numbers that are available in the monthly reports. One possibility to adjust the fatalities is to re-classify a portion of the reported injuries as death. Using hospital-level administrative data from Turkey, Demiral et al. (2010) estimate that 3.9% of individuals who were admitted to hospitals with traffic injuries die within 30 days. This, however most likely not to reflect the fatality rate for all injured since only severe cases would be admitted to the hospital. Another possibility, which I implement for the country-level regressions, is to use

the ratio of all fatalities to fatalities at the crash scene to calculate an *adjustment ratio*. These statics are available in MTI reports since 2015 which gives a median adjustment rate of 2.02[7].

For the city-level analysis, I adjusted both fatalities and injuries. Comparing the total of monthly injuries for 2018 from the city level reports (310,109) which does not take into account post-crash deaths and one that does from MTI for the same year (307,071), I chose a post-crash fatality rate for injured as 1% and increased(decreased) monthly deaths(injuries) by 1%[8].

The estimated results for adjusted deaths and injuries for the whole sample and the smaller Diff-in-Diff sample are reported in Table 4. The estimated decline in traffic accident-related deaths is 43 percent in April, and the estimated decline in injuries is around 65 percent. According to Diff-in-Diff results, deaths decline by 72 percent due to stricter measures, and injuries by 19 percent.

Check for Pre-Trend

I re-estimate the models by including indicators for months from December 2019 to April 2020, the results are presented in Table 5 for the whole sample and in Table 6 for the Diff-in-Diff sample. According to results, the traffic accident outcomes were slightly higher compare previous year until the stay-at-home rules were implemented.

Discussion

Every year 1.35 million people die and up to 50 million are injured in traffic accidents. 90% of these losses occur in low- and middle-income countries (WHO, 2018; Puvanachandra et al. 2012). High population density and road congestion are major factors (Ashraf et al. (2019); Golob and Recker (2003); Jones et al. (2003)). In 2019, 174.590 accidents with deaths or injuries happened in Turkey where 285,638 people were injured, and 2524 people died at the crash scene which reflects only half of the fatalities that occur within 30 days of a crash. In addition to the unmeasurable personal loss to the individuals and their families, these traffic accidents take an immense toll on the economy in terms of cost of emergency response, health care and loss of productivity.

This paper examines the decline in traffic accidents and related injuries and fatalities as a result of the stay-at-home rules that were introduced to fight rapidly increasing COVID-19 cases in Turkey. The results suggest that during April when the strictest measures were in place for the entire month, traffic accidents dropped approximately by 60 percent, deaths declined by 43 percent and injuries declined by 64 percent compared to April of last year. This is in addition to declines in March when relatively milder rules were in effect during half of the month. Applying these estimates to statistics from March and April 2019, the estimates imply that approximately 21,000 accidents, 17,6000 injuries and 200 deaths avoided in only one and a half months that the stay-at-home

[7] I simply compute ratio of total fatalities to fatalities at the crash scene for each month. The median is 2.02.

[8] Also, the number of individuals who died after the crash is roughly one percent of the reported injuries. Note that this is roughly equivalent to using the *adjustment rate*.

policies were in place[9], more than half of these individuals who had otherwise died or injured are likely to have been between 24 and 64 year old (see Table 8 in Appendix). In contrast, there were 3174 official deaths attributed to COVID-19 between March 10 and April 30 in Turkey[10].

[9] Total accidents in March and April 2019 were 32,401 and 31,761 respectively. Adjusted number of deaths were 319 and 393, injuries were 20,102 and 20,552. I multiplied these numbers with the estimates from Table 2 and Table 4.

[10] See: https://covid19.saglik.gov.tr/

References:

Ashraf I, Hur S, Shafiq M, Park Y (2019) Catastrophic factors involved in road accidents: Underlying causes and descriptive analysis. PLoS ONE 14 (10)

Brodeur, Abel, Nikolai Cook, and Taylor Wright. *On the Effects of COVID-19 Safer-At-Home Policies on Social Distancing, Car Crashes and Pollution*. No. 13255. Institute of Labor Economics (IZA), 2020.

Demirel, B., Demircan, A., Akar, T., Keleş, A., & Bildik, F. (2010). Ülkemizde Trafik Kazalarında Ölenlerin Gerçek Sayısı Nedir?. *Pamukkale Tıp Dergisi*, (2), 70-76.

Fraser Shilling and David Waetjen. Special Report (Update): Impact of COVID19 Mitigation on Numbers and Costs of California Traffic Crashes. Available online: https://roadecology.ucdavis.edu/files/content/projects/COVID_CHIPs_Impacts_updated_415.pdf

Golob, Thomas F., and Wilfred W. Recker. "Relationships among urban freeway accidents, traffic flow, weather, and lighting conditions." Journal of transportation engineering 129.4 (2003): 342-353.

Jones, A. P., Haynes, R., Kennedy, V., Harvey, I. M., Jewell, T., & Lea, D. (2008). Geographical variations in mortality and morbidity from road traffic accidents in England and Wales. Health & place, 14(3), 519-535.

Naci, Huseyin, and Timothy D. Baker. "Productivity losses from road traffic deaths in Turkey." International Journal of Injury Control & Safety Promotion 15.1 (2008): 19-24.

Puvanachandra, P., Hoe, C., Özkan, T., & Lajunen, T. (2012). Burden of road traffic injuries in Turkey. Traffic injury prevention, 13(sup1), 64-75.

Sarla. G. COVID Dairies: An Indian Perspective. J Medical Research and Surgery 2020.1(3): 1-4.

Wesson, H. K., Boikhutso, N., Bachani, A. M., Hofman, K. J., & Hyder, A. A. (2014). The cost of injury and trauma care in low-and middle-income countries: a review of economic evidence. Health policy and planning, 29(6), 795-808.

World Health Organization. "Road Traffic Injuries". https://www.who.int/health-topics/road-safety#tab=tab_1

World Health Organization. *Global status report on road safety 2018*. World Health Organization, 2018.

Table 1: Summary Statistics of Accident Outcomes:
From Dec 2018 to February 2020

	mean	sd	min	max
Accidents w. Death/Injury	159.8562	208.2115	3	1535
Accidents w. Material Loss	232.358	515.2163	5	4367
Deaths	2.342048	2.93979	0	19
Injuries	259.2876	304.9861	5	2256
March 2020				
	mean	sd	min	max
Accidents w. Death/Injury	131.0494	179.2897	7	1165
Accidents w. Material Loss	202.7901	449.7379	6	3128
Deaths	1.802469	2.282651	0	9
Injuries	202.9259	250.1352	10	1593
April 2020				
	mean	sd	min	max
Accidents w. Death/Injury	68.81481	88.58712	4	549
Accidents w. Material Loss	118.9877	259.7534	7	1775
Deaths	1.753086	2.244609	0	10
Injuries	95.64198	116.8268	5	727

Table 2: Panel Poisson Models with City Fixed Effects

	(1) Accidents w. Death/Injury	(2) Accidents w. Material Loss	(3) Deaths	(4) Injuries
Mar-2020	0.786***	0.874***	1.086	0.778***
	(0.0128)	(0.0112)	(0.158)	(0.0101)
Apr-2020	0.407***	0.534***	0.856	0.359***
	(0.00763)	(0.00771)	(0.122)	(0.00552)
Observations	1377	1377	1377	1377

Exponentiated coefficients; Standard errors in parentheses
Models include month, year and city fixed effects
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Poisson Diff-in-Diff Estimates

	(1) Accidents w. Death/Injury	(2) Accidents w. Material Loss	(3) Deaths	(4) Injuries
Apr-2020	0.469***	0.605***	0.760	0.396***
	(0.0181)	(0.0217)	(0.183)	(0.0179)
Zonguldak	1.292***	1.359***	1.100	1.220***
	(0.0957)	(0.114)	(0.0968)	(0.0891)
Apr-2020 # Zonguldak	0.754***	0.684***	0.00000306***	0.812***
	(0.0216)	(0.0200)	(0.00000315)	(0.0303)
Constant	48.12***	78.24***	0.448***	90.19***
	(4.014)	(7.082)	(0.112)	(7.757)
Observations	867	867	867	867

Exponentiated coefficients; Standard errors in parentheses
Sample: non-metropolitan cities
Models include month, year fixed effects, Std Errors are clustered at city level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Panel Poisson Models with City Fixed Effects - Adjusted Death and Injury

	(1) Deaths	(2) Injured	(3) Deaths	(4) Injured
Mar-2020	0.902	0.778***	0.796	0.790***
	(0.0875)	(0.0102)	(0.117)	(0.0366)
Apr-2020	0.574***	0.359***	0.546***	0.365***
	(0.0587)	(0.00554)	(0.0854)	(0.0183)
Zonguldak			1.125	1.219***
			(0.0856)	(0.0886)
Mar-2020 # Zonguldak			1.742***	1.019
			(0.136)	(0.0326)
Apr-2020 # Zonguldak			0.286***	0.813***
			(0.0359)	(0.0307)
Constant			1.228	85.74***
			(0.170)	(7.409)
Observations	1377	1377	867	867

Exponentiated coefficients; Standard errors in parentheses

Models in columns 1 and 2 are estimated with Panel Poisson with city fixed effects and include month, year and city fixed effects. Models in (3) and (4) include month and year fixed effects and clustered standard errors at city level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Pre-Trend Poisson with Fixed Effects

	(1)	(2)	(3)	(4)
	Accidents w. Death/Injury	Accidents w. Material Loss	Deaths (Adjusted)	Injuries (Adjusted)
Dec-2019	1.100***	1.010	1.111	1.058***
	(0.0142)	(0.00988)	(0.0828)	(0.0109)
Jan-2020	1.070***	0.898***	0.901	1.067***
	(0.0143)	(0.00875)	(0.0715)	(0.0113)
Feb-2020	1.056***	1.025**	1.111	1.033***
	(0.0148)	(0.0109)	(0.0927)	(0.0116)
Mar-2020	0.836***	0.834***	0.897	0.818***
	(0.0110)	(0.00881)	(0.0701)	(0.00864)
Apr-2020	0.433***	0.510***	0.571***	0.377***
	(0.00695)	(0.00638)	(0.0483)	(0.00505)
Observations	1377	1377	1377	1377

Exponentiated coefficients; Standard errors in parentheses
Models include month, year and city fixed effects
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Pre-Trend Poisson Diff-in-Diff Estimates

	(1)	(2)	(3)	(4)
	Accidents w. Death/Injury	Accidents w. Material Loss	Deaths (Adjusted)	Injuries (Adjusted)
Dec-2019	1.056*	0.954	1.305**	1.017
	(0.0347)	(0.0359)	(0.140)	(0.0450)
Zonguldak	1.259***	1.340***	1.127	1.160**
	(0.0933)	(0.113)	(0.0852)	(0.0847)
Dec-2019 # Zonguldak	1.061**	1.163***	0.900	1.195***
	(0.0274)	(0.0264)	(0.0801)	(0.0392)
Feb-2020	0.973	1.146***	1.047	0.946
	(0.0284)	(0.0517)	(0.129)	(0.0385)
Feb-2020 # Zonguldak	1.178***	1.067*	0.693***	1.285***
	(0.0345)	(0.0353)	(0.0616)	(0.0486)
Jan-2020	1.104***	0.898***	1.108	1.135***
	(0.0316)	(0.0288)	(0.153)	(0.0366)
Jan-2020 # Zonguldak	1.214***	1.073***	1.372***	1.518***
	(0.0320)	(0.0234)	(0.128)	(0.0390)
Mar-2020	0.831***	0.876***	0.860	0.829***
	(0.0255)	(0.0412)	(0.0950)	(0.0348)
Mar-2020 # Zonguldak	1.094***	0.900***	1.739***	1.071**
	(0.0275)	(0.0237)	(0.142)	(0.0352)
Apr-2020	0.451***	0.583***	0.590***	0.384***
	(0.0155)	(0.0212)	(0.0872)	(0.0170)
Apr-2020 # Zonguldak	0.774***	0.694***	0.285***	0.854***
	(0.0219)	(0.0213)	(0.0360)	(0.0328)
Constant	47.41***	77.50***	1.570***	83.73***
	(3.534)	(5.931)	(0.160)	(6.257)
Observations	867	867	867	867

Exponentiated coefficients; Standard errors in parentheses
Sample: non-metropolitan cities
Models include month, year fixed effects, Std Errors are clustered at city level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

APPENDIX:

Table 7: Panel Poisson Models – Country Level Results

	(1)	(2)	(3)	(4)
	All Accidents	Injured	Deaths	Deaths (Adjusted)
Mar-2020	0.784***	0.817***	1.018	1.005
	(0.00647)	(0.00820)	(0.110)	(0.0788)
Apr-2020	0.404***	0.343***	0.896	0.831**
	(0.00396)	(0.00444)	(0.0978)	(0.0653)
Constant	10830.3***	16986.8***	219.5***	428.1***
	(41.20)	(55.18)	(6.590)	(11.04)
Observations	88	88	88	52

Exponentiated coefficients; Standard errors in parentheses. Adjusted deaths estimates use data from 2015 onwards. Adjustment was applied to years 2019 and 2020 where number of deaths after the crash is not available.
Models include month, year fixed effects
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Traffic Accident Deaths and Injuries by Age Groups

	Age groups							
	0 - 9		**10 - 14**		**15 - 17**		**18 - 20**	
Year	Killed persons	Injured persons	Killed persons	Injured persons	Killed persons	Injured persons	Killed persons	Injured persons
2013	202	19 303	95	13 405	116	15 599	187	23 540
2014	181	20 920	97	14 083	113	16 847	195	25 253
2015	387	22 738	186	14 585	291	17 875	436	27 191
2016	339	22 530	159	14 320	262	17 709	424	26 615
2017	331	22 342	175	14 634	281	16 894	388	25 247
2018	309	23 765	156	15 524	200	16 322	369	25 995

	Age groups							
	21 - 24		**25 - 64**		**65 +**		Unknown	
Year	Killed persons	Injured persons	Killed persons	Injured persons	Killed persons	Injured persons	Killed persons	Injured persons
2013	224	29 031	2 354	157 301	488	15 060	19	1 590
2014	274	31 193	2 189	159 177	452	16 585	23	1 001
2015	522	34 059	4 205	169 498	1 474	17 656	29	819
2016	492	33 081	4 212	170 300	1 365	18 411	47	846
2017	533	32 264	4 266	169 375	1 272	17 898	181	1 729
2018	490	32 515	3 771	172 077	1 349	20 031	31	842

Source: General Directorate of Public Security and General Command of Gendarmerie

Note: Table was retrieved from Turkish Statistical Institute Website