ERF Working Papers Series

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ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية

Working Paper No. 1443
December 2020

IT TAKES A CURFEW: THE EFFECT OF COVID-19 ON FEMALE HOMICIDES[1]

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We thank Ahmet Kurnaz for helping us in collecting homicide data, Evrim Kepenek, the editor of Bianet Male Violence Monitoring Report for explaining the data, Cevat Giray Aksoy, Bilge Erten and Ana Maria Oviedo for valuable comments and Tuna Kosekoglu for research assistance. We would like to acknowledge that any errors are our own and Bianet can not be held accountable for the findings based on its data.

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[1] The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

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First published in 2020 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

Gender-based violence is a global phenomenon threatening women irrespective of race, nationality, education or socio-economic status. Evidence shows that domestic violence help calls have been increasing in many countries during the Covid-19 pandemic, but the effect on female homicides, this extreme form of violence, is not clear. In this study, we analyze the effects of social distancing measures and in particular the impact of curfews on female homicides in Turkey where domestic violence and female homicides are on the rise, causing public uproar. We find that the probability that a woman is killed by an intimate partner declined by about 57 percent during the period of strict social distancing measures, and by 83.8 percent during curfews in comparison to the same period between 2014 and 2019. We do not find any impact on female homicides by other perpetrator types. We argue that the main reason driving the decline in female homicides is the physical inability of ex-partners to reach victims due to isolation measures, although homicides by current partners have also declined during curfews. Fewer women leaving current partners due to economic hardships and fear of infection as well as increased probability of getting caught -especially during curfews might have also played a role in deterring deadly crimes against women.

Keywords: Covid-19, female homicide, pandemic, violence against women, gender inequalities.
JEL Classifications: J12, I18.

1 Introduction

Gender-based violence is a global phenomenon threatening women irrespective of race, nationality, education, or socio-economic status. UN Women estimates that one in three women worldwide experiences physical and/or sexual violence at some point in their lives. According to the United Nations Office on Drugs and Crime (2018), a total of 87,000 women were intentionally killed in 2017, with about 60 percent by intimate partners or family members. Violence against women has significant economic costs in terms of decreased mental health and productivity, lost income, and expenditures on service provision. Violence against women also creates vicious cycles by normalizing violent behavior among younger generations, lowering human capital formation and trapping women into poverty and gender based inequalities.

There is emerging evidence that domestic violence against women and girls increased in several countries during the Covid-19 pandemic. Cases of domestic violence increased by over 25 percent in France, Singapore, Cyprus, and Argentina, with significant increases in other countries such as Canada, Germany, Spain, the UK (UNDP, 2020), and in U.S. (Leslie and Wilson, 2020). In this study, we analyze the effects of the Covid-19 pandemic and the social distancing measures on female homicides, the extreme form of gender-based violence, in Turkey. More specifically, we first explore how measures under Covid-19 affected female homicides in Turkey and then focus specifically on the impact of curfews.

How the pandemic might affect female homicides is still an open question as there are several opposing mechanisms at play. As in all other violence cases, fear of death, increased health risks and social isolation measures such as curfews may directly deteriorate the psychological well-being of the individuals and trigger depression (Van Gelder et al., 2020), increasing the probability of violence against women during the pandemic.[1] Second, job losses and associated economic stress can trigger anxiety, at times change intra-household bargaining power of couples and may increase or reduce domestic violence and female homicides, depending on who becomes the main breadwinner in line with male-backlash and instrumental theories of violence (Erten and Keskin, 2020; Aizer, 2010; Macmillan and Gartner, 1999). Finally, the extended time

[1] Altindag et al. (2020) show that individuals who were aged 65 or older and were subject to mandatory lockdowns in Turkey experienced substantially worse mental health outcomes compared to individuals just below the 65 age threshold and were not subject to mandatory lock down.

spent with a partner at home might trigger conflict and increase the probability of homicide by unstable partners. And worse, women might find it more difficult to leave current partners due to the economic downturn and fear of infection, despite the fact that they might be subject to increased domestic violence.

While the channels mentioned above could lead to an increase in female homicides, other channels might tend to reduce it. First, curfews and social distancing measures related to the pandemic may reduce female homicides simply due to the inability to reach victims. This channel might particularly affect female homicides in which the perpetrator resides outside the household, e.g., an ex-partner. Second, decreased mobility during this period and the associated police stops and identity checks could dissuade potential perpetrators by increasing the probability of getting caught - a fear that would apply to perpetrators in and outside of the household alike, and particularly for more severe crimes with heavy sentences. Using variation in the intensity of government-mandated lockdowns in India, Ravindran and Shah (2020) show that while domestic violence complaints increased by 0.47 standard deviations in districts with the strictest lockdown rules, rape, and sexual assault complaints decreased by 0.4 standard deviations during the same period. Bullinger et al. (2020) find that total calls for police decreased due to the stay-at-home orders in Chicago, except for domestic violence calls. Qualitative evidence from Turkey for the pre-Covid-19 period supports the *inability to reach* channel: a recent report by the Turkish Police Academy suggests that ex-partner jealousy and conflict over children among separated/divorced couples impose the greatest risk for women and highlight the fact that a non-negligible part of homicides by ex-partners take place on days when men arrive to see the children (Taştan and Küçüker Yıldız, 2019).

Turkey has the highest intimate partner violence and female homicide rates across all OECD members (OECD, 2019). In 2019 alone, a total of 474 women were killed. While high homicide rates in Turkey has stirred public outrage,[2] lack of publicly available judicial or police data on violence help calls and female homicides make it difficult to study the subject. In this study, we solve this problem by collecting news coverage of female homicides: We use the daily news database specifically dedicated to male violence against women in Turkey, called the "Bianet

[2] https://www.theguardian.com/world/2020/jul/23/turkey-outrage-rising-violence-against-women Last accessed on 17 September 2020.

Male Violence Monitoring Portal". A particular concern over using news data is the potential underreporting problems. While this is certainly a concern for crimes such as sexual or physical abuse, female homicide is a criminal category that is far less likely to go underreported. Several women's associations and NGOs are closely monitoring violence against women and advocate for commitment to international conventions, such as the Council of Europe Convention on preventing and combating violence against women and domestic violence, also known as the Istanbul Convention. While self-reported domestic violence incidences can be subject to potential measurement errors, as they may reflect changing reporting patterns especially during major shocks, female homicides are much less prone to underreporting problems or change in reporting patterns during the pandemic.[3] Information on female homicides is more readily accessible through news outlets and social media as it causes public outrage and hence is harder to hide.

We use difference-in-differences and event-study methods to compare daily female homicides before and after social distancing began, relative to trends during the same period between January 1, 2014 and July 31, 2019. We document that compared to the trends in previous years, the overall homicide probability declined in the largest metropolitan cities between April and May 2020, when social distancing measures were implemented rigorously, but increased afterwards when the measures were relaxed. We find that the main reason behind the decline in the overall homicide probability was the sharp reduction in murders committed by intimate partners -*ex or current*-, especially during curfews. Our results suggest that the *overall* probability that a woman is killed on a given day declined by about 34.6 percent and the probability that a woman is killed by *an intimate partner* declined by a staggering 83.8 percent, compared to the same dates in previous years in the cities which were subject to regular curfews. We show, in contrast, that there was no decline in female homicides in cities where mobility declined the least. We also find no impact on female homicides perpetrated by male family members (other than intimate partners) and homicides perpetrated by other men. These last two results further reinforce our belief that our results are not driven by underreporting of female homicides during the pandemic, because if this were the case, we would expect that female homicides by other

[3]Even if some female homicides are underreported, our estimations are consistent as long as underreporting is not systematic across regions.

perpetrator types and/or homicides in other cities with higher mobility would also decline.

Our results contribute to the literature on the impact of the Covid-19 pandemic and social distancing measures and highlight the unsettling fact that it is the physical inability to reach women, rather than the legal mechanisms that prevent violence against women at risk during the pandemic. This finding indicates that the current legislative framework or its implementation cannot effectively prevent female homicides, and it is only when perpetrators, - especially ex-partners- are physically unable to reach women that there is a significant decrease in homicides. The experience in Covid-19 pandemic once again points to the need to reinforce an adequate monitoring and preventive mechanisms, including the strict enforcement of international best practices on preventing and combating violence against women and domestic violence.

2 Timeline of mobility-restricting measures in Turkey during the Covid-19 outbreak

The first official Covid-19 case was reported on March 11, 2020 in Turkey, and the first Covid-19-related death was recorded on March 17, 2020. As the total number of cases increased to 690 and total deaths to 9, on March 21, the government imposed lockdowns on individuals aged 65 and older and on those with chronic health conditions. Starting from March 23, the government introduced remote work arrangements for all employees of public institutions and distance learning for all educational facilities from primary schools to universities.

While the measures above were implemented to limit mobility, for the remaining residents, the government initially advised self-imposed social distancing measures without forcing curfews. However, as the infection rates continued to escalate, a series of curfews on weekends and on national holidays were announced for metropolitan cities depending on the number of Covid-19 cases. The first weekend curfew was enforced for the weekend between April 11 to 12 for all 30 metropolitan cities of Turkey and in Zonguldak[4], followed by a series of curfews in the following weekends and long weekends connecting national holidays. The next curfew

[4]These metropolitan cities are Adana, Ankara, Antalya, Aydın, Balıkesir, Bursa, Denizli, Diyarbakır, Erzurum, Eskişehir, Gaziantep, Hatay, İstanbul, İzmir, Kahramanmaraş, Kayseri, Kocaeli, Konya, Malatya, Manisa, Mardin, Mersin, Muğla, Ordu, Sakarya, Samsun, Şanlıurfa, Tekirdağ, Trabzon and Van. While Zonguldak is not a metropolitan city, it was consistently included in the curfew cities due to the severity of Covid-19 cases. For the ease of argument, we will include Zonguldak in our list of "metropolitan cities" for the remainder of the paper.

was implemented on the weekend of April 18 and 19, followed by another longer one on the national holiday connecting April 23, the National Children's day to next weekend until April 26, and later for the International Labor Day between May 1 to May 3. The weekend of May 9 to 10 was under curfew for 24 metropolitan cities[5], and the long weekend of May 16 to 19 due to the National Youth Day (May 19th) for 15 metropolitan cities[6]. There was a national curfew for all 81 cities of Turkey on the religious holiday between May 22 to May 26, followed by the weekend of May 30 to 31 for 15 metropolitan cities. Finally, the last curfew was on the weekend of June 27 to 28 for all 81 cities when the 2020 national university entrance exam took place. The fine for curfew offenders was set as 3,186 Turkish Liras, slightly above the monthly minimum wage of 2,943 Turkish Liras. According to the state news agency, the total amount of fines collected in the first curfew weekend during April 11-12 was around 8.4 million Turkish Liras.[7] Hence, it is plausible to assume that the curfews were implemented strictly and fines were heavy enough to deter mobility.

3 Data and Methodology

3.1 Data

We are not able to use official statistics or administrative data on domestic violence in Turkey, because real time or high-frequency data on domestic violence incidences and homicides are not publicly available. Official statistics are based on the National Survey on Domestic Violence against Women and are only available for two years; 2008 and 2014.[8] Existing judiciary statistics also do not include female homicides or domestic violence as a separate category and are not available at high frequency.

In the absence of these data sources, the most reliable alternative is to use the news data on female homicides. The database we rely on is called the "Male Violence Monitoring Portal",

[5] Adana, Ankara, Balıkesir, Bursa, Denizli, Diyarbakır, Eskişehir, Gaziantep, İstanbul, İzmir, Kahramanmaraş, Kayseri, Kocaeli, Konya, Manisa, Mardin, Ordu, Sakarya, Samsun, Şanlıurfa, Tekirdağ, Trabzon, Van, and Zonguldak.

[6] Ankara, Balıkesir, Bursa, Eskişehir, Gaziantep, İstanbul, İzmir, Kayseri, Kocaeli, Konya, Manisa, Sakarya, Samsun, Van, Zonguldak.

[7] https://www.aa.com.tr/tr/koronavirus/istanbulda-sokaga-cikma-yasagi-denetimlerinde-8-milyon-406-bin-lira-ceza-kesildi/1802127 Last accessed October 10, 2020.

[8] These micro-surveys are used in recent research addressing several important questions such as the relationship between domestic violence and education (Erten and Keskin, 2018; Gulesci et al., 2020), economic empowerment (Dildar, 2020; Yilmaz, 2018), Syrian refugee flows((Erten and Keskin, 2020), and impact of panic buttons (Tumen and Ulucan, 2019).

maintained by an independent media outlet called the Bianet.[9] This outlet collects data on female homicides, physical and sexual assault to women, and abuse of children from national and local press on a daily basis and fact-checks with the Turkish Bar Association and the General Directorate of Security. As explained in its website, the homicide database of the Male Violence Monitoring Report only covers women who lost their lives as a result of male violence and any violence cases or crimes that are not gender-based are excluded.

Information collected by Bianet includes date, location, and perpetrator tags. To obtain the dataset we use in this study, we text-mined all daily female homicide news in the website posted between January 1, 2014 and July 31, 2020.[10] Our final sample consists of a total of 1,951 female homicides across all 81 provinces of Turkey between 2014-2020. Of the 1,951 cases, 982 took place in the 15 metropolitan cities with 65.8 percent committed by an ex or current intimate partner, 19.2 percent committed by any male family member or relative who is not an intimate partner and the rest is by other men including unknown perpetrators. The unconditional probability of a homicide on a given day across 81 cities is 0.95 percent whereas the probability is 2.6 percent in the 15 metropolitan cities.

As explained in the previous section, Turkey implemented mobility reducing measures between March and June 2020, which correspond to weeks between week 10 and 21. Available data shows that these measures successfully reduced mobility in this period. Figure 1 shows the mobility trends in the first thirty weeks of 2020, across the four most populated cities of Turkey and in Turkey in general based on the Apple mobility data (Apple, 2020).[11] As the figure shows, mobility clearly declines after the first Covid-19 case in week 10 and remains mostly flat during the period of consecutive weekend curfews. Mobility starts increasing in week 21, when social distance measures and weekend curfews were lifted and increases above the levels recorded in January and February in the four most populated cities.

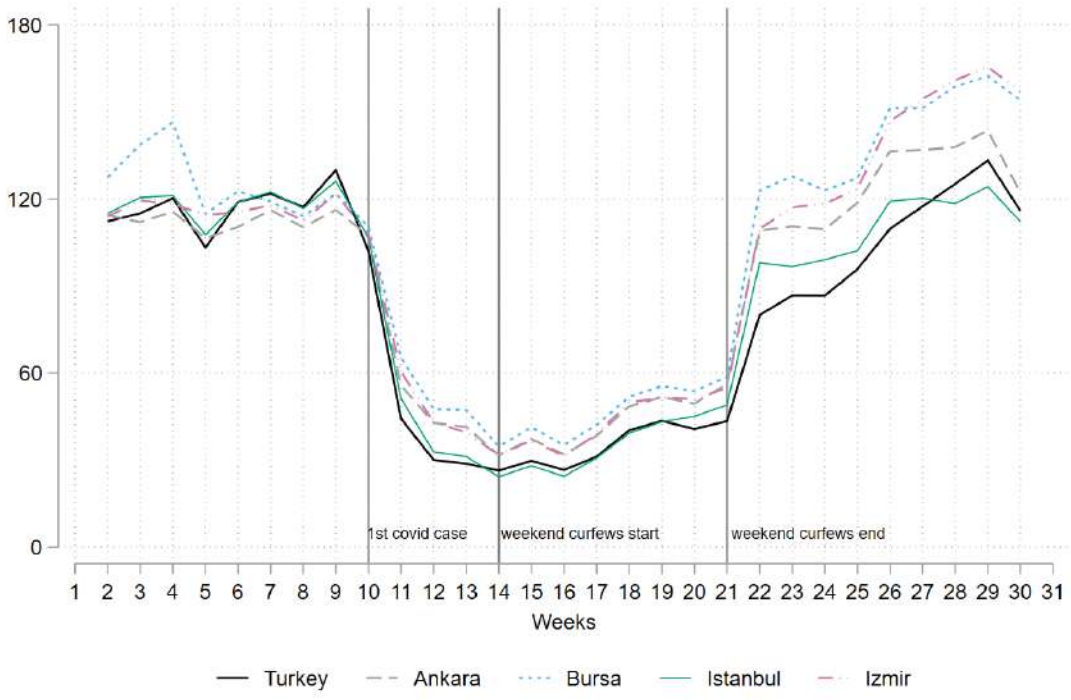
The number of female homicides shows a strikingly correlated pattern to mobility in the first seven months of 2020. In Figure 2, we show the total number of homicides and homicides

[9] Bianet explains in its website that Male Violence Monitoring Portal is published within the framework of "Journalism for Rights, Rights for Journalists" project implemented by the IPS Communication Foundation with the financial assistance of the Swedish International development Agency (SIDA). We are not the first ones to collect homicide data based on Bianet's Male Violence report. Kavakli (2020) also scrapes Bianet reports to explore the relationship between geographical distribution, economic development and female homicides in Turkey. For further information, see: http://bianet.org/english/gender/134394-bianet-is-monitoring-male-violence. Last accessed October 19, 2020.

[10] The website includes information on male violence going back to 2008.

[11] These four cities are among our sample of 15 metropolitan cities.

Figure 1: Mobility indices in the first seven months of 2020 for Turkey and selected provinces

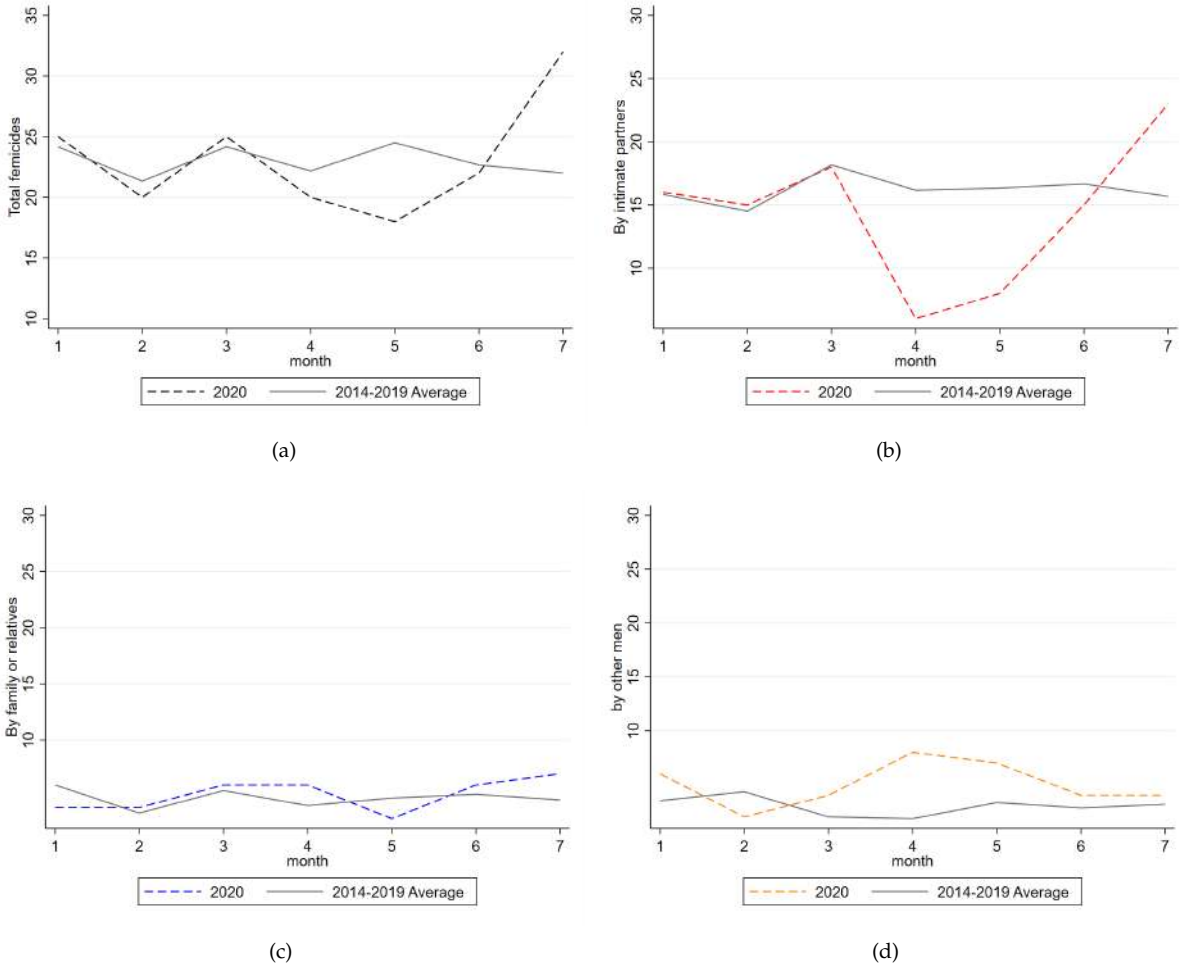


(a)

Source: Apple Mobility Trends Reports, available at: https://covid19.apple.com/mobility.
Note: The data show a relative volume of directions requests for Turkey and selected provinces compared to a baseline volume on January 13th, 2020, such that the index takes on the value 100 on that day. Days in the dataset are defined as midnight-to-midnight, Pacific time. Provinces are defined as the greater metropolitan area and their geographic boundaries remain constant across the data set.

by perpetrator type in the first seven months of 2020 in comparison to the monthly averages between 2014 and 2019. While the pre-Covid-19 trends are quite similar, homicides by intimate partners decline sharply in April when the consecutive weekend curfews started in metropolitan cities and were implemented strictly. Furthermore, both the homicides by intimate partners and total homicides sharply increase in June when the consecutive curfews ended. The increase after June is well above the previous years' average and seems to more than compensate for the decline in April and May. Appendix A displays the local polynomial regressions of daily female homicide probabilities throughout 2020 and also shows that total homicides decline with social distancing measures taken after the first Covid-19 case in March but start to increase when measures are relaxed over June and July. As before, the main source of the decline is the fall in homicides by intimate partners.

Figure 2: Total Female Homicides in 81 Metropolitan Cities: Comparison of January to July, 2020 with Previous Years



Source: Own estimations using Bianet's Male Violence Report

3.2 Identification

In estimating the impact of the pandemic and the social distancing measures on female homicides, we closely follow the empirical specification applied by Leslie and Wilson (2020) who investigate the impact of the Covid-19 pandemic on police calls for service for domestic violence in the 14 cities of U.S. during March to May 2020 in comparison to the trends in 2019. We rely on event study and difference in differences methods, but since the daily homicides are much more extreme and rarer than non-deadly domestic violence calls for police help, our outcome variable is the *probability that a woman is killed on a given day in a given city* instead of the natural

logarithm of total daily homicides.[12] And since our data is at daily frequency, we do not use homicide rates per 100,000 women as the outcome variable, due to the fact that the population figures are only available at annual frequency.

Although we report estimations for all cities of Turkey, our main focus is the impact in 15 metropolitan cities, i.e., Ankara, Balıkesir, Bursa, Eskişehir, Gaziantep, İstanbul, İzmir, Kayseri, Kocaeli, Konya, Manisa, Sakarya, Samsun, Van, Zonguldak due to two simple reasons. First, these cities are among the most populated and economically largest in Turkey. According to the figures by the Turkish Statistical Institute (Turkstat), the share of these 15 cities in Turkey's total value added was 67 percent while their population shares were 52 percent in Turkey. The second reason is that these cities were consistently included in curfews, from the very first to the last, due to high population densities and infection rates. Hence, comparing the trends in these 15 cities with remaining cities which were subjected to only two curfews[13] might be far from ideal. Hence, we believe the identification is cleanest for these 15 cities.

Event-study analysis

We begin with a weekly event study analysis to document the change in homicides due to the social distancing measures taken in response to Covid-19, in comparison to the probability in the same period between 2014 and 2019. The reference week is the 10^{th} week, corresponding to the dates between March 9 to 15, 2020.

We estimate the following equation for all 81 cities of Turkey and for 15 metropolitan cities separately:

$$Pr(Homicide_{cdy}) = \sum_{j=0}^{31} \beta_j I(Week = j)_d * Y2020_y + \phi_{cy} + \delta_{c,month} + \psi_{c,week} + \theta_{c,dow} + \epsilon_{cdy} \qquad (1)$$

where $Homicide_{cdy}$ is a variable taking on the value 1 if there were any female homicides in city c, day-of-the-year d, in year y. $I(Week = j)_d$ is the indicator function, taking on a value equal to 1 if a particular day is in week j. We take Monday as the first day of the week, with week 1 starting on the first Monday of each year. We only include weeks from 1 to 30 for each

[12] More specifically, we have a lot of city-date cells containing zeros for days when no woman is killed.

[13] There were only two nationwide curfews between March and July, the first one was in the Ramadan holidays between May 22 to 26, and on June 27 and 28 when the national university entrance took place.

year between 2014 and 2020, focusing on the period between January 1 to July 31. $Y2020_y$ is the dummy, representing year 2020. ϕ_{cy}, $\delta_{c,month}$, $\psi_{c,week}$ and $\theta_{c,dow}$ stand for city-year effects, city-month effects, city-week-of-the-month effects, and city-day-of-the-week effects, respectively. Hence our specification allows for city-specific weekly, monthly, and annual trends, and also captures the differences in the intensity of infection rates across cities. Our estimations represent within-city comparisons of daily homicide probabilities in 2020 relative to previous years. We cluster standard errors at city-year level.

Difference-in-Differences estimations

To estimate the overall impact of the Covid-19 pandemic and associated social distancing measures on homicides relative to the same period between 2014 to 2019, we rely on two difference-in-differences models. We start by estimating the following model for which the variable of interest is the interaction of the social distancing period during Covid-19 pandemic and Year 2020 dummies:

$$Pr(Homicide_{cdy}) = \alpha + \gamma SD_d + \beta SD_d * Y2020_y + \phi_{cy} + \delta_{c,month} + \psi_{c,week} + \theta_{c,dow} + \epsilon_{cdy} \qquad (2)$$

where $Homicide_{cdy}$ is a variable taking on the value 1 if there were any female homicides in city c, day-of-the-year d, in year y, SD_d is a dummy representing the period between March 11 and May 31 for each year. As before, $Y2020_y$ is the dummy representing the year 2020, and ϕ_{cy}, $\delta_{c,month}$, $\psi_{c,week}$ and $\theta_{c,dow}$ stand for city-year effects, city-month effects, city-week-of-the-month effects, and city-day-of-the-week effects, respectively. In this specification, the coefficient of interest, β, represents the change in homicides during the period of intense social distancing measures in 2020 relative to the same periods between 2014 and 2019. We estimate equation (2) separately for all 81 cities and for 15 metropolitan cities.

After looking at the effect of the general social distancing measures as above, we specifically look at the impact of curfews on homicide probability by perpetrator type for both 81 cities and 15 metropolitan cities. We estimate the following equation controlling for city-year effects, city-month effects, city-week-of-the-month effects and city-day-of-the-week effects, as before:

$$Pr(Homicide_{cdy}) = \alpha + \gamma Curfew_d + \beta Curfew_d * Y2020_y + \phi_{cy} + \delta_{c,month} + \psi_{c,week} + \theta_{c,dow} + \epsilon_{cdy} \quad (3)$$

where $Curfew_d$ is a dummy indicating whether the day in a given year is April 11-12, April 18-19, April 23-26, May 1-3 for all 30 metropolitan cities of Turkey, May 9-10 for 24 metropolitan cities, May 16-19 for 15 metropolitan cities, May 22-26 for all 81 cities of Turkey, May 30-31 for 15 metropolitan cities and June 27-28 for all 81 cities.

4 Results

We start by showing the results of the event study analysis (Figure 3), which show a significant decrease in homicides by intimate partners in the weeks of social distancing and reduced mobility, and in none of the other categories. Starting with homicides by all perpetrator types, the coefficients are very imprecise and in general not statistically different from zero, except for few weeks for 15 metropolitan cities towards the end of the curfew period. On the other hand, the second panel, which displays estimates for homicides by intimate partners suggests that while the coefficients for weeks 1 to 9 are generally not statistically different from zero, they turn negative and significant after the first Covid-19 case for all cities across Turkey as well as for 15 metropolitan cities alone. The coefficients for most weeks between week 14 to 21, which mark the period of the strictest social distancing measures, remain negative and significant for 15 metropolitan cities. The coefficients turn insignificant again when social distancing measures are relaxed after week 21 and when mobility starts increasing with the arrival of summer months. While the homicides by intimate partners seem to have declined with social distancing measures, we do not see any statistically meaningful change in homicides by male family members or relatives as revealed by the third panel.

Although the point estimates are imprecise, we see an increase in some weeks for homicides by other men in the fourth panel. The homicides by other men is the rarest form of all female homicides and hence it is difficult to draw conclusive arguments based on news articles. However, we believe economic stress could potentially explain this increase. Our text mining analysis

suggests that the majority of homicides committed by other men due to economic hardships[14] are recorded in 2020, with a share of 27 percent among all similar news between 2014-2020.[15] Furthermore, 40 percent of all homicides perpetrated by other men between January to July 2020 for which the news articles contain keywords reflecting economic stress took place in April and May 2020, when the government put strict lockdowns in some services sectors, and employment and jobs in many other sectors decreased significantly. Demir Seker et al. (2020) find that around 7 million workers (out of around 30 million) in Turkey are under risk of job loss due to Covid-19, and Gursel and Sahin (2020) show that the number of available jobs decreased significantly between February and April 2020. This hypothesis is consistent with the findings by Taştan and Küçüker Yıldız (2019) who show that, based on the judicial statistics, about 57.1 percent of all homicide perpetrators in years 2016 to 2018 were either low skilled or unemployed men. Overall, the event-study analysis shows that homicides by intimate partners declined in 15 metropolitan cities and across Turkey during the period when the social distancing measures such as curfews were implemented most rigorously.

Moving to the difference-in-differences results, Table 1 shows the first set of results on the impact of the pandemic for all 81 cities of Turkey. In line with the event-study findings, we do not find a statistically significant change in total female homicide probability in response to general social distancing measures related to the Covid-19 shock in both panels, although the coefficients are negative in line with the findings of the event study. However, coefficients of homicides by intimate partners are negative and highly significant for all 81 cities of Turkey and in 15 Metropolitan cities with the most strict social distancing measures. In particular, female homicides by intimate partners seem to have declined by 1 percentage points compared to the same periods between 2014 and 2019 in the 15 cities. Given the fact that the mean daily homicide probability by intimate partners in 15 metropolitan is about 1.75 percent, the point estimate corresponds to a decline of roughly 57 percent. The relative decline across all cities of Turkey is even stronger, with 60.6 percent.

In line with the event-study analysis, Table 1 shows no impact on the probability of homicide

[14] for which the news article contains certain keywords such as ”economic hardships” or ”unemployed”

[15] The year 2018 has the second highest share in all years with 25 percent. In 2018 the economy grew only by 2.6 percent and it is the lowest growth rate recorded between 2010-2019.

Table 1: Covid-19 and Female Homicides by Perpetrator Type

	(1) All Female Homicides	(2) By Intimate Partners	(3) By Family	(4) By Others
	Panel A: All cities			
(March 11-May 31)	-0.004	-0.004	-0.000	-0.001*
	(0.004)	(0.004)	(0.002)	(0.001)
(March 11-May 31) * 2020	-0.002	-0.004***	0.000	0.002**
	(0.002)	(0.001)	(0.001)	(0.001)
Observations	120,366	120,366	120,366	120,366
	Panel B: 15 Metropolitan cities			
(March 11-May 31)	-0.008	-0.016	0.005	-0.004*
	(0.016)	(0.015)	(0.012)	(0.002)
(March 11-May 31) * 2020	-0.008	-0.010***	0.002	0.002
	(0.005)	(0.003)	(0.002)	(0.002)
Observations	22,290	22,290	22,290	22,290
Province Effects	Yes	Yes	Yes	Yes
Day of the Week Effects	Yes	Yes	Yes	Yes
Week of Year Effects	Yes	Yes	Yes	Yes
Month Effects	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
Province x Day of the Week Effects	Yes	Yes	Yes	Yes
Province x Month Effects	Yes	Yes	Yes	Yes
Province x Year Effects	Yes	Yes	Yes	Yes
Province x Week of Year Effects	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Notes: (1) Robust standard errors are clustered at city-year level and ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. (2) March 11-May 31 is a dummy variable taking on value equal to 1 for the period between these dates for each year.

by male family members. We do however see that there is a statistically significant increase in homicides by other men for the 81 provinces of Turkey, but not in the 15 metropolitan cities. This differential impact across two groups of cities reinforces our view for the role of economic stress and the physical barriers to reach the victims. We know that the mobility declined more radically in the 15 metropolitan than the rest of Turkey. And yet, female homicide by other men across Turkey increased while it did not in the 15 cities. Hence, it could be the case that physical inability to reach victims must have dominated in the 15 cities, while fewer restrictions elsewhere could have made preying easier.

So far, our descriptive and regression analyses suggest that there has been a decline in female homicides perpetrated by intimate partners. Given the increased economic and psychological stress due to Covid-19 that would otherwise have increased homicides, a plausible explanation is

Table 2: Curfews and Female Homicides by Perpetrator Type

	(1) All Female Homicides	(2) By Intimate Partners	(3) By Family	(4) By Others
	Panel A: All cities			
Curfew Days	-0.001	0.001	-0.001	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)
Curfew Days * 2020	-0.003	-0.008***	0.001	0.003
	(0.003)	(0.002)	(0.002)	(0.002)
Observations	120,366	120,366	120,366	120,366
	Panel B: 15 Metropolitan cities			
Curfew Days	-0.000	0.002	-0.000	-0.001
	(0.004)	(0.003)	(0.002)	(0.002)
Curfew Days * 2020	-0.009*	-0.015***	-0.003	0.005
	(0.005)	(0.005)	(0.002)	(0.004)
Observations	22,290	22,290	22,290	22,290
Province Effects	Yes	Yes	Yes	Yes
Day of the Week Effects	Yes	Yes	Yes	Yes
Week of Year Effects	Yes	Yes	Yes	Yes
Month Effects	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
Province x Day of the Week Effects	Yes	Yes	Yes	Yes
Province x Month Effects	Yes	Yes	Yes	Yes
Province x Year Effects	Yes	Yes	Yes	Yes
Province x Week of Year Effects	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Notes: (1) Robust standard errors are clustered at city-year level and ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. (2) For all years, curfew days are April 11-12, April 18-19, April 23-26, May 1-3 for 30 metropolitan cities, May 9-10 for 24 metropolitan cities, May 16-19 for 15 metropolitan cities, May 22-26 for all 81 cities, May 30-31 for 15 metropolitan cities and June 27-28 for all 81 cities.

that the strict social distancing measures might be driving down homicides by intimate partners. We test this explanation in the next set of results where we use a new variable that captures the exact dates of curfews for relevant cities. Table 2 displays our results for all city-curfew dates. The results suggest that, looking at the period between 2014 and 2020, the curfew days themselves are irrelevant in terms of homicide probabilities; however, homicides by intimate partners decrease significantly at the exact curfew dates in 2020 in comparison to the cities which were not subject to the curfews in 2020 or in comparison to the same dates in previous years. Narrowing down the sample and focusing on the 15 metropolitan cities which were always subject to the curfews, we find a stronger decline in homicides by intimate partners on curfew days in 2020 compared to the same days between 2014 and 2019. The estimated

coefficient is 1.5 percentage points, corresponding to a staggering 83.8 percent decline in mean homicide probability by intimate partners. We do not observe a statistically significant change in homicides by any other perpetrator type. However, the overall homicide probability also decreases by 0.9 percentage points in curfew days in 2020 for 15 metropolitan cities due to the steep decline in murders perpetrated by intimate partners. The estimated effect is about 34.6 percent decline in overall homicide probability.

In the Appendix B, C, and D, we provide several checks to explain the mechanisms and prove that our results are not driven by unobserved factors pertaining to social distancing measures or specific curfew dates. In Appendix B, we attempt to break down the intimate partners in our dataset into current and ex-partners based on a text-mining analysis. We find that homicides by current partners declined by 72.1 percent decline and homicides by ex-partners declined by 90.9 percent in the curfew dates in the 15 metropolitan cities. We believe the physical inability to reach victims due to lower mobility is the main cause of decline in murders by ex-partners. At the same time, lower mobility might also have led to a decline in murders by current partners in cases where the partners do not share the same house, such as younger women living with parents.

In Appendix C, we re-run our regressions on the impact of Covid-19 social distancing measures for the bottom 15 cities in which the mobility declined the least, based on the Mobility Data by Google LLC (2020). Since our conjecture is that homicides by intimate partners must have declined due to physical inability to reach victims under strict social distancing measures, we would expect that in cities where the mobility decline was lowest, there should be limited impact. Our results show that there is no statistically significant change in female homicides in cities where there the decline in mobility was lowest compared to all other cities in Turkey, providing further support for our hypothesis.

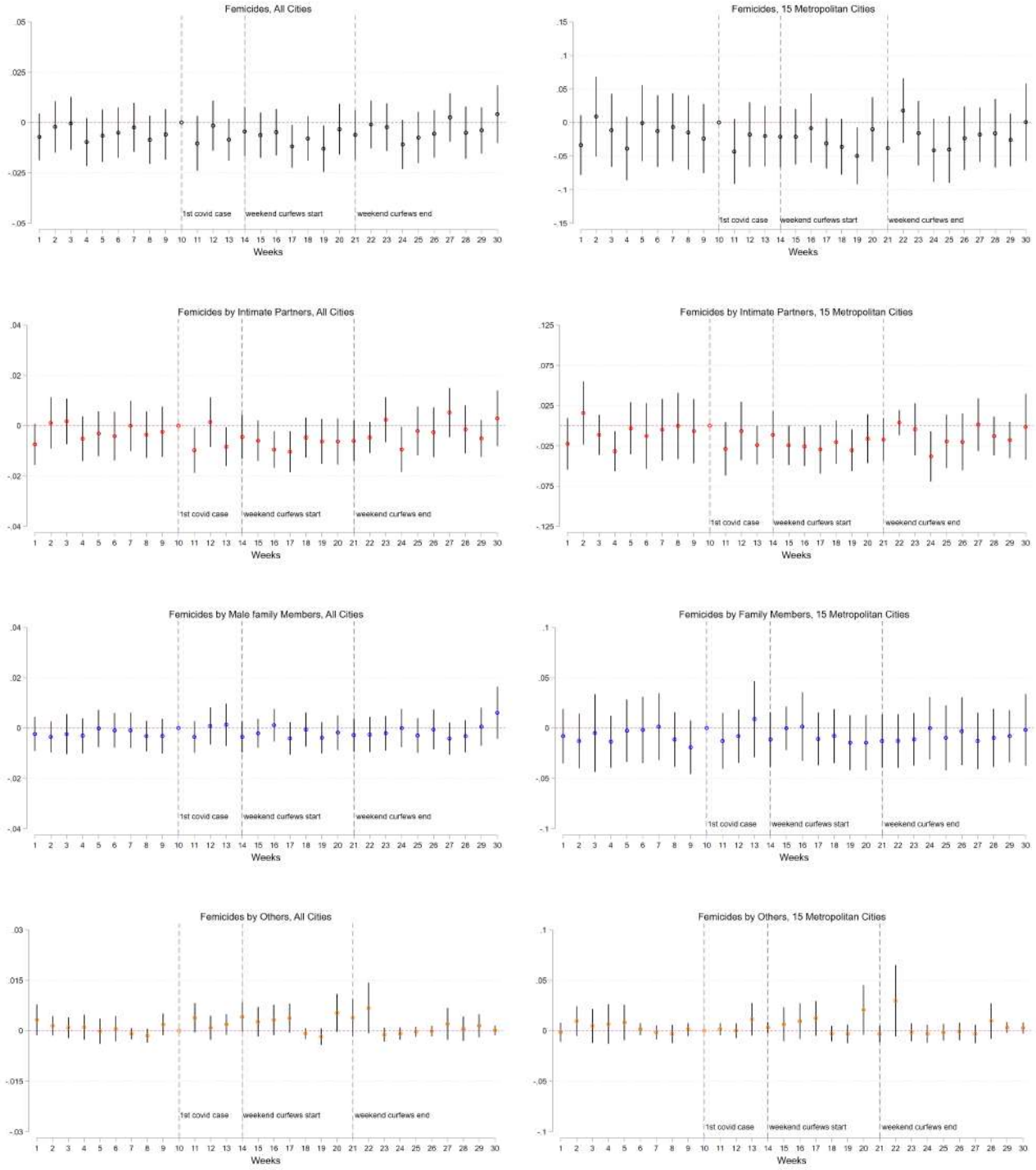
Finally in Appendix D, we show that our results are not driven by reasons peculiar to announced curfew dates in 2020 or corresponding weeks in 2020 by relying on placebo tests.

5 Conclusion

Our study shows, somewhat counter-intuitively, that there has been a decline in female homicides by intimate partners due to Covid-19 measures that restrict mobility and the magnitude of the decrease increases as measures become more restrictive (such as under curfews). Our findings do not imply that the non-homicidal domestic violence against women has declined during the pandemic; there is in fact evidence that the violence have actually increased. However, due to the pandemic, fewer women might be able to leave their partners due to fear of infection as well as increased economic hardships. As the majority of women in Turkey are killed by either ex-partners or by partners whom the women are trying to separate from, women not being able to leave the current partner despite the increased violence might reconcile the results. Furthermore, the physical inability to reach the victim by ex-partners, the deterrent effects of the increase in probability of getting caught and possible reductions in women's intra-household bargaining powers are also likely to have caused a decline in deadly crimes against women. In this respect, we believe our results should be viewed as complementary rather than contradicting to the existing evidence on domestic violence during the Covid-19 pandemic.

On the policy side, our findings highlight the fact that either or both the legislative framework and its implementations are not sufficient to prevent female homicides and it takes a curfew to protect women from intimate partners. As an early signatory to the Council of Europe Convention on preventing and combating violence against women and domestic violence, also known as the Istanbul Convention, the legislative framework in Turkey allows for strict punishment against these crimes. A stronger commitment for implementation could signal that perpetrators cannot get away with light sentences, and can save the lives of many more women when the pandemic is over, not only in Turkey but elsewhere in the world.

Figure 3: Event Study Estimations: All homicides



Notes: The outcome variable is the probability that a woman is killed on a given date, in a given city. The figures represent the regression coefficient plots estimated by Equation (1). Data from the first 30 weeks of 2014 to 2020 are included, bringing the sample period through January to the end of July in 2020. City-by-year, city-by-week-of-year, city-by-month-of–year and city-by-day-of-week fixed effects are included. The vertical lines for each coefficient show 95 percent confidence intervals, clustered at city-year levels. The reference week is the 10^{th} week of 2020, a week before the official social distancing measures were announced.

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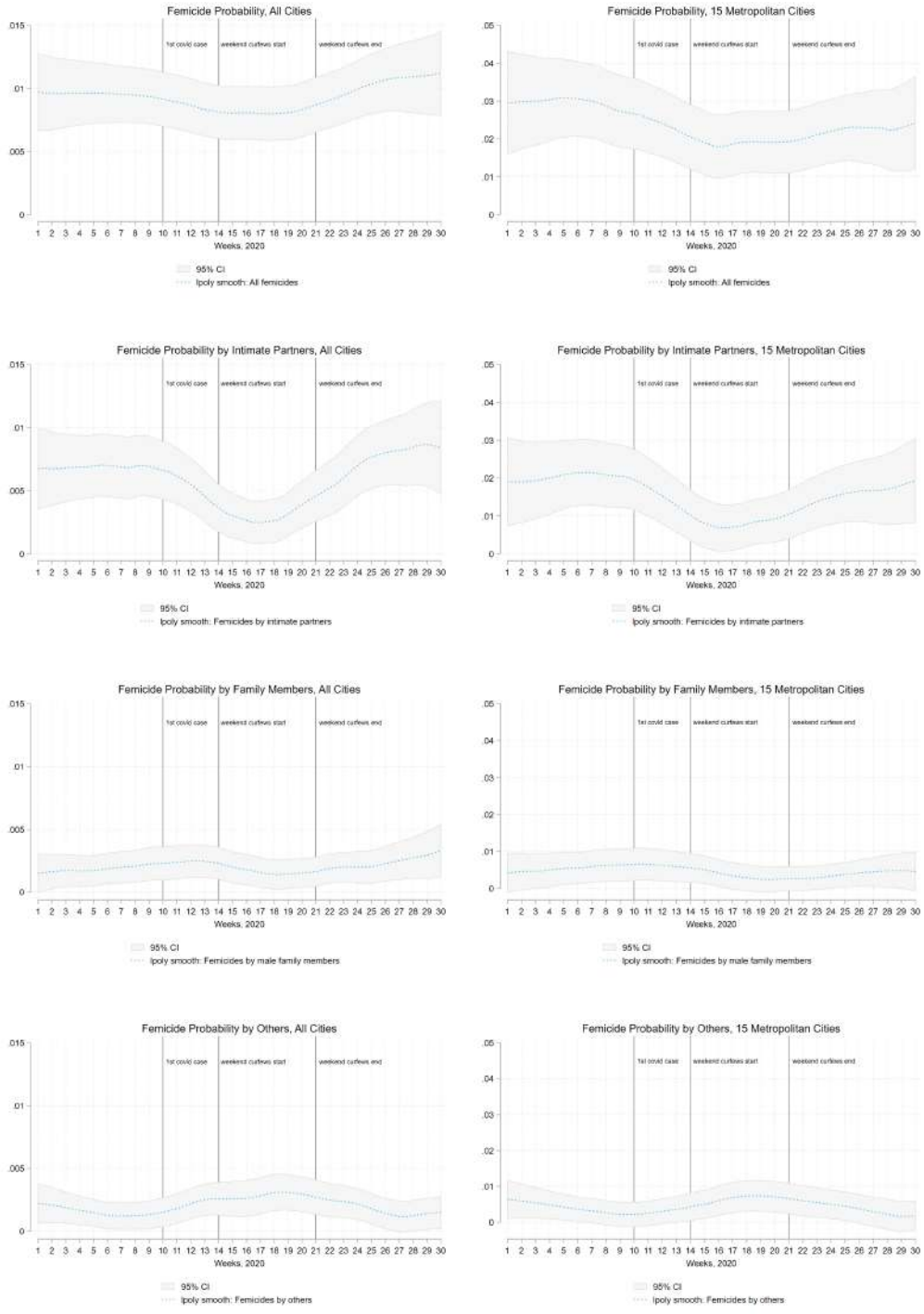
A Appendix: Female Homicides During Covid-19

Figure 4: Daily Probability of Female Homicides: January to July, 2020



The figures represent local linear regressions of homicide probabilities over the 31 weeks between January 1 to July 31, 2020 for all cities of Turkey and for the 15 metropolitan cities separately. Dependent variable is a binary variable indicating whether a homicide takes place on a given day in a city.

B Appendix: Ex-partners versus Current partners

To understand which channel might have contributed more to the decline in homicides by intimate partners, we try to break down the intimate partners in our dataset into current and ex partners.[16] An important caveat follows: there might be cases where a current relationship could be in the borders of separation, and our attempt might be subject to potential errors, such as in the case of a woman trying unsuccessfully to break up with a boyfriend. These cases might be wrongly counted as murder by current partners. So our estimations for ex-partners should be regarded as lower bounds and results on current partners should be taken with caution.

Our text-mining analysis suggests that around 37 percent of homicides by partners are committed by an ex-husband or ex-boyfriend, as opposed to a current partner. As shown in Table 3 in Appendix B, we find that female homicides by both current and ex-partners decreased during the curfew period for the 15 metropolitan cities. The estimated coefficients of -0.8 and -0.6 percentage points correspond to a decline of 72.1 percent decline in homicides by current partners and 90.9 percent decline in homicides by ex-partners. We believe the physical inability to reach victims due to lower mobility is the main cause of decline in murders by ex-partners. At the same time, lower mobility might also have led to a decline in murders by current partners in cases where the partners do not share the same house, such as younger women living with parents.

The decline in homicides committed by current partners is also consistent with the instrumental theory of violence which predicts that a decline in female resources, through lower employment opportunities, may reduce the incentives of men to use violence as a means of extracting resources from women. There is ample evidence that women are disproportionately affected by the pandemic through increased burden of childcare and through job losses or furloughs, as women are more likely to be employed in services sector and in informal jobs that were hit the most (Alon et al., 2020; Blundell et al., 2020; McKinsey & Company and LeanIn, 2020).[17] Furthermore, work arrangements from home for women, or women dropping out of the labor force might have also played a role in the reduction of deadly crimes by conservative

[16] If the news article makes it a clear that a woman is killed by an ex-husband, ex-boyfriend, or by a husband with whom there is a divorce court case is ongoing (with or without a suspension order), we count that incidence as murder by an ex-partner.

[17] Informality rate for female employment in Turkey is around 40 percent.

partners who have a distaste for their partners' employment.[18]

Table 3: Female Homicides by Ex-partners and Current partners, 15 Metropolitan Cities

	(1) Current partners	(2) Ex-partners
Panel A:		
Curfew Days	0.001	0.002
	(0.003)	(0.002)
Curfew Days*2020	-0.009**	-0.006***
	(0.004)	(0.002)
Panel B:		
Curfew Days	-0.002	0.001
	(0.003)	(0.002)
Curfew Days*2019	0.013*	0.001
	(0.007)	(0.004)
Panel C:		
Curfew Days	-0.000	0.000
	(0.003)	(0.002)
Curfew Days*2018	-0.002	0.005
	(0.005)	(0.004)
Panel D:		
Curfew Days	-0.002	0.001
	(0.002)	(0.002)
Curfew Days*2017	0.007	0.003
	(0.010)	(0.004)
Panel E:		
Curfew Days	-0.000	0.001
	(0.003)	(0.002)
Curfew Days*2016	-0.002	-0.002
	(0.006)	(0.006)
Panel F:		
Curfew Days	-0.000	0.001
	(0.003)	(0.002)
Curfew Days*2015	-0.005	0.001
	(0.003)	(0.004)
Panel G:		
Curfew Days	-0.000	0.001
	(0.003)	(0.002)
Curfew Days*2014	-0.002	-0.001
	(0.004)	(0.003)
Observations	22,290	22,290
Province Effects	Yes	Yes
Day of the Week Effects	Yes	Yes
Week of Year Effects	Yes	Yes
Month Effects	Yes	Yes
Year Effects	Yes	Yes
Province x Day of the Week Effects	Yes	Yes
Province x Month Effects	Yes	Yes
Province x Year Effects	Yes	Yes
Province x Week of Year Effects	Yes	Yes
Clustered SE	Yes	Yes

Notes: (1) Robust standard errors are clustered at city-year level and ***, **, and * refer to 1%, 5%, and 10% significance levels. (2) For each year, curfew days are April 11-12, April 18-19, April 23-26, May 1-3, May 9-10, May 16-19, May 22-26, May 30-31 and June 27-28.

[18]The isolation measures might have limited the underlying reasons for male insecurity over potential rivals. Although imperfect, our text-mining analysis suggest that about 12.7 percent of homicide news contain keywords indicating male jealousy.

C Appendix: Female Homicides in Cities with Least Decline In Mobility

Table 4: Covid-19 and Female Homicides by Perpetrator Type in 15 Cities with Least Reduction in Mobility

	(1) All Female Homicides	(2) By Intimate Partners	(3) By Family	(4) By Others
(March 11-May 31)	-0.003	-0.002	-0.002	0.000
	(0.002)	(0.001)	(0.001)	(0.000)
(March 11-May 31) * 2020	0.001	0.001	0.001	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)
Observations	22,290	22,290	22,290	22,290
Province Effects	Yes	Yes	Yes	Yes
Day of the Week Effects	Yes	Yes	Yes	Yes
Week of Year Effects	Yes	Yes	Yes	Yes
Month Effects	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
Province x Day of the Week Effects	Yes	Yes	Yes	Yes
Province x Month Effects	Yes	Yes	Yes	Yes
Province x Year Effects	Yes	Yes	Yes	Yes
Province x Week of Year Effects	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Notes: (1) Robust standard errors are clustered at city-year level and ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. (2) We rank cities in terms of total percentage decline in mobility at retail and recreation centers, grocery and pharmacies, parks, transit stations and workplaces between April 15, 2020 and the reference period which Google reports as between January 3 and February 6, 2020. Based on this calculation, 15 cities in which the mobility declined least are; Bitlis, Agri, Bayburt, Sirnak, Igdir, Gumushane, Tunceli, Ardahan, Hakkari, Mus, Kilis, Batman, Kars, Karaman and Artvin. (3) March 11-May 31 is a dummy variable taking on value equal to 1 for the period between these dates for each year.

D Appendix: Placebo Curfews

In the previous section, we showed that homicides by intimate partners declined significantly in the largest 15 metropolitan cities of Turkey during the Covid-19 pandemic. We also showed that the main mechanism was the government's decision to enforce weekend curfews to reduce the mobility and the speed of the virus infection. An important question is whether our results can be driven by some unobserved peculiarities pertaining to April 11-12, April 18-19, April 23-26, May 1-3, May 9-10, May 16-19, May 22-26, May 30-31 and June 27-28 instead of reflecting the real impact of enforcement of curfews in 2020. After all, curfew dates are purposefully enforced for weekends in order to limit the already high damage on economic activity. Furthermore, some of the weekend curfews were extended to include national holidays such as the National Sovereignty and Children's Day of April 23, Labor day of May 1, National Youth Day of May 19 and Ramadan holiday between May 22-26. It could be the case that on these special occasions, homicides are lower for reasons unrelated to curfews and hence our coefficients might be biased.

In order to show that the decline in homicides, especially those perpetrated by intimate partners is due to the curfews, we run two sets of robustness checks. In our first robustness check, we interact the curfew dates with each of the year dummies for 2014 to 2019, instead of interacting with year 2020. The aim of this first placebo test is to understand whether our results above could have been driven by specific annual shocks other than Covid-19. If there is no causal relationship between the actual enforcement of curfews in 2020 and decline in homicides, one would expect to see an effect of placebo curfews, at least in one of the years between 2014 to 2019. Table 5 in Appendix D shows no such relationship. The point estimates for the interaction between the curfew days and year dummies in columns (1) to (3) of all panels are statistically insignificant and we do not observe any impact of placebo curfews on total homicides, homicides by intimate partners or homicides by family members.

In our second robustness check, we check whether it is the "weekend effects" as opposed to the curfew effects driving our results. We assign the same "weekend days" corresponding to our actual curfew days of 2020 for each year between 2017 and 2019. To give an example; the

first weekend curfew took place in week 15 of year 2020[19], corresponding to April 11 and 12. The weekend of week 15 in year 2019 corresponds to April 13 and 14 and the weekend of week 15 in year 2018 corresponds to April 14 and 15. We limit the exercise between years 2017 and 2019 because as we go further back in time, the distance between the weekend dates increase, i.e. April 11-12 in 2020 versus April 14-15 in 2018 and the corresponding weekends in previous years might not be appropriate placebos anymore. The estimations in Table 6 in Appendix D confirm that our results are not driven by weekend effects, as none of the coefficients in columns (1)-(4) are significant.

[19]Here, we take the week count starting with January 1 of each year as opposed to the first Monday of each year in the event study analysis.

Table 5: Placebo Curfews-1: Same Dates in Previous Years, 15 Metropolitan Cities

	(1) All Female Homicides	(2) By Intimate Partners	(3) By Family	(4) By Others
Panel A:				
Curfew Days	-0.003	-0.002	-0.001	-0.000
	(0.004)	(0.003)	(0.002)	(0.002)
Curfew Days*2019	0.013	0.014	-0.001	-0.000
	(0.009)	(0.009)	(0.003)	(0.004)
Panel B:				
Curfew Days	-0.003	0.000	-0.000	-0.001
	(0.003)	(0.003)	(0.001)	(0.002)
Curfew Days*2018	0.013	0.003	-0.003	0.009**
	(0.010)	(0.005)	(0.004)	(0.004)
Panel C:				
Curfew Days	-0.002	-0.001	-0.001	0.001
	(0.004)	(0.003)	(0.001)	(0.002)
Curfew Days*2017	0.004	0.009	0.003	-0.004*
	(0.010)	(0.010)	(0.004)	(0.003)
Panel D:				
Curfew Days	-0.001	0.001	-0.002	0.001
	(0.004)	(0.003)	(0.002)	(0.002)
Curfew Days*2016	-0.005	-0.004	0.005	-0.005*
	(0.007)	(0.008)	(0.003)	(0.003)
Panel E:				
Curfew Days	-0.000	0.001	-0.001	0.000
	(0.004)	(0.003)	(0.002)	(0.002)
Curfew Days*2015	-0.008	-0.004	-0.001	-0.003
	(0.005)	(0.005)	(0.002)	(0.002)
Panel F:				
Curfew Days	-0.000	0.001	-0.001	0.000
	(0.004)	(0.003)	(0.002)	(0.002)
Curfew Days*2014	-0.007	-0.003	-0.001	-0.003
	(0.006)	(0.005)	(0.003)	(0.005)
Observations	22,290	22,290	22,290	22,290
Province Effects	Yes	Yes	Yes	Yes
Day of the Week Effects	Yes	Yes	Yes	Yes
Week of Year Effects	Yes	Yes	Yes	Yes
Month Effects	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
Province x Day of the Week Effects	Yes	Yes	Yes	Yes
Province x Month Effects	Yes	Yes	Yes	Yes
Province x Year Effects	Yes	Yes	Yes	Yes
Province x Week of Year Effects	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Notes: (1) Robust standard errors are clustered at city-year level and ***, **, and * refer to 1%, 5%, and 10% significance levels. (2) For each year, curfew days are April 11-12, April 18-19, April 23-26, May 1-3, May 9-10, May 16-19, May 22-26, May 30-31 and June 27-28.

Table 6: Place Curfews-2: Same Weekends in Previous Years, 15 Metropolitan Cities

	(1) All Female Homicides	(2) By Intimate Partners	(3) By Family	(4) By Others
Panel A:				
Corresponding weekend in 2019	-0.005	-0.003	0.000	-0.002
	(0.004)	(0.004)	(0.002)	(0.002)
Corresponding weekend* Year 2019	0.009	0.010	0.001	-0.001
	(0.009)	(0.008)	(0.003)	(0.004)
Panel B:				
Corresponding weekend in 2018	0.003	0.003	0.001	-0.002
	(0.005)	(0.004)	(0.002)	(0.002)
Corresponding weekend* Year 2018	0.004	-0.006	-0.002	0.008
	(0.010)	(0.006)	(0.004)	(0.007)
Panel C:				
Corresponding weekend in 2017	0.004	0.003	0.000	-0.000
	(0.004)	(0.003)	(0.002)	(0.002)
Corresponding weekend* Year 2017	0.005	0.000	0.003	0.000
	(0.012)	(0.009)	(0.005)	(0.004)
Observations	22,290	22,290	22,290	22,290
Province Effects	Yes	Yes	Yes	Yes
Day of the Week Effects	Yes	Yes	Yes	Yes
Week of Year Effects	Yes	Yes	Yes	Yes
Month Effects	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
Province x Day of the Week Effects	Yes	Yes	Yes	Yes
Province x Month Effects	Yes	Yes	Yes	Yes
Province x Year Effects	Yes	Yes	Yes	Yes
Province x Week of Year Effects	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Notes: (1) Robust standard errors are clustered at city-year level and ***, **, and * refer to 1%, 5%, and 10% significance levels.