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ABSTRACT

Empowered or Impoverished: The Impact of Panic Buttons on Domestic Violence*

This paper estimates the causal effect of a targeted panic button program–implemented in two Turkish provinces between 2012 and 2016–on domestic violence against women. Diff-in-diff and synthetic control estimates suggest that the program notably increased physical domestic violence against women both at the extensive and intensive margins. Specifically, we find that the likelihood of physical domestic violence against women in the treated provinces increased by more than 5 percentage points relative to the control provinces, and the number of domestic physical violence incidents against women increased by around 10 percent. The increase comes almost entirely from the increase in violence against less-educated women with high fertility. We show that employment rates and economic independence indicators have improved for those women in the treated provinces, which suggests that the program have economically empowered and encouraged vulnerable women. However, partners/husbands of those women started using more physical violence in response to female empowerment. Our results are consistent with the "male backlash" theories and a class of non-cooperative models incorporating domestic violence as a vehicle/instrument for enhancing bargaining power, but inconsistent with the models predicting that economic empowerment of women reduces domestic violence against them by balancing bargaining power within the household. We also develop a method to understand whether the increase is attributable to actual or self-reported violence. We conclude that the estimates are entirely driven by the increase in actual rather than self-reported violence.

JEL Classification: J12, J16, K36

Keywords: domestic violence, panic button, male backlash, female empowerment, bargaining

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1 Introduction

Domestic violence against women is an important public policy matter globally. Approximately 30 percent of all women are documented to experience physical violence by an intimate partner at least once in their lifetime (Devries et al., 2013). Domestic violence entails substantial direct and indirect costs in terms of mental and physical health care, judicial action, and loss of productivity (Aizer, 2010). It also limits freedom along several dimensions (Sen, 1999), and has intergenerational implications (Aizer, 2011) with significant spillover effects (Carrell and Hoekstra, 2010). Empowering women to reduce domestic violence/abuse is listed among both the Millennium Development Goals and the Sustainable Development Goals agreed by all UN member states. Female empowerment is often raised as a policy option to increase the bargaining power of women within the household through income/cash transfers, welfare improvement programs, and increased labor market opportunities (Stevenson and Wolfers, 2006; Bowlus and Seitz, 2006; Hidrobo and Fernald, 2013; Haushofer and Shapiro, 2016; Hidrobo et al., 2016; Buller et al., 2018), although the evidence on the usefulness of female empowerment interventions is rather mixed (Farmer and Tiefenthaler, 1996; Angelucci, 2008; Eswaran and Malhorta, 2011; Bobonis et al., 2013; Field et al., 2016; Guarnieri and Rainer, 2019).

In this paper, we estimate the causal effect of a "panic button" program/tool implemented in two provinces of Turkey—Adana and Bursa—between 2012 and 2016 with the ultimate aim of empowering vulnerable women against intimate partner violence through improving women's safety. The program was expected to reduce men's tendency to exercise physical domestic violence against their female partners in the treated provinces based on the conjecture that empowering women would protect them against domestic violence. Panic button programs have been implemented in various settings to increase safety for the general public. More recently, various online applications installed in smart phones have enabled users to summon help quickly and without drawing attention. For example, some online applications directly call 911 in the U.S.—or equivalent emergency services in other countries—if the user hits the panic button. In India, all mobile phones sold after 2017 compulsorily include an authorized built-in panic button application. The distinctive feature of the panic button program implemented in Turkey is that it specifically targets reducing physical

intimate partner violence against women. The program was piloted in 2012 in two provinces with the ultimate goal of extending the coverage across the entire country, but the implementation was abruptly stopped in 2016.

Using multiple waves of the National Survey on Domestic Violence against Women (NSDVW) micro-level data set for Turkey, we estimate the impact of the panic button program on physical domestic violence against women in Turkey within a quasi-experimental setting. Our identification strategy relies on a variety of diff-in-diff specifications. The diff-in-diff model we use in the empirical analysis embeds specifications that relax the common trends assumption. We also use the synthetic control method as a consistency check. We find that the panic button program increased the probability of domestic physical violence against women by 5.6 percentage points in the overall, which correspond to a 9-10 percent increase in the number of physical domestic violence incidents. We document significant heterogeneity in terms of the impact of the policy. In particular, we find that the increase almost entirely comes from less-educated women—i.e., women with less than high school education. The increase in the probability of physical violence is approximately 10 percent for less-educated women, while the impact is nil for higher-educated ones. We report that the increase in violence is more prevalent for women with 2 kids and above. Our results also provide evidence that the increase in domestic violence is higher when the husband is more educated than the wife. The results are robust to alternative specifications and various additional sensitivity/placebo tests.

To test whether the panic button program empowered women or not, we estimate the impact of the program on women's employment and degree of their economic independence—i.e., whether they have full control over how to spend their own income and whether they can find enough money when they need. We provide robust evidence that the policy empowered less-educated women in the sense that their employment rate and degree of economic independence increased as a consequence of the panic button program. Overall, these results suggest that the panic button program might have provided additional incentives for men to restore control by exercising physical violence against their empowered female partners. This is consistent with the "male backlash" theories and a class of non-cooperative models incorporating domestic violence as a ve-

hicle/instrument for enhancing bargaining power, but inconsistent with the models predicting that economic empowerment of women reduces domestic violence against them by balancing bargaining power within the household.

Since we use survey data in our analysis, whether our estimates are driven by an increase in actual or self-reported violence—which will have very different policy implications—is a question that naturally arises. Most studies in the literature are not able to distinguish between actual versus self-reported violence due to data limitations. Our data set offers an interesting set of questions that help us distinguish between the two channels. We utilize the retrospective nature of the domestic violence questions in the survey. In particular, there is a question asking whether or not women in the sample are exposed to violence before 12 months prior to the survey administration—in addition to our main question asking domestic violence during the past 12 months. The time period examined in this specific question falls into the pre-program period, but the question is directed in the 2014 (post-program) survey. If our estimates were driven by the self-reporting effect, then we would have observed a similar increase in violence when this retrospective question was the dependent variable. We find that domestic violence experienced in the pre-program period but reported after the program implementation does not change in a statistically significant way. As a result, our estimates suggest null effects when this retrospective variable is used in the regressions. We conclude that the estimates are entirely driven by the increase in actual rather than self-reported violence.

Several papers in the literature document that better labor market opportunities, improvements in income and living conditions, increased protection by law, and provision of government transfers may reduce domestic violence against women—see e.g., Aizer (2010), Anderberg et al. (2015), Hidrobo et al. (2016), Amaral (2017), and Abiona and Koppensteiner (2018).[1] However, policy measures to empower women may in fact increase domestic violence on them through various channels. Theoretical and empirical work suggest that domestic violence increases when women start working (Chin, 2012; Heath, 2014) and when they and/or their family are rich (Tauchen

[1] Jensen and Oster (2009) and Card and Dahl (2011) argue that content of televised media and results of televised sports games significantly affect domestic violence against women.

et al., 1991; Bloch and Rao, 2002).[2] Some studies show that physical violence against women may increase—they might even be killed—when they call the police or seek shelter protection (Farmer and Tiefenthaler, 1996), or because a mandatory arrest law is adopted to protect them (Iyengar, 2009).[3]

Theoretical models feature alternative channels through which domestic violence against women changes in response to changes in economic incentives and government policy. Aizer (2010) argues that improvements in the gender wage gap reduce domestic violence. The Nash bargaining model she constructs suggests that husband, whose utility function is increasing in the level of violence exercised on wife, is forced to reduce violence when improvements in wife's labor market options increase the likelihood of divorce. She empirically supports this theoretical hypothesis. Similarly, Anderberg et al. (2015) construct an equilibrium model of dynamic signaling with incomplete information, and show both theoretically and empirically that there is a positive correlation between female unemployment and domestic violence.

In contrast, Eswaran and Malhorta (2011) show using a non-cooperative resource allocation model, incorporating domestic violence as an instrument to enhance men's bargaining power, that empowering women increases the level of physical domestic violence against them. Macmillan and Gartner (1999) argue that female employment triggers domestic violence especially when their male partners are not employed. Farmer and Tiefenthaler (1996) analyze the effect of calling the police and receiving shelter protection on domestic violence. They argue that women who tend to forgive their male partners and continue marriage following a domestic violence incident tend to experience more violence in the future due to lowered threat points in intra-household bargaining. Looking at the bigger picture, these alternative channels and theories suggest that female empowerment may in fact increase domestic violence against them under certain circumstances. The common feature of these models is that domestic violence may be used by male partners to restrict women's autonomy. Eswaran and Malhorta (2011) argue that these reverse mechanisms are more relevant for the developing-country context. Our findings are also consistent with the

[2] Erten and Keskin (2018) find that improved female education through a compulsory education reform did not reduce physical violence and, in fact, increased psychological violence against women in Turkey.

[3] See Ellsberg et al. (2015) for a comprehensive review of the literature on domestic violence prevention policies.

studies arguing that men can respond to better status of their female partners in retaliation, since men perceive the improvements in women's socio-economic status as a threat to their traditional patriarchal role. We document that these effects are more prevalent for less-educated women, women with high fertility (i.e., above 2 children), and women with relatively lower education than their male partners.

The plan of the paper is as follows. Section 2 provides the institutional details of the panic button program implemented in two provinces between 2012 and 2016. Section 3 describes the data and explains the econometric identification strategy. Section 4 presents the estimates and discusses the results in detail. Section 5 concludes.

2 Panic button program: Institutional setting

The "Turkish Law on Protection of Family and Prevention of Violence against Females" was adopted in 2012. After the Law became effective, the Ministry of Women and Family Affairs[4] set "reducing the incidence of domestic violence against women in Turkey" as a key policy target. The panic button program was implemented as a major component of that target. The focus of the panic button program was to protect vulnerable women facing domestic abuse/violence and the ones at risk in the piloted provinces, Adana and Bursa. The implementation started in 2012 in the two provinces with the implicit goal of eventually increasing regional coverage—if the policy proves to be effective. The panic button program was operated through a GPS-based electronic support system sponsored by a large GSM company in Turkey. It allowed the security officials to detect the location of the victim upon her activation of the button. The number of buttons distributed in the two provinces was rather limited initially, but the number of active panic buttons increased over time. A large media campaign, which was carried out through various outlets both at national and provincial levels, made it very clear that every women in the two treated provinces had the right to get access to a panic button upon request. The campaign strongly communicated the idea that the program will offer immediate help and protection to women exposed (or at severe risk of being exposed) to domestic violence.

[4]The name of the Ministry of Women and Family Affairs is changed as the Ministry of Family, Labor, and Social Services after the 2018 general elections.

During the initial years of the program, media reports suggested that the government authorities were very satisfied with the outcomes of the program. In an article disseminated to the mainstream media outlets by Anadolu Agency in September 2013[5], the success of the policy was underlined by reporting that "there was not even a single violence event against the women equipped with the panic button." The article also included a statement by a local security officer highlighting the dissuasive effect of panic button on the husband/partner of domestic violence victims. The Minister of Family and Social Policy, Fatma Sahin, also declared that the government decided to expand the panic button policy based on the encouraging outcomes obtained. Surprisingly, the panic button program was abruptly abandoned by the Ministry in 2016. The 2016 National Act Plan of the Ministry of Family and Social Policy states that the panic button system is canceled due to the failure in effective protection of victims in addition to the structural and technical difficulties in implementation. The sudden removal of the policy without any reported negative event stemming from the panic button reveal that there may be more than officially announced basis of cancellation. One possible cause is the indirect effect of the panic button policy on the families who are not currently provided with panic button, but who also have the potential to be covered by the treatment.

The panic button program increases the expected cost of using violence against female partner—even for the ones who are not equipped with the button as they may become a holder after a violence event. This threat increases the bargaining power of the married women. In a country where patriarchal mechanisms still work, exogenous increases in bargaining power of women can create backlash effects on their husbands. If a wife starts to use her increased bargaining power on the decision mechanism in the household on the allocation of household resources, the number of conflicts possessing to end with violence rises. Thus, interestingly, a measure designed against violence can itself to be a reason for using violence in this process.

[5]See, for example, https://www.star.com.tr/guncel/sahin-panik-butonu-kadina-siddeti-azaltti-haber-787853/.

3 Data and empirical approach

3.1 Data description

We use the 2008 and 2014 waves of the Turkish National Research on Domestic Violence Against Women micro-level data sets compiled and published by the Turkish Statistical Office (TurkStat). The two waves of the National Research on Domestic Violence Against Women survey provide cross-sectional information on personal and socio-economic characteristics of 20,116 women of age 15-59 in Turkey.[6] Most importantly, the survey includes a very detailed module on intimate partner violence against women. The survey releases information on whether the interviewed women are exposed to physical, psychological, sexual, and economic violence from their male partners or husbands. Our main focus is on the physical violence questions. The survey asks whether the partner of a participating woman (1) slapped or threw an object to hurt her, (2) pushed/assaulted her or pulled her hair, (3) punched/hit her with an item, (4) kicked/beat her, (5) grabbed her or burned a part of her body, and (6) threatened her with a gun/knife or used those on her. The intensity of these 6 physical violence categories is also presented in the survey data by asking how many times the victim is exposed to the corresponding category—with response categories as once, a few, and many times.

We restrict our sample to married women only as the share of non-married women is small in the data set and the mechanisms/theories to be tested in this paper are more relevant under marital arrangements. The survey asks whether a woman faced violence in the previous 12 months and whether she ever faced violence. Our main dependent variable is a dummy taking 1 if exposed to physical violence in the previous 12 months and 0 otherwise. Specifically, we construct this variable by assigning 1 if a woman experienced at least one of the 6 physical violence types categorized above in the previous 12 months. We disregard the "ever faced physical violence" question as we wish to capture the effect of the panic button policy and earlier violence events may disqualify our estimation strategy, which we explain in Section 3.2. We construct another outcome variable defining the number of physical violence events experienced in the previous 12 months for the

[6] The 2008 and 2014 waves of the survey include 20,257 married women in total. 141 observations were dropped as the province of residence was missing for them.

purpose of capturing intensive margin adjustments. We then use the natural logarithm of this variable in the estimations. Around one third of the women in our sample experienced physical violence by their intimate partners at least once in their life time. This ratio is close to 40 percent when we condition on married women, which suggests that married women experience more violence on average.

Our data set also provides information on the labor market status and bargaining power of women in the household. We use the variable on whether a woman is employed in the week before the interview as a proxy for employment. To construct proxies for economic independence indicators, which we then use to analyze female empowerment, we use (1) the question asking whether the female respondent is able to decide how to spend all of her own income without any interference from the husband or other family members and (2) the question asking whether the respondent is able to find enough money when she needs as indicators of household bargaining position of women. Table (1) presents the summary statistics for the main variables used in the empirical analysis.

The two treated provinces, Adana and Bursa, are large provinces located on the coastal regions of the Mediterranean Sea and Marmara Sea, respectively. As Table (1) suggests, the rates of domestic violence against women in those two provinces are not higher than the average rate of violence across the country. The Ministry does not provide a reason why those two provinces are selected for pilot implementation of the panic button program. Those provinces were likely selected because the Ministry had enough qualified personnel on the field and the provincial police forces were able to put long-term commitment to the program implementation in full coordination with the Ministry.

3.2 Identification strategy

Our main goal is to estimate the causal effect of the panic button program on the domestic physical violence against women. The panic button program was implemented in two Turkish provinces, Adana and Bursa, between 2012 and 2016. We do not know who actually had access to a panic button or who effectively used it in those two provinces. The program was widely advertised locally

and nationally; as a result, it visibly increased the cost of domestic violence for all male partners in the two provinces. So, the program potentially changed the behavior of all male partners in the treated provinces rather than only the partners of women who actually had access to a panic button.

Our micro data set includes two cross-sectional waves, 2008 and 2014, with province-level regional categorization. This setting allows us to implement a diff-in-diff (DiD) strategy based on a standard before-after/treatment-control comparison structure. We use various DiD specifications to estimate the causal effect of interest. In all specifications, the pre-treatment and post-treatment periods are defined by the dummy variable A taking 1 if the observation belongs to the survey wave 2014 and 0 if it belongs to 2008. The treatment and control groups differ across our three specifications. In the first specification, which we name as the "Wide DiD," the treatment group is defined by the dummy variable T taking 1 if the subjects live in Adana and Bursa provinces—which are the treated provinces—and 0 if they live in the other provinces.[7] The upper panel of Figure (1) visualizes the Wide DiD. The colored provinces are the treated ones and the white color describes the control provinces. In the second specification, which we call the "Narrow DiD," the dummy variable T takes 1 if the subjects live in Adana and Bursa provinces and 0 if they live in one of the 12 provinces neighboring Adana and Bursa.[8] The lower panel of Figure (1) displays the treated and control provinces in the Narrow DiD model. The narrow specification captures the idea that the neighboring provinces may serve as a better control group for the treated provinces.

Accordingly, our difference-in-differences regression equation can be specified and formulated as follows:

$$y_{i,y,p,r} = \gamma + \beta(A_{i,y} \times T_{i,p}) + f_y + f_p + (f_y \times f_r) + \epsilon_{i,y,p,r}, \tag{1}$$

where i, y, p, and r index individuals, survey waves/years, provinces, and NUTS2-level regions[9], respectively; y is the outcome variable of interest; f_y, f_p, and f_r are survey year, province and

[7] There are 81 provinces in Turkey; therefore, the number of provinces in the control group for "Wide DiD" is 79.

[8] The control provinces in the Narrow DiD model consist of Balikesir, Bilecik, Hatay, Icel, Osmaniye, Yalova, Kocaeli, Kutahya, Sakarya, Nigde, Kayseri, and Kahramanmaras.

[9] There are 81 provinces and 26 NUTS2-level regions in Turkey.

regions fixed effects; and ϵ is a usual error term. The main parameter that captures our causal effect of interest is β. The interaction terms $f_y \times f_r$ control for time-varying regional shocks that affect the outcome variable. It would be ideal to include these interactions at province-year level, i.e., as $f_y \times f_p$. However, such an interaction structure would create collinearity between the interaction terms and the main treatment variable as the treatment is also provided at province-year level, which would make β a redundant parameter. Instead, we go one level up and include the time-varying regional shocks at NUTS2-level.

Our third specification follows a synthetic control method approach à la Abadie and Gardeazabal (2003) and Abadie et al. (2010, 2015). The synthetic control method assigns the untreated provinces weights that make them comparable to the treated provinces on average. Table (2) presents the estimated weights for 79 control provinces. We use those synthetic control weights in a DiD specification similar to Equation (1) to see whether the results obtained from Wide DiD and Narrow DiD specifications change in this alternative setting.

Relaxing the common trends assumption. Our data set consists of two survey years, 2008 and 2014, which correspond to the pre-program and post-program periods, respectively. This means that there is not enough time periods to perform a credible event-study analysis—such as Autor (2003)—that is typically used in diff-in-diff designs as a formal test of the common trends assumption. Instead, we follow Stephens and Yang (2014) and choose a specification that relaxes the common trends assumption. Inclusion of the year-region interaction terms captures time-varying effects specific to NUTS2 regions. For example, one main region-specific shock that exists in 2014 but not in 2008 is the refugee influx.[10] Refugees are unevenly distributed across the country and their presence may be affecting household bargaining, and therefore domestic violence, either through the labor market channel or the marriage market channel. Similarly, those interaction terms also capture differential trends in intimate partner violence across regions and policy implementations or other shocks that differ across regions. Note that the two treated provinces are located in different NUTS2-level regions; therefore, the inclusion of region-year interaction terms also captures any differential trends across provinces within the treatment group.

[10] See Tumen (2016) for a detailed institutional description of the refugee shock.

4 Results and discussion

This section presents the results of our empirical analysis and discusses the estimates in detail. Before we start, we would like to clarify the mode of inference used in our analysis. We cluster the standard errors at province level as the treatment is also provided at the same level. The Wide-DiD specification and the synthetic control analysis both cover 81 provinces across Turkey, which suggests that the number of clusters is large enough to warrant a healthy calculation of clustered standard errors. Our Narrow-DiD specification has a smaller number of provinces—14 provinces—and therefore a smaller number of clusters. It is well-known that clustering substantially reduces the standard errors when the number of clusters are low, which increases the likelihood of a type-2 error (MacKinnon et al., 2017). One solution is to calculate standard errors using wild cluster bootstrap (Roodman et al., 2019). We report both the clustered and wild bootstrapped standard errors in our tables, and interpret the results accordingly. We should note at this stage that we interpret the significance levels of the Narrow-DiD coefficients based on the wild bootstrapped standard errors.

Tables (3) and (4) present our baseline results for the effect of the program on the probability and number of physical domestic violence, respectively. We find that the program increased the probability of physical domestic violence against married women by 5.6-5.8 percentage points and the number of physical domestic violence events by approximately 9 percent. These estimates are robust to wild cluster bootstrapping in all specifications.

Next we examine the heterogeneous effects of the panic button program on different sub-samples. We first divide our sample between less-educated (less than high school) and more-educated (high school and above) married women. Tables (5) and (6) report the estimates for less-educated women. The Narrow-DiD specification does not yield statistically significant estimates when the standard errors are wild bootstrapped. We find that the program increased the probability and number of physical domestic violence against less-educated women by 10 percentage points and 16-17 percent, respectively. As shown in Tables (7) and (8), married women with at least high school education did not experience any increase in physical domestic violence. This statement

does not immediately imply any level differences in physical violence against women of different education levels. Instead, it suggests that wife's education level is a critical determinant how the husband responds to any threats to his control on his wife.

Tables (9) and (10) present the results for married women with low (0 or 1 child) and high fertility (2 children and above). We find that the panic button program increased the probability of physical domestic violence against married women with high fertility by approximately 8 percentage points, while there is no statistically significant impact on the ones with low fertility. Farmer and Tiefenthaler (1996) argue that women's forgiving tendencies increase domestic violence against them. Our finding related to fertility is consistent with the arguments raised by Farmer and Tiefenthaler (1996) in the sense that higher number of children increases the commitment of the wife on marriage and therefore reduces the probability of divorce when physical violence is imposed by the husband. As a result, the husband becomes more likely to exercise physical violence when the wife is empowered in marriages with multiple children.

We also examine how husband's education correlates with the impact of the panic button program on physical domestic violence against married women. Tables (11), (12), (13), and (14) show the results of the regressions for the sub-samples conditioned on husband's education and the education gap between the husband and the wife. Our estimates suggest two main findings, which are related to each other: (1) men with at least a high school education increased their violence against their female partners in response to the program and (2) the increase in the probability of physical violence against women is significant in marriages where the husband is more educated than the wife.

Next we investigate whether the panic button program economically empowered married women or not. To perform this task, we focus on three outcome variables: women's employment, whether women has full control over how to spend all of her own money, and whether women can have access to enough money when needed. These three outcome variables together enable us to test whether the program led to female empowerment or not. If the answer is yes, then the result that "more educated husbands increased physical domestic violence against their less-educated

wives in marriages with high fertility" can be interpreted within the context of male backlash theories. Indeed, we find that the program increased the employment rates among married women and, consistent with our baseline results, we highlight that the increase comes entirely from the increase in the employment rates of less-educated women [Table (15)]. The finding that increased employment may have triggered the increase in domestic violence against women is in line with the findings reported by Chin (2012).

To understand how the panic button program affected the economic independence levels of women, the results presented in Tables (16), (17), (18), (19), and (20) should be interpreted together. Tables (16)-(19) report that the increase in physical domestic violence against women comes almost entirely from women with low economic independence, i.e., the ones who cannot fully decide how to spend own money or who cannot find enough money when needed. Table (20) reports the analysis in which we set "economic independence" as the outcome variable. The economic independence variable is constructed as a dummy variable taking 1 if the woman "can fully decide how to spend own money" or "can find enough money when needed," and 0 otherwise. The results suggest that the program switched part of the economically dependent women into being economically independent. Again, consistent with our baseline findings, this switch comes from less-educated women.

The panic button program specifically targets reducing domestic physical violence against women. Our dataset also provides information on the types of domestic violence other than physical violence. Accordingly, we also analyze how the panic button program changed the probabilities of psychological and sexual domestic violence against married women. The results presented in Table (21) and Table (22) suggest that psychological violence did not change, but sexual violence somewhat increased against less-educated women in the treated provinces relative to control provinces following the implementation of the program. Studies, in general, report positive correlation between physical and sexual domestic violence against women, which is also observed in our study.

Whether our estimates are driven by an increase in actual or self-reported violence is a question

that naturally arises. In other words, whether female empowerment triggered additional violence or led to more courageous self-reporting of violence is the key issue here. Generally speaking, reporting bias—as an old debate in the epidemiology literature—is known as "selective revealing" by subjects, when there is a situation making them misreport the available information. This is typically the case for questions about sensitive personal and/or family issues. Survey questions about domestic violence fall into this category as vulnerable women may tend to under-report the incidence of intimate partner violence that they are exposed to. In addition to survey data, administrative records on domestic violence also suffer from reporting bias. Most studies in the literature are not able to distinguish between actual versus self-reported violence due to data limitations.

Our data set offers an interesting set of questions that help us distinguish between the two channels. We utilize the retrospective nature of the domestic violence questions. In particular, there is a question asking whether or not women in the sample are exposed to violence before 12 months prior to the survey administration—in addition to our main question asking domestic violence during the past 12 months. The time period examined in this specific question falls into the pre-program period, but the question is directed in the 2014 (post-program) survey. If our estimates were driven by the self-reporting effect, then we would have observed a similar increase in violence when this retrospective question was the dependent variable. In contrast, our estimates suggest null effects when this retrospective variable is used in the regressions. Estimates presented in Tables (23), (24), and (25) say that domestic violence experienced in the pre-program period, but reported after the program implementation does not change in a statistically significant way—for the entire sample, high-educated women, and low-educated women. So, we conclude that the estimates are entirely driven by an increase in actual rather than self-reported violence.

Finally, we perform a placebo exercise to verify the robustness of our difference-in-differences analysis. We keep our treated provinces unchanged. Out of 79 control provinces across Turkey, we randomly draw 2 provinces, employ our DiD regression, and record the resulting coefficient estimate along with wild bootstrapped standard errors. We repeat this task 1,000 times. Figure (2) plots the distribution of the 1,000 estimated coefficients. The average estimate is 0.0059 and

the average wild bootstrapped standard error is 0.0254. The interval of estimates is roughly between -0.04 and 0.06. Of those 1,000 estimates, only 0.03 percent are statistically significant based on wild bootstrapped standard errors and 1.5 percent are statistically significant based on simply clustered standard errors. This exercise suggests that the results are robust to changing the control provinces with any randomly selected group of provinces in the difference-in-differences analysis.

5 Concluding remarks

This paper evaluates the impact of a panic button program piloted in two Turkish provinces between 2012 and 2016 to reduce physical domestic violence against women. The aim was to ultimately extend the coverage of the program to the entire country upon approval of its effectiveness. The program was terminated in 2016 with no substantive reason, and the impact of the program on domestic violence against women was unknown to date. Using the quasi-experimental nature of the institutional setting, we employ a difference-in-differences strategy to estimate the causal effect of the program on domestic violence against women and other related outcomes to uncover the underlying mechanisms at work.

We find that the panic button program increased physical domestic violence against less-educated women and women with high fertility both at the extensive and intensive margins. We also document that the program increased employment rates and economic independence levels of those women. In the big picture, the program empowered less-educated women economically, but also triggered a male backlash effect in the sense that males increased physical violence against their female partners to restore their—perceivedly weakened due to increased autonomy of women—authority in the household. Empowered women who are less likely to divorce—due to cultural, socio-economic, religious, or family reasons—have been affected the worse. We should note that the mechanism that we hypothesize in this paper and other male backlash channels are more likely to operate in developing country contexts, where paternalistic norms are dominant in the household. These results support the view that prevention policies aiming to reduce domestic violence by empowering women and changing the bargained intra-household positions should be

exercised with caution.

Using the retrospective nature of the domestic violence questions in the survey, we develop a method that helps us to separately identify the change in actual violence form the self-reporting bias. Since we also argue that the program has empowered married women, it may well be the case that the program has encouraged women to report domestic violence they are exposed to in a truthful way. We present convincing evidence that the entire effect comes from the increase in actual domestic violence against women rather than an increase in self-reporting. This finding reinforces the male backlash arguments.

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Summary statistics

	Wide				Narrow			
	Treated		**Control**		**Treated**		**Control**	
	Before	After	Before	After	Before	After	Before	After
Physical violence incidence (last 12 months)	0.087	0.081	0.113	0.079	0.087	0.081	0.105	0.092
# of physical violence in logs (last 12 months)	0.156	0.136	0.196	0.133	0.155	0.136	0.182	0.156
Psychological violence incidence (last 12 months)	0.273	0.277	0.275	0.243	0.273	0.277	0.255	0.234
Sexual violence incidence (last 12 months)	0.060	0.047	0.090	0.050	0.060	0.047	0.074	0.044
Age	36.75	38.35	36.68	38.47	36.75	38.35	37.07	38.57
Education less than high school	0.757	0.726	0.823	0.805	0.757	0.726	0.815	0.784
Can find enough money when needed	0.476	0.497	0.412	0.413	0.476	0.497	0.470	0.446
Can decide how to spend own money	0.111	0.213	0.081	0.166	0.111	0.213	0.092	0.151
Employed last week	0.108	0.230	0.146	0.198	0.108	0.230	0.174	0.199
Husband's education less than high school	0.646	0.628	0.679	0.661	0.646	0.628	0.707	0.664
Number of children	2.17	2.05	2.56	2.51	2.17	2.05	2.23	2.26
# of observations	370	296	9,606	5,531	370	296	1,627	855

Table 1: Summary statistics. This table reports the means of the main variables used in the empirical analysis with respect to treatment and control groups—by paying attention to differences before and after the treatment for each group. The sample includes married women only. Formal definitions of the wide and narrow specifications are provided in Section 3 [see also Figure (1)].

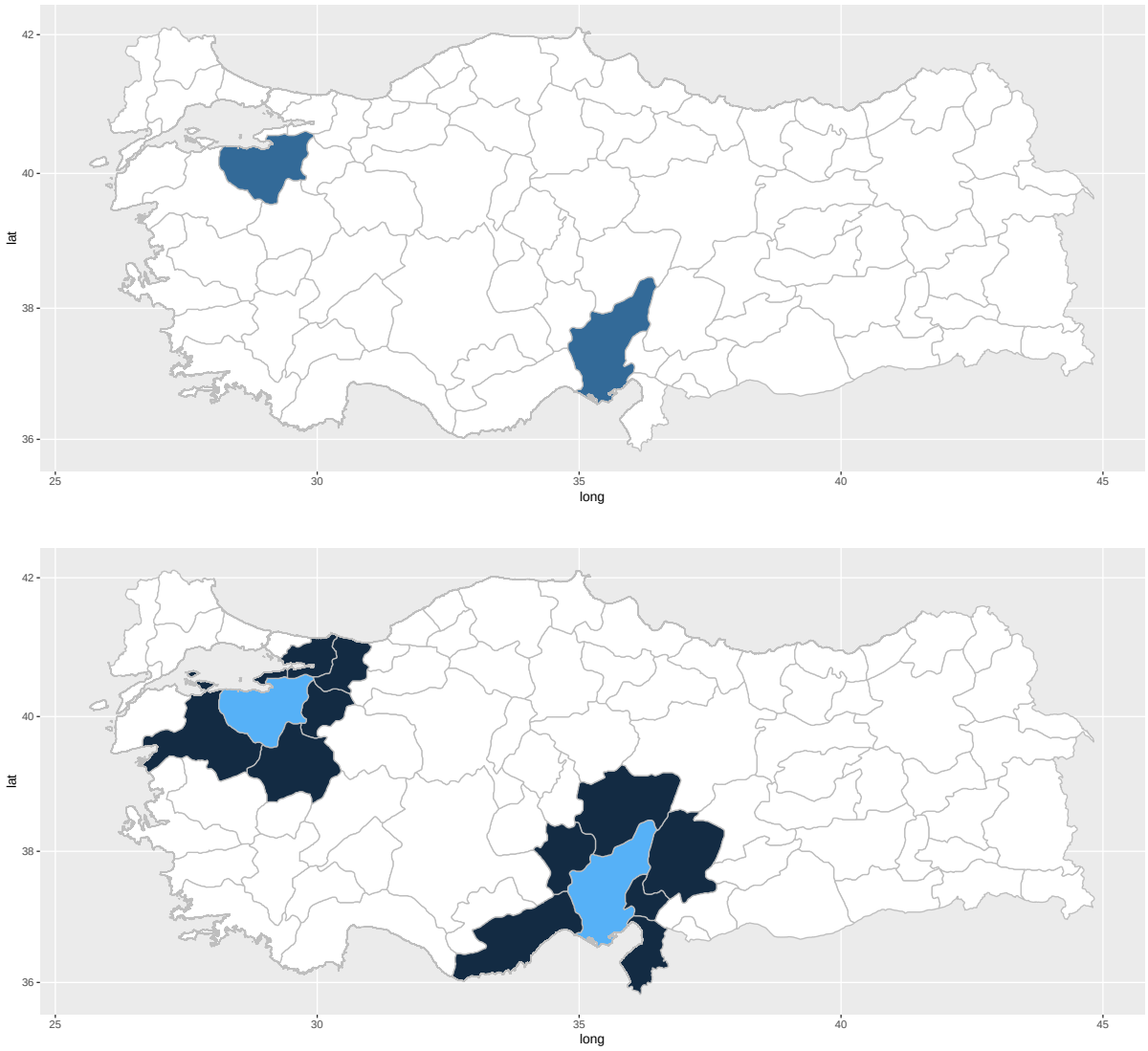

Figure 1: DiD specifications. The first map refers to the "Wide DiD" specification, where the treated provinces are Adana and Bursa while the control provinces include the rest of the country. The second map describes the "Narrow DiD" specification, where the definition of the treatment group is unchanged and the control group is changed as the neighboring provinces—i.e., Balikesir, Bilecik, Hatay, Icel, Osmaniye, Yalova, Kocaeli, Kutahya, Sakarya, Nigde, Kayseri, and Kahramanmaras.

Synthetic control weights

Province name	Weight	Province name	Weight
Adana	0.0124	Izmir	0.0117
Adiyaman	0.0117	Kahramanmaras	0.0127
Afyonkarahisar	0.0127	Karabuk	0.0127
Agri	0.0146	Karaman	0.0137
Aksaray	0.0107	Kars	0.0146
Amasya	0.0078	Kastamonu	0.0078
Ankara	0.0127	Kayseri	0.0098
Antalya	0.0088	Kilis	0.0146
Ardahan	0.0068	Kirikkale	0.0078
Artvin	0.0068	Kirklareli	0.0156
Aydin	0.0390	Kirsehir	0.0078
Balikesir	0.0088	Kocaeli	0.0088
Bartin	0.0078	Konya	0.0088
Batman	0.0098	Kutahya	0.0088
Bayburt	0.0078	Malatya	0.0127
Bilecik	0.0098	Manisa	0.0088
Bingol	0.0137	Mardin	0.0127
Bitlis	0.0107	Mugla	0.0088
Bolu	0.0078	Mus	0.0088
Burdur	0.0478	Nevsehir	0.0088
Bursa	0.0124	Nigde	0.0127
Canakkale	0.0068	Ordu	0.0088
Cankiri	0.0078	Osmaniye	0.0107
Corum	0.0088	Rize	0.0088
Denizli	0.0088	Sakarya	0.0088
Diyarbakir	0.0146	Samsun	0.0088
Duzce	0.0117	Sanliurfa	0.0146
Edirne	0.0068	Siirt	0.0098
Elazig	0.0117	Sinop	0.0088
Erzincan	0.0088	Sirnak	0.0302
Erzurum	0.0107	Sivas	0.0088
Eskisehir	0.0117	Tekirdag	0.0088
Gaziantep	0.0146	Tokat	0.0088
Giresun	0.0098	Trabzon	0.0098
Gumushane	0.0068	Tunceli	0.0088
Hakkari	0.0088	Usak	0.0059
Hatay	0.0127	Van	0.0810
Icel	0.0098	Yalova	0.0098
Igdir	0.0117	Yozgat	0.0098
Isparta	0.0244	Zonguldak	0.0107
Istanbul	0.0185		

Table 2: Estimated synthetic control weights. The weights for 81 provinces in Turkey are obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. The weights are estimated to match the pre-treatment composition of wife's age and education, and husband's education as a predictor for domestic violence indicators in the treatment and control groups.

Probability of physical intimate partner violence last year

All sample	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0568	0.0581	0.0561
(Clustered standard errors)	(0.0041)***	(0.0108)***	(0.0043)***
(Wild bootstrap p-values)	(0.0173)**	(0.0848)*	(0.0230)**
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	15,803	3,148	15,803
# of clusters	81	14	81
R^2	0.0420	0.0537	0.0458

Table 3: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Natural logarithm of the total number of physical intimate partner violence last year

All sample	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0905	0.0879	0.0911
(Clustered standard errors)	(0.0084)***	(0.0101)***	(0.0089)***
(Wild bootstrap p-values)	(0.0269)**	(0.0906)*	(0.0326)**
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	15,803	3,148	15,803
# of clusters	81	14	81
R^2	0.0458	0.0487	0.0487

Table 4: The dependent variable is coded as the natural logarithm of the total number of physical intimate partner violence that the subject was exposed to in the previous 12 months. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Women<high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0989	0.0743	0.1000
(Clustered standard errors)	(0.0202)***	(0.0108)***	(0.0215)***
(Wild bootstrap p-values)	(0.0952)*	(0.1176)	(0.0977)*
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	12,854	2,491	12,854
# of clusters	81	14	81
R^2	0.0469	0.0623	0.0497

Table 5: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women of less than high school education. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Natural logarithm of the total number of physical intimate partner violence last year

Women<high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.1645	0.1212	0.1686
(Clustered standard errors)	(0.0371)***	(0.0085)***	(0.0396)***
(Wild bootstrap p-values)	(0.1726)	(0.1093)	(0.1679)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	12,854	2,491	12,854
# of clusters	81	14	81
R^2	0.0406	0.0532	0.0430

Table 6: The dependent variable is coded as the natural logarithm of the total number of physical intimate partner violence that the subject was exposed to in the previous 12 months. The sample includes married women of less than high school education. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Women≥high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	-0.0165	0.0054	-0.0180
(Clustered standard errors)	(0.0203)	(0.0157)	(0.0207)
(Wild bootstrap p-values)	(0.6691)	(0.7295)	(0.6428)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	2,949	657	2,949
# of clusters	81	14	81
R^2	0.0754	0.1118	0.0844

Table 7: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women of high school education and above. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Natural logarithm of the total number of physical intimate partner violence last year

Women≥high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	-0.0369	-0.0100	-0.0385
(Clustered standard errors)	(0.0265)	(0.0392)	(0.0276)
(Wild bootstrap p-values)	(0.3080)	(0.8373)	(0.3459)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	2,949	657	2,949
# of clusters	81	14	81
R^2	0.0805	0.1025	0.1040

Table 8: The dependent variable is coded as the natural logarithm of the total number of physical intimate partner violence that the subject was exposed to in the previous 12 months. The sample includes married women of high school education and above. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Fertility*≤*1	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	-0.0035	-0.0085	-0.0100
(Clustered standard errors)	(0.0249)	(0.0440)	(0.0285)
(Wild bootstrap p-values)	(0.9291)	(0.8562)	(0.8252)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	3,825	834	3,825
# of clusters	81	14	81
R^2	0.0649	0.0938	0.0662

Table 9: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women with 0 or 1 child. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Fertility*≥*2	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0805	0.0763	0.0787
(Clustered standard errors)	(0.0030)***	(0.0062)***	(0.0037)***
(Wild bootstrap p-values)	(0.0288)**	(0.1355)	(0.0283)**
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	11,978	2,314	11,978
# of clusters	81	14	81
R^2	0.0470	0.0615	0.0575

Table 10: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women with 2 children or above. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Men<high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0201	-0.0096	0.0207
(Clustered standard errors)	(0.0303)	(0.0232)	(0.0338)
(Wild bootstrap p-values)	(0.7151)	(0.8121)	(0.7260)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	10,606	2,145	10,606
# of clusters	81	14	81
R^2	0.0519	0.0654	0.0550

Table 11: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women with husband less than high school education. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Men≥high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.1321	0.1791	0.1262
(Clustered standard errors)	(0.0344)***	(0.0243)***	(0.0360)***
(Wild bootstrap p-values)	(0.1893)	(0.0276)**	(0.1891)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	5,197	1,003	5,197
# of clusters	81	14	81
R^2	0.0535	0.0865	0.0548

Table 12: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women with husband of high school education and above. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Husband's educ*≤*Wife's educ	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0654	0.0200	0.0668
(Clustered standard errors)	(0.0525)	(0.0469)	(0.0552)
(Wild bootstrap p-values)	(0.5131)	(0.8838)	(0.5465)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	8,676	1,895	8,676
# of clusters	81	14	81
R^2	0.0775	0.0869	0.0937

Table 13: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women with husbands at most as educated as themselves. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Husband's educ*>*Wife's educ	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0695	0.1127	0.0724
(Clustered standard errors)	(0.0299)**	(0.0252)***	(0.0313)**
(Wild bootstrap p-values)	(0.3647)	(0.1199)	(0.2643)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	7,127	1,253	7,127
# of clusters	81	14	81
R^2	0.0758	0.0954	0.0758

Table 14: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women with husbands more educated than themselves. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Women employed last week

	Wide DiD	Narrow DiD	Synthetic control
Panic button effect (All women)	0.0681	0.0520	0.0701
(Clustered standard errors)	(0.0221)***	(0.0254)*	(0.0229)***
(Wild bootstrap p-values)	(0.1050)	(0.1683)	(0.1142)
# of observations	15,803	3,148	15,803
R^2	0.0712	0.0721	0.0806
Panic button effect (Women<HS)	0.0806	0.0748	0.0820
(Clustered standard errors)	(0.0137)***	(0.0237)***	(0.0141)***
(Wild bootstrap p-values)	(0.0723)*	(0.2028)	(0.0920)*
# of observations	12,854	2,491	12,854
R^2	0.0836	0.0921	0.0905
Panic button effect (Women≥HS)	-0.0225	-0.0217	-0.0023
(Clustered standard errors)	(0.0301)	(0.0457)	(0.0315)
(Wild bootstrap p-values)	(0.6428)	(0.6146)	(0.9509)
# of observations	2,949	657	2,949
R^2	0.1004	0.1207	0.1017
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of clusters	81	14	81

Table 15: The dependent variable is coded as a dummy variable indicating whether the woman is employed during the previous week of the interview of not. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Can find enough money when needed	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0371	0.0694	0.0374
(Clustered standard errors)	(0.0333)	(0.0325)*	(0.0340)
(Wild bootstrap p-values)	(0.7102)	(0.4964)	(0.7646)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	6,561	1,468	6,561
# of clusters	81	14	81
R^2	0.0475	0.0652	0.0534

Table 16: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women, who can find enough money when needed. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Cannot find enough money when needed	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0964	0.0702	0.0967
(Clustered standard errors)	(0.0366)**	(0.0367)*	(0.0373)**
(Wild bootstrap p-values)	(0.0931)*	(0.1934)	(0.0953)*
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	9,242	1,680	9,242
# of clusters	81	14	81
R^2	0.0514	0.0691	0.0547

Table 17: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women, who cannot find enough money when needed. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Can fully decide how to spend own income	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0215	0.0623	0.0166
(Clustered standard errors)	(0.0274)	(0.0241)**	(0.0297)
(Wild bootstrap p-values)	(0.6467)	(0.1046)	(0.7454)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	1,801	383	1,801
# of clusters	81	14	81
R^2	0.1044	0.1570	0.1132

Table 18: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women, who can fully decide how to spend own income. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence last year

Cannot fully decide how to spend own income	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	0.0604	0.0507	0.0599
(Clustered standard errors)	(0.0079)***	(0.0125)***	(0.0088)***
(Wild bootstrap p-values)	(0.0332)**	(0.0936)*	(0.0825)*
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	14,002	2,765	14,002
# of clusters	81	14	81
R^2	0.0429	0.0561	0.0463

Table 19: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence in the previous 12 months. The sample includes married women, who cannot fully decide how to spend own income. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Women economically independent

	Wide DiD	Narrow DiD	Synthetic control
Panic button effect (All women)	0.1274	0.1937	0.1217
(Clustered standard errors)	(0.0508)**	(0.0193)***	(0.0508)**
(Wild bootstrap p-values)	(0.1997)	(0.1311)	(0.1777)
# of observations	15,803	3,148	15,803
R^2	0.0854	0.0468	0.1043
Panic button effect (Women<HS)	0.1480	0.2292	0.1413
(Clustered standard errors)	(0.0657)**	(0.0326)***	(0.0667)**
(Wild bootstrap p-values)	(0.5056)	(0.0998)*	(0.5448)
# of observations	12,854	2,491	12,854
R^2	0.0684	0.0540	0.0816
Panic button effect (Women≥HS)	-0.0581	0.0647	-0.0625
(Clustered standard errors)	(0.0702)	(0.0246)*	(0.0733)
(Wild bootstrap p-values)	(0.7335)	(0.2292)	(0.7282)
# of observations	2,949	657	2,949
R^2	0.0701	0.0856	0.0754
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of clusters	81	14	81

Table 20: The dependent variable is coded as a dummy variable indicating whether the woman is economically independent or not. A woman is economically independent if she can find enough money when she needs or she can fully decide how to spend own income. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of psychological intimate partner violence last year

	Wide DiD	Narrow DiD	Synthetic control
Panic button effect (All women)	-0.0020	-0.0128	-0.0001
(Clustered standard errors)	(0.0258)	(0.0373)	(0.0266)
(Wild bootstrap p-values)	(0.9376)	(0.8541)	(0.9968)
# of observations	15,803	3,148	15,803
R^2	0.0245	0.0394	0.0274
Panic button effect (Women<HS)	-0.0117	-0.0272	-0.0108
(Clustered standard errors)	(0.0218)	(0.0187)	(0.0241)
(Wild bootstrap p-values)	(0.8085)	(0.3765)	(0.8418)
# of observations	12,854	2,491	12,854
R^2	0.0280	0.0530	0.0303
Panic button effect (Women≥HS)	0.0428	0.0554	0.0483
(Clustered standard errors)	(0.0430)	(0.0957)	(0.0430)
(Wild bootstrap p-values)	(0.3933)	(0.7968)	(0.3432)
# of observations	2,949	657	2,949
R^2	0.0606	0.0838	0.0746
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of clusters	81	14	81

Table 21: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to psychological intimate partner violence in the previous 12 months. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of sexual intimate partner violence last year

	Wide DiD	Narrow DiD	Synthetic control
Panic button effect (All women)	0.0153	0.0457	0.0139
(Clustered standard errors)	(0.0207)	(0.0106)***	(0.0210)
(Wild bootstrap p-values)	(0.7867)	(0.4633)	(0.7275)
# of observations	15,803	3,148	15,803
R^2	0.0345	0.0223	0.0433
Panic button effect (Women<HS)	0.0415	0.0567	0.0401
(Clustered standard errors)	(0.0126)***	(0.0151)***	(0.0123)***
(Wild bootstrap p-values)	(0.2201)	(0.4692)	(0.2807)
# of observations	12,854	2,491	12,854
R^2	0.0371	0.0284	0.0448
Panic button effect (Women≥HS)	-0.0551	0.0038	-0.0569
(Clustered standard errors)	(0.0274)**	(0.0062)	(0.0264)**
(Wild bootstrap p-values)	(0.1500)	(0.5288)	(0.1731)
# of observations	2,949	657	2,949
R^2	0.0721	0.1129	0.0983
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of clusters	81	14	81

Table 22: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to sexual intimate partner violence in the previous 12 months. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence before the program

All sample	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	-0.0365	0.0080	-0.0413
(Clustered standard errors)	(0.0350)	(0.0193)	(0.0373)
(Wild bootstrap p-values)	(0.6495)	(0.8400)	(0.6408)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	15,803	3,148	15,803
# of clusters	81	14	81
R^2	0.0598	0.0495	0.0572

Table 23: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence before the implementation of the program. The sample includes married women. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence before the program

Women<high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	-0.0025	0.0258	-0.0067
(Clustered standard errors)	(0.0271)	(0.0266)	(0.0274)
(Wild bootstrap p-values)	(0.9594)	(0.6140)	(0.8771)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	12,854	2,491	12,854
# of clusters	81	14	81
R^2	0.0562	0.0470	0.0568

Table 24: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence before the implementation of the program. The sample includes married women of less than high school education. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Probability of physical intimate partner violence before the program

Women≥high school	Wide DiD	Narrow DiD	Synthetic control
Panic button effect	-0.0639	-0.0210	-0.0764
(Clustered standard errors)	(0.0449)	(0.0343)	(0.0460)
(Wild bootstrap p-values)	(0.4473)	(0.6352)	(0.3145)
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Year×Region interactions	Yes	Yes	Yes
# of observations	2,949	657	2,949
# of clusters	81	14	81
R^2	0.0692	0.1324	0.0626

Table 25: The dependent variable is coded as a dummy variable indicating whether the subject was exposed to physical intimate partner violence before the implementation of the program. The sample includes married women of high school education and above. The year-region interactions are defined based on NUTS2 regional categorization in Turkey. The "panic button effect" variable is obtained by interacting the treated-untreated and before-after dummies. Standard errors are clustered at province level. The wild bootstrap exercise is performed as described by Roodman et al. (2019) based on 10,000 replications. The synthetic control column reports DiD results using the synthetic control weights obtained by employing the Abadie and Gardeazabal (2003) and Abadie et al. (2010) procedure. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

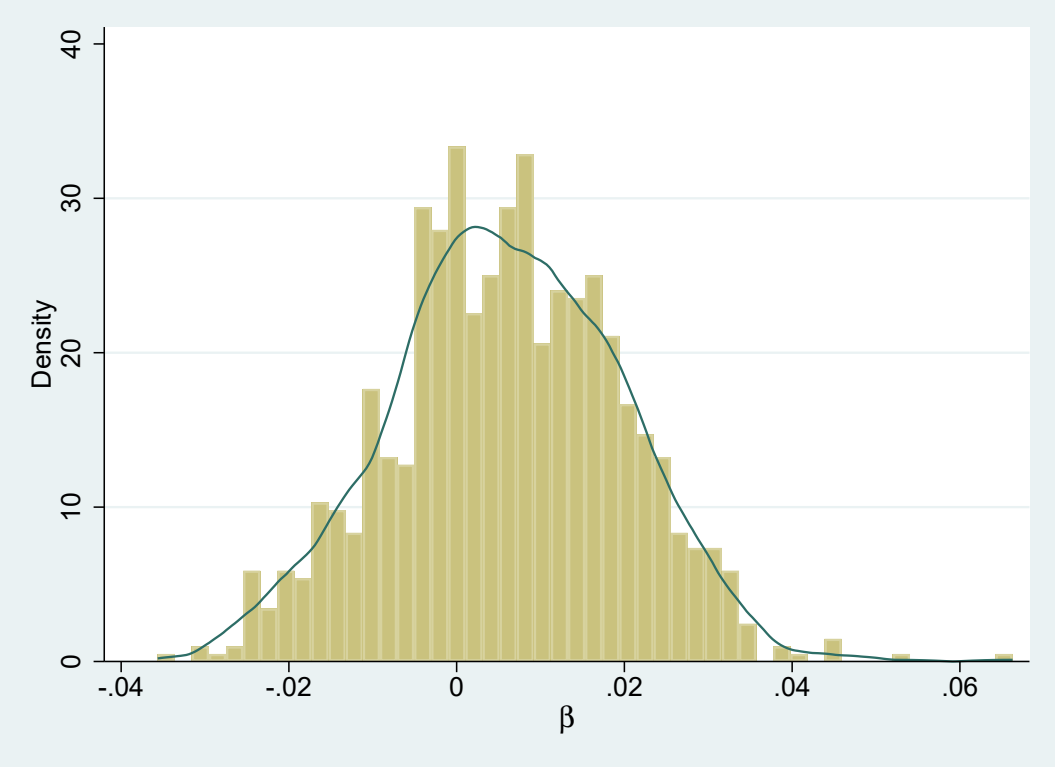

Figure 2: Placebo treatment groups. This figure is constructed based on the following algorithm. First, the treated provinces, Adana and Bursa, are excluded from the sample. Then, 2 placebo treated provinces are randomly selected among the remaining 79 provinces—originally control provinces. The Wide DiD specification is implemented; a "placebo" panic button effect is estimated and recorded. This procedure is performed 1,000 times and the resulting coefficient estimates are plotted. Around 98.5 percent of the estimates are statistically insignificant with clustered standard errors and 99.7 percent of the estimates are statistically insignificant based on wild bootstrap p-values. The mean coefficient estimate is 0.0059 and the mean standard error is 0.0254. The distribution of the coefficient estimates is close to being symmetric around the mean.