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Conflict exposure and labour market outcomes: Evidence from longitudinal data for the Gaza Strip☆

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ABSTRACT

This paper documents the effect of variations in the individual-level intensity of conflict exposure on various labour market outcomes for Palestinians living in the Gaza Strip. Combining individual-level longitudinal employment data and geolocalised information on conflict-related events, we show that an increase in conflict exposure of the individual, while it does not affect the employment status on average, it has a heterogeneous impact on job transitions depending on the worker being employed in the private or the public sector. We also find that, for those in the private sector, higher conflict exposure reduces the labour income and the number of hours worked. For those in the public sector, the effect of conflict is instead null on both the labour income and the number of hours worked and it is positive on wages. Finally, we provide suggestive evidence that these results are explained by the combination of two mechanisms, namely the conflict-induced change in the health conditions of the workers (which affects the labour supply) and in the level of the local economic activity (which affects the labour demand).

1. Introduction

Conflict has severe economic, social, and political consequences. Exposure to conflict decreases economic activity (Amodio and Di Maio, 2018; Korovkin and Makarin, 2023; Del Prete et al., 2023), reduces education outcomes (Leon, 2012; Justino et al., 2014; Brück et al., 2019a; Bertoni et al., 2018), worsen health conditions (Mansour and Rees, 2012; Minoiu and Shemyakina, 2014; Di Maio and Leone Sciabolazza, 2021), impacts fertility (Krahnert et al., 2019), and influences political views (Jaeger et al., 2012).

One important way in which conflict is also expected to negatively affect individual well-being is through its impact on the labour market. However, evidence on the effects of conflict on labour market outcomes is still very limited, mainly because of a lack of data. Detailed labour market data are rarely available in conflict-affected countries and, even when they exist, they often lack the longitudinal dimension which is necessary for the rigorous measurement of the impacts of conflict at the individual level across time and for the understanding the mechanisms through which they materialize. Both these elements are key to properly design policy measures for mitigating the negative impact of conflict on the labour market and the economy at large.

In this paper, we document the effect of conflict exposure on several labour market outcomes for Palestinians living in the Gaza Strip. Over the past fifteen years, the Gaza Strip has experienced successive rounds of violent confrontations with Israel. These clashes have had severe economic and humanitarian impacts on the civilian population, in one of the most densely populated and poorer regions in the world. Focusing on the Gaza Strip allows us to overcome some of the data limitations that often characterizes studies on the labour-market effects of conflict. There are two main reasons for this. First, longitudinal detailed individual-level data on various labour market outcomes are available for various years for a large sample of individuals. Second, the conflict

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between the Gaza Strip and Israel is characterised by different phases in terms of intensity, location, and type of violent events, providing meaningful time and geographical variation in the level of conflict to which individuals have been exposed.

In this paper, we estimate the effect of variations in the individual-level intensity of conflict exposure on various labour market outcomes for Palestinians living in the Gaza Strip during the period 2013-2018. This period includes various waves of fighting between the Palestinians and the Israeli Defence Forces (IDF), including the so-called Gaza-Israeli War. In our analysis, we combine two main data sources. The first one is the Socio-Economic Monitoring of the Palestinian Households' Survey. This dataset provides information on a large number of individual-level labour-market outcomes (employment status, labour income, number of hours worked, and wages), the sector of activity (public vs private), the industry (agriculture, manufacturing, and service), and the health conditions (i.e., whether the individual suffered from any difficulty in vision, hearing, or movement). It also reports data on household-level consumption levels and assistance received. In our analysis, we use all the three waves of the SEFSec survey which provide longitudinal individual-level data allowing us to build a panel for the period 2013-2018. Our final sample includes the 1724 individuals interviewed in all three waves. The second data source is the Integrated Crisis Early Warning System (ICEWS) dataset, which provides geo-localized information on all conflict-related violent events that occurred in the Gaza Strip during the period 2013-2018. We use this data to build an individual-specific measure of exposure to conflict given by the number of conflict-related violent which occurred in the 10 km radius from the centroid of respondent's residential locality.[1] To the best of our knowledge, this is the first paper looking at the effect of localized conflict exposure on labour market outcomes using longitudinal data at the individual level.

In our analysis, we study the effect of conflict exposure on labour outcomes by exploiting the variation in the number of conflict events that occurred in the neighbourhood of residence of the individual, controlling for individual, time, and locality-specific time trends. We provide suggestive evidence that our analysis is unlikely to be affected by threats to the identification strategy such as sample attrition, reverse causality, measurement error, and relocation or migration choices.

We begin by looking at the effect of conflict on the employment status of the individuals in the Gaza Strip. Our results show that an increase in conflict exposure of the individual, while it does not affect the employment status on average, it has a heterogeneous impact on job transitions depending on the worker being employed in the private or the public sector. For those employed in the private sector, an increase in conflict exposure increases the probability of becoming unemployed but also that of becoming employed in the public sector. For those employed in the public sector, an increase in conflict exposure reduces the probability of being employed in the private sector but it does not increase the probability of becoming unemployed. These findings suggest, in line with anecdotal evidence on the behaviour of the Hamas government in the Gaza Strip, that jobs in the public sector are used as a buffer against the negative effects of conflict on the economy.

Next, we show that an increase in the number of conflict events occurred in the neighbourhood of the individual reduces the labour income. Heterogeneity analysis indicates that the effect is mostly driven by the labour income reduction suffered by workers in the private sector, while the labour income for workers in the public sector does not change with conflict intensity. In the private sector, the labour income decreases because conflict, while not having an impact on wages, reduces the number of hours worked. In the public sector, conflict instead only weakly reduces the number of hours while increases wages, thus leading to a non–significant change in the labour income. We also show that these results are robust to several checks, such as the use of alternative model specifications, the inclusion of additional controls, and the use of alternative measures of conflict exposure.

As the second step in our analysis, we explore the possible mechanisms explaining the finding that higher conflict exposure affects labour income, number of hours worked, and wages, with these effects being different across the private and the public sector. We provide suggestive evidence that two mechanisms are at work, namely the conflict-induced change in the health conditions of the individuals (which affect the labour supply) and in the level of the local economic activity (which affect labour demand). The reduction in the labour income in the private sector – driven by a reduction in the number of hours worked – is the result of the worsening in individual health conditions (which reduces the labour supply) coupled with a lower private sector level of economic activity (which reduces labour demand). For those in the public sector, we show that the worsening in the individual health conditions (which reduces the labour supply) is instead coupled with a null (or positive) effect of the conflict on the size of the public sector (which leaves unaffected - or increases - the demand of labour). This is consistent with our results indicating that for these workers conflict does not affect the labour income and the number of hours worked, while it has a positive effect on wages.

Our paper contributes to two main lines of research. The first one is the microeconomic analysis of the effect of conflict-related violence. Most of this literature focuses on the impact of conflict on education and health (see Verwimp et al. 2019, for a review).[2] Only a few studies look at the economic outcomes, including the labour market ones, of individuals exposed to violence. Among those, a wide variety of results emerge, depending on the conflict, the type of violence, the time horizon, and the mechanism considered.[3] Ksoll et al. (2022) show - using data for Kenyan flower exporters - that post-electoral violence leads to a significant reduction in labour supply by increasing workers' absenteeism. Fernandez et al. (2014) document the conflict-induced changes in the labour supply from on-farm to off-farm labour. Conflict has also long-run negative effects on the labour market outcomes. Galdo (2013) finds that very early-life exposure to conflict reduces adult earnings. Islam et al. (2016) use data from the Cambodia Civil War to show that conflict - by disrupting schooling - has a negative effect on long-term labour productivity and economic development. In the context of the West Bank, Adnan (2015) and Cali and Miaari (2018) show that conflict-induced internal and external workers' mobility restrictions imposed by Israel have severe negative labour market effects for Palestinian workers. We contribute to this literature by combining individual-level longitudinal data and georeferenced information on conflict-related violent events to study the effect of individual-level exposure to conflict on various labour market outcomes. Our results show that the impact of conflict exposure is highly heterogeneous across types of jobs and types of outcomes considered. Moreover, we document

[1] The Gaza Strip is a very small territory, hence the geographical borders of the administrative units (locality or governorate) are not relevant discontinuities for the effect of the Gaza-Israeli conflict. In this context, a measure of conflict exposure built considering the number of events that occurred in the neighbourhood of the individual is thus to be preferred to alternatives based on the number of events that occurred within a given administrative unit.

[2] A companion literature looks at the effect of violence on the labour market. Rozo (2018) shows that an increase in the homicides in Colombia leads to a reduction in the supply and in the demand of labour which result in a decline in wages. Utar (2020) documents how drug-related violence reduces output and employment of Mexican firms by local demand and labour supply, the latter being the effect of the violence-induced increase in the worker reservation wage.

[3] Heterogeneous results are observed especially when looking at the effect of conflict of gender. Some studies find that conflict is associated with lower women's employment (Kondylis, 2010; Berrebi, and Ostwald, 2016) while others with a higher probability that women are working (Shemyakina, 2015; Cahalan et al., 2020).

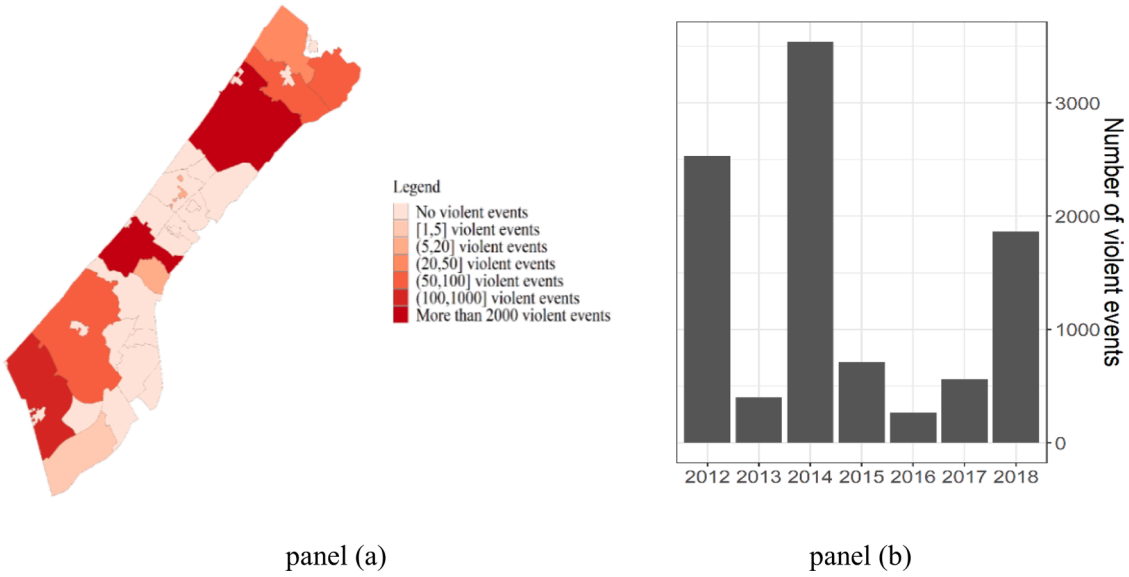

Fig. 1. Total number of violent events in the Gaza Strip (2012–2018). The map shows the boundaries of the Gaza Strip localities. Source: Authors' elaboration on ICEWS data.

a novel supply-side mechanism explaining the negative effect of conflict on the labour income, namely the reduction in the number of hours worked due to the conflict-induced worsening in the individual-level health conditions.

Our paper also contributes to the literature on the effects of the Palestinian-Israeli conflict. Several studies have documented the education, economic, political, and health effects of the conflict. Yet, most of them have only considered Palestinians living in the West Bank during the Second Intifada (i.e., the period 2000-2005).[4] The focus on the West Bank during the Second Intifada also characterises the studies looking at the labour market effect of the Palestinian-Israeli conflict (Mansour, 2010; Di Maio and Nandi, 2013; Adnan, 2015; Cali and Miaari, 2018). One exception is Miaari (2020) who studies the dynamics of the public-private wage differential in the West Bank and the Gaza Strip during the period 1998-2006, documenting that this increases after the outbreak of the Intifada in both regions. Only a few studies have looked at the Gaza Strip after the end of the Second Intifada. Etkes and Zimring (2015) document that the blockade imposed on the Gaza Strip between mid-2007 and mid-2010 led to a large welfare reduction. This effect is the combination of labour reallocation (away from manufacturing and exporting firms) and reduced (labour) productivity. Brück et al. (2019b), by comparing Gazan households before and after the 2014 Gaza War, find that food security is not directly affected by the conflict but that household resilience capacity declines, due to a deterioration of income stability and diversification, and increases the use of social safety nets. Di Maio and Leone Sciabolazza (2021) show that Palestinians living in Gaza Strip localities exposed to more conflict events have a higher probability of suffering from physical impairment and a chronic disease. Adnan (2022) documents that the Blockade increased unemployment and reduced real wages in the Gaza Strip. The analysis also shows a reduction in the share of the private vs the public sector and an increase in the public/private wage gap after the Blockade. Our findings complement those from these previous studies by analysing the impact of the conflict on the Gaza Strip labour market. By focusing on the effects of the Palestinian-Israeli conflict on the Gaza Strip, our analysis contributes to the understanding of the impact of one of the longest ongoing conflicts of our time on one of the most disadvantaged populations in the world.

The paper proceeds as follows. Section 2 provides some background for our analysis. Section 3 describes the datasets used in the analysis. Section 4 presents the estimation strategy. Section 5 discusses the results of the empirical analysis. Section 6 concludes.

2. Background

The Gaza Strip is a small and highly densely populated territory, bounded by the Mediterranean Sea, Israel, and Egypt, home to about 2 million people. Together with the West Bank and East Jerusalem, it forms the Occupied Palestinian Territories (OPT).[5]

Since 2007, there has been a situation of latent conflict between the Gaza Strip and Israel. In that year, as a retaliation for the victory of Haman in the general elections in the OPT, Israel declared an economic blockade enforced by Israel Defence Force (IDF).[6] The blockade imposes severe restrictions on land, air, and maritime movements of goods and people into and out of the Gaza Strip. Despite some changes over the years, restrictions on movements remain tight (UNCTAD, 2020).

Over the past fifteen years, Gaza has experienced successive rounds of violent confrontation with Israel. The Gaza War (2008-2009) has been followed by three major clashes between Hamas and Israel (in 2012, 2014 and 2018) involving the shelling of Israel with rockets and massive air and land attacks from Israel on the Gaza Strip. The conduct of the hostilities by both sides has raised serious concerns about the protection

[4] These include Miaari et al. (2011), Mansour and Rees (2012), Amodio and Di Maio (2018), Brück et al. (2019a), Di Maio and Nisticò (2019), Ayhb and Fallah (2020), Jürges et al. (2022).

[5] In 1993, following the Olso Accord, the newly created Palestinian Authority (PA), assumed control over civilian issues in both the West Bank and Gaza Strip, while Israel maintained control over security issues in both areas. At the end of 2005, the Israeli army unilateral withdraw from the Gaza Strip but not from the West Bank. In January 2006, political tensions between Hamas and Fatah movements led to a (de-facto) two separate Palestinian governments: a Fatah government in the West Bank and a Hamas government in the Gaza Strip (for more detail see, World Bank 2013).

[6] In September 2007, after the victory of Hamas to the first general Palestinian election after the Second Intifada, the Israeli government declared the Gaza Strip a "Hostile Territory" and imposed the blockade. Shortly after, also Egypt closed its borders with the Gaza Strip. For an account of the political background of the blockade, its evolution, and its economic effects during the first years of its implementation, see Etkes and Zimring (2015).

of civilians making the situation in the Gaza Strip to be recognized as a humanitarian crisis (United Nations, 2017).

The conflict between Gaza and Israel is part of the so-called Palestinian-Israeli conflict, which dates back at least to 1948. The reasons for the beginning of the various phases of the conflict are various and debated. Yet, as for the events during the last fifteen years, there is a general agreement that the motivations for the escalation in the tension between Hamas and Israel - which eventually have led to the various rounds of violent confrontation during this period - have been political rather than related to changes in the local economic condition in the Gaza Strip *per se* (International Crisis Group, 2021).[7] In fact, the specific events that motivated the renewal of the fighting have often occurred in Jerusalem Est or in the West Bank.[8]

In the last decade, the Gaza Strip has suffered a decline in economic performance and an increase in political uncertainty. Economic growth has been highly volatile largely because of the conflict situation (PCBS, 2016; Atamanov and Palaniswamy, 2018; Brück et al., 2019b). During this period, the Gaza Strip has recorded one of the worst economic performances globally and its labour market can be characterised as "collapsed" (ILO, 2019). According to the latest available data, 53% of the Palestinian population in the Gaza Strip lives in poverty (ILO, 2018, 2019). The economy of the Gaza Strip heavily relies on the public sector as a safety net (Atamanov and Palaniswamy, 2018) and the majority of households receive government or non-governmental assistance (World Bank, 2018).

3. Data

In our empirical analysis, we combine different data sources. Data on individual and household characteristics are from various waves of the Socio-Economic and Food Security (SEFSec) survey. Data on conflict events and fatalities that occurred in the Gaza Strip are extracted from the ICEWS dataset and the B'Tselem dataset.

3.1. Socio-economic and food security (SEFSec) survey

Our main source of data is the Socio-Economic and Food Security (SEFSec) survey. This survey is administered by the Palestinian Central Bureau of Statistics (PCBS). The SEFSec survey provides information on food-related and key socio-economic aspects, including employment, education, and health. The sample is representative of the household-head gender, refugee status, and households' locality of residence (which is the third level of administrative units in the Gaza Strip).[9] Starting from its fifth wave conducted in 2013, the SEFSec is a panel allowing us to track individuals across survey waves. To exploit the panel dimension of the data, in our analysis we thus use the last three waves of the SEFSec, covering the period 2013-2018 (PCBS, 2014, 2015, 2018).[10] We restrict our analysis on the individuals located in the Gaza Strip. Our sample of analysis includes all the 1724 individuals who are interviewed three times. More than 93% of the sample is male and the average age is 42. Around 63% of the sample is employed and the average number of hours worked is 40. Among those who report their sector of employment, 53% are in the private sector, 43% are in the public sector, and 4% is employed by NGOs or international agencies. Table A1 reports the descriptive statistics for all the variables used in the analysis. Sample attrition is discussed in Section 4.

Table 1
Conflict exposure and employment status in the Gaza Strip.

Sample	Employed (1=Yes)	
	All (1)	All (2)
Number of Conflict Events$_{i,t-1}$	0.0000 (0.0000)	0.0000 (0.0000)
Age	-0.0243*** (0.0019)	-0.0248*** (0.0022)
Received (any) assistance (1 = Yes)		-0.1792*** (0.0292)
Additional Controls	No	Yes
Individual Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Number of Observations	5172	5172

Note: Conditional logit estimated coefficients are reported in columns (1)-(2). Standard errors (in parentheses) are robust and clustered at the individual level. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level. An intercept is included, but not reported. *Employed* is a dummy variable that takes value 1 if the respondent worked at least one month during the previous 12 months, and zero otherwise. *Number of conflicts* is obtained using the ICEWS database (CAMEO codes "190", "193", and "194"). It counts the number of violent events that occurred during the 12 months before the respondent's interview took place, within 10 km from the centroid of the residential locality. *Additional controls* include: household size and household number of children. See Table A1 for the definition of all the variables. The sample includes all household heads residing in the Gaza Strip who were between 19 and 65 years old in 2013.

3.2. Conflict data

We combine two different sources of data to measure conflict intensity in the Gaza Strip. The first one is the Integrated Crisis Early Warning System (ICEWS) dataset (Shilliday and Lautenschlager 2012). The ICEWS dataset records any interaction that occurred between socio-political actors in the world (i.e., cooperative or hostile actions between individuals, groups, sectors, and nation-states) since 1995. This dataset is built upon an original repository containing nearly 30 million worldwide news stories published by over 6000 international, regional, national, and local news publishers. For each event, the dataset reports the geo-location, the date, and the source and target entities of the interaction. Each event type is also categorized on a scale from most hostile to most cooperative. Using the ICEWS dataset, we are thus able to identify and to geo-localise any conflict-related violent event that occurred in the Gaza Strip during the period under analysis. As argued by Amodio et al. (2021), ICEWS data are strongly informative of the level of political violence in the OPT given that they also capture instances of political violence that do not result in any fatality.

Fig. 1 shows the geographical distribution and the evolution of the number of conflict events in the Gaza Strip during the period 2012-2018.[11] The number of events is very different across the various localities. This is shown in Fig. 1 panel (a) by the different colour gradients, where darker hues are associated with a higher number of conflict-related events that occurred in the period 2012–2018. During the period under consideration, the number of conflict-related violent events in the

[7] Abrahams et al. (2020) use data for the period 2007–2014 to document that political conditions give rise to the escalation in the number of attacks between Gazan militants and the IDF. Israel often justifies the security measures imposed on Gaza as an effort to erode the public support of Hamas which is considered a terrorist group (Loewenthal at al., 2021).

[8] For instance, the 2014 Gaza War was initiated by Israel following the kidnapping and murder of three Israeli teenagers by Hamas members in the West Bank.

[9] Appendix 2 reports detailed information on the methodology of the SEFSec survey.

[10] The data collection for the fifth wave of the SEFSec was implemented between December 2013 and March 2014. The sample include 2554 households living in the Gaza Strip. The sixth wave of the SEFSec was conducted in year 2015 (March-May). The sample includes 3150 households in the Gaza Strip. The seventh wave of the SEFSec was conducted in 2018 (August-October). The sample include 4028 households living in the Gaza Strip.

[11] While the survey data cover the period 2013–2018, in this figure we also report conflict event data for 2012 since these are used in our following analysis to build the conflict measure for 2013.

localities varies from around 20 to more than 2000.[12] The figure also shows that conflict-related events do not occur only in some specific localities, but they are spread across localities in all the Gaza Strip. Variation in the number of conflict events is high not only geographically but also temporally. Fig. 1 panel (b) shows the temporal evolution of conflict intensity by plotting for each year between 2012 and 2018 the total number of conflict events that occurred in the Gaza Strip. There three peaks in the evolution of conflict intensity: namely, in 2012, 2014 and 2018.[13]

As an additional source of data to measure conflict intensity in the Gaza Strip, we use the B'Tselem dataset on Palestinian fatalities (B'Tselem, 2018).[14] For each event that occurred in the OPT which led to a Palestinian fatality, the dataset provides a rich set of information including age, gender, and place of residence of the killed, date, location, and description of the circumstances of the event.

4. Estimation strategy

We estimate the effect of the exposure to conflict on individual-level labour market outcomes using the following econometric model:

$$Y_{ijlt} = \alpha + \beta\ Conflict\ Exposure_{i,t-1} + \mu X_{it} + \theta Z_{jt} + \pi_i + \rho_t + \varepsilon_{ijlt} \quad (1)$$

where Y_{ijlt} indicates one of the outcomes of interest. These include: $Employment_{ijlt}$, i.e. a dummy variable which takes value 1 if individual i from household j living in locality l at time t is employed, and zero otherwise; $Labour\ income_{ijlt}$, i.e. the (log) monthly labour earnings for individual i from household j living in locality l at time t; and $Number\ of\ hours_{ijlt}$, a variable which indicates the number of hours worked in the week, and $Wage_{ijlt}$, a variable measuring the wage of the employed individuals. $Conflict\ Exposure_{i,t-1}$ is the proxy for the conflict intensity exposure for individual i at time t. In our main analysis, we measure $Conflict\ Exposure_{i,t-1}$ using the $Number\ of\ Conflict\ Events_{i,t-1}$, namely the number of conflict-related violent events as recorded in the ICEWS dataset that occurred in the 10 km radius from the centroid of respondent's residential locality.[15] The period over which the number of conflict events is counted is the 12 months before the date of the interview. X_i and Z_j, are the vectors of individual and household time-varying characteristics. The vector X_i includes the household's head age and a dummy taking value 1 if he/she received any aid assistance and zero otherwise. The vector Z_j includes household size and household number of children. π_i and ρ_t are individual and time fixed effects, respectively. Individual fixed effects allow us to control for all time-invariant unobservable individual characteristics. Year fixed effects instead control for overall trends in the economic activity which are common to all individuals. By including individual and year-fixed effects in our regression specification, we sort out a large fraction of unobservable determinants of individual-level outcomes, possibly correlated with conflict intensity. In our robustness checks, we also augment the regression model by including a full set of locality-specific time trends. These account for all observable and unobservable locality-specific characteristics which vary with time, for instance, the local-level economic conditions. Finally, ε_{ijlt} is the error term. In the analysis, $t =$ 2013, 2014, and 2018. Depending on the nature of the outcome variable adopted (e.g., continuous, categorical, or binary), we employ different estimation techniques to estimate our model. In all regressions, standard errors are robust and clustered at the individual level, that is the level at which we measure conflict exposure.

Identification threats Our identifying strategy is valid under the assumption that, conditional on individual and time-fixed effects and controlling for observable characteristics, the variation in conflict intensity over time is orthogonal to any other determinant of individual labour outcomes. There are four main possible reasons why this assumption may not hold. Our results may be affected by sample selection due to attrition. Our analysis considers the three most recent SEFSec surveys, the only ones for which a panel dimension is available (see Section 3.1). Of the 1943 individuals included in the first of these SEFSec surveys, 89% are interviewed three times, i.e. in each survey wave during the period 2013-2018. These are the 1724 individuals included in our balanced sample. The remaining 11% (219 individuals) are missing in one or more waves (due to attrition) and they are potentially posing a selection bias problem. To check how attrition may affect our results, we run two tests. First, we look at the possibility that attrition is related to the intensity of conflict exposure. To this end, we regress an indicator for attrition (a dummy taking value 1 if the household is not interviewed in that wave and 0 otherwise) on the level of total conflict intensity the individual has been exposed to during the previous year. Reassuringly, results in Table A3 show that the probability of attrition is not related to conflict exposure: i.e., being exposed to higher conflict intensity does not increase the likelihood of an individual to be missing from one or more waves of the survey. Second, we test whether the 219 excluded individuals are different from the 1724 included in our sample across a large number of observable characteristics. Results are presented in Table A4. The two groups of individuals do not appear to be statistically different in any of the outcomes we consider in our analysis (i.e., employment status, number of hours worked, health conditions) nor for the characteristics that we use as controls in the regressions. This is reassuring evidence for the validity of our analysis. Based on these results, we argue that it is unlikely that selection bias drives our findings.

Another possible threat to our identification strategy is that of reverse causality. For instance, if labour market, health, or education conditions are what determine conflict intensity at the locality level, one would expect localities with higher unemployment, more people with health diseases, and more school dropouts to have a higher number of conflict events.[16] As we discuss in Section 2, political analyses and anecdotal evidence suggest that in the context of the Gaza-Israeli conflict this is unlikely to be the case. Yet, we attempt to formally test for this possibility by estimating the following model:

$$Number\ of\ Conflict\ Events_{lt} = \alpha + \beta\ Y_{lt}\ + \tau_l + \rho_t + \varepsilon_{lt} \quad (2)$$

where $Number\ of\ Conflict\ Events_{lt}$ is the number of conflict events in

[12] The list of the events included in our measure of conflict exposure are reported in Table A.2.

[13] The first peak of violence corresponds to the events occurred during the *Operation Returning Echo* – an Israel Defense Forces (IDF) military operation which took place March 9-14, 2012 - and the *Operation Pillar of Defense* – an IDF operation which took place November 14-22, 2012. This was the highest outbreak of violence since the 2008–2009 Gaza War (*Operation Cast Lead*). The second and highest peak instead captures the 2014 Israel–Gaza conflict also known as *Operation Protective Edge*, a military operation launched by Israel on July 8th2014 which resulted in the death of thousands of people in the Gaza Strip. The 2018 peak refers to the upsurge in violence due to the so–called Gaza border protests in March 2018 and the *Gaza-Israel clashes* in November 2018.

[14] B'Tselem is an Israeli NGO which collects statistics on the Israeli-Palestinian conflict since the beginning of the Second Intifada. Both the Israelis and the Palestinians consider these data to be accurate and reliable, and for this reason have been used in a number of previous studies (see Mansour and Rees 2012; Amodio and Di Maio 2018).

[15] The SEFSEc data do not provide the geographical coordinates of the household's location. Yet, because localities in the Gaza Strip are geographically quite small, this modelling choice provides us with a good approximation of the exact location of the households.

[16] We consider the possible role of school dropout because - as suggested by Rodriguez and Sanchez (2012), in a context of violent conflict being a dropout may increase rebellion in adolescents. In turn, this may contribute to increase the number of demonstrations, the level of violence and, possibly, the number of the consequent conflict-related events.

locality l in year t; and τ_l and ρ_t are locality-and year fixed effects, respectively, and ε_{lt} is the error term. Y_{lt} is - alternatively - the locality-level of unemployment, the locality-level number of individuals with health diseases, and the number of locality-level school dropouts. Results reported in Table A5 suggest that reverse causality is unlikely to be a threat to our results. The locality-level labour market situation, average health conditions, or number of students out of school do not predict the local level of conflict intensity (as proxied by the number of conflict events).[17]

Our measure of conflict exposure is potentially affected by measurement error. The information on the location and the number of conflict events we use to build our measure of conflict exposure are from the ICEWS dataset which is possibly affected by some common weakness of very large datasets with multiple sources. To minimize this possibility, we carefully check for duplicated events - i.e., events for which all the characteristics (date, location, actors, description, etc.) are the same. It is also possible that the reporting of conflict events in the ICEWS dataset is biased toward certain areas or types of events as some areas might have better media coverage. However, it is unlikely that this may have an effect on our results since geographical differences in the reporting of events are captured by individual and year fixed effects in our regression. A somehow related concern is that international publishers may be more likely to cover events that occurred in larger cities or some specific type of events (i.e., the most violent ones). This may lead to an upward bias in the estimated negative effect of conflict because individuals are more likely to be located in those areas and events would result to be more destructive than the true average. Previous studies using ICEWS data shows that this is unlikely to be the case for the Gaza Strip (Amodio et al., 2021).

One final possible concern with our identification strategy is that individuals may react to an increase in conflict intensity by changing residential location. If individuals with higher capabilities move to locations with less conflict events, the negative effect of conflict exposure on labour market outcomes would just capture the fact that less able workers are those who remain in areas with more conflict events. Although we cannot directly track individual-level relocation with our data[18], exiting evidence suggest that internal and international migration is limited in the context of the Gaza Strip.[19] Internal mobility is traditionally low and, due to the embargo that started in 2007, international migration is nearly zero (PCBS 2015; Etkes and Zimring, 2015; World Bank, 2019). These observations, together with the results on attrition (Table A.3) and sample selection (Table A.4), suggest that conflict-induced internal relocation or international migration are unlikely to be serious threats to our identification strategy.

5. Results

5.1. Conflict exposure and individual labour market outcomes

This section describes the effect of conflict exposure on employment status, labour income, number of hours worked, and wages of Palestinians in the Gaza Strip during the period 2013-2018.

5.1.1. Employment status

Table 1 shows the estimation results for our model (1) when the outcome is $Employed_{ijlt}$, i.e., a dummy variable which takes value 1 if individual i from household j living in locality l at time t is employed and zero otherwise. In column (1), we report the results for the baseline specification. An increase in the intensity of conflict exposure - as measured by the number of conflict-related violent events that occurred in the 10 km radius from the centroid of respondent's residential locality during the 12 months before the respondent's interview takes place - has no statistically significant effect on the employment status of the individual. In column (2), we augment the model specification including individual and household controls. The estimates are unchanged: the probability to be employed does not vary with the level of conflict exposure experienced by the individual during the last year.[20] Our results also indicate that there is a negative correlation between having received any type of assistance and being employed.[21] This suggests that aid targeting in the Gaza Strip is well-functioning: unemployed are more likely to receive support from NGOs or from the Palestinian Authority.

While an increase in conflict exposure does not impact the probability of becoming unemployed, heterogeneous effects emerge when we differentiate by the type of employer, i.e., if consider the effect of conflict for those employed in the private sector and for those in the public sector. Table 2 shows the results of a multinomial logit model with individual fixed effects estimating - for those employed at time t - the impact of an increase in conflict exposure on the probability of becoming unemployed or moving to another sector in the following period, with respect to the probability of remaining employed in the same sector. Columns (1)-(3) show that, for those employed in the private sector, an increase in conflict exposure increases the probability of becoming unemployed but also that of becoming employed in the public sector, in an international organization, or NGO.

At the same time, columns 4-6 show that for those employed in the public sector an increase in conflict exposure reduces the probability of being employed in the private sector in the following period but it does not increase that of becoming unemployed (with respect to that of remaining employed in the public sector). The less negative impact of conflict for those in the public sector and the increase in the probability to move from the private sector to the public one are consistent with anecdotal evidence suggesting that the Hamas government provides job

[17] We also do not find evidence that locality-level labour, health, and education characteristics at the time of the survey do predict conflict intensity at the time of the next survey, or the following year. Results available upon request.

[18] The SEFSec does not track individuals moving away from their residential location and does not report why an individual is not interviewed in a specific wave. Yet, we can use the 219 individuals who are not present in all survey waves to get a sense of the magnitude of possible out migration movements in the SEFSEc sample. Of these individuals, 187 enter the sample in the second wave and then remain in the sample, while the remaining 32 are interviewed in the first wave and then exit the sample in a subsequent wave. Based on these figures, the maximum number of individuals that may have (out) migrated is less than 2% (32/1943) of the full sample of individuals in the SEFSEc dataset.

[19] The most recent official data by the Palestinian Central Bureau of Statistics on internal and external migration are from 2010 and reported in PCBS (2010). The survey results indicate that only 11% of the population in the Gaza Strip have ever changed their place of residence. Most of these movements have occurred before the Second Intifada and internal migration in the following decade has been "very negligible" (PCBS, 2009). Moreover, the Report also indicates that the main cause for internal mobility is marriage, while only 2.2% of the Gaza Strip move for reasons related to the conflict.

[20] Aggregate unemployment has increased in the Gaza Strip during the period under analysis, possibly also in consequence of the effects of the conflict events following the Israeli-imposed blockade (World Bank, 2018; UNCTAD, 2019). Our findings are not in contradiction with this possibility. Our estimates quantify the effects of temporal variations in the level of conflict exposure of the individual on her probability to be employed, i.e., it provides the marginal (rather than the total) effect of an increase in the level of conflict-related violence. Given our estimation strategy, our results are thus to be interpreted as measuring the *additional* effect of being directly exposed to conflict events on the probability of being employed, given the overall effect of conflict on the labour market conditions in the Gaza Strip.

[21] This finding confirms the results in Brück et al. (2019b) indicating that households whom residence was damaged during the 2014 Gaza War received more cash and in-kind assistance than non-affected households.

Table 2
Conflict exposure and employment transition across sectors in the Gaza Strip.

Dependent Variable	0 = Remains in the private sector			0 = Remains in the public sector		
	1 = Becomes unemployed (1)	1 = Moves to the public sector (2)	1 = Moves to International Organization or NGO (3)	1 = Becomes unemployed (4)	1 = Moves to private sector (5)	1 = Moves to International Organization or NGO (6)
Number of Conflict Events$_{i,t-1}$	0.0022***	0.0022***	0.0028**	0.0004	-0.0001**	0.0000
	(0.0002)	(0.0001)	(0.0013)	(0.0008)	(0.0000)	(0.0006)
Age	0.0264	-0.0147	0.0997**	-0.0664	0.0100**	0.0378
	(0.0164)	(0.0106)	(0.0496)	(0.0958)	(0.0039)	(0.1195)
Received (any) assistance (1 = Yes)	-0.3069	0.1523	-1.3547	-0.3280	-0.2684***	0.0548
	(0.4307)	(0.0926)	(1.4642)	(0.2880)	(0.0483)	(0.2797)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1246	1301	1007	438	1212	297

Note: Multinomial logit results. Standard errors (in parentheses) are robust and clustered at the individual level. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level. An intercept is included, but not reported. For columns 1-3, the sample includes individuals who are employed in the private sector at time *t*, and either remain in their sector of work at time *t+1*, or became unemployed (column 1), move to the public sector (column 2), or move to an international organization or NGO (column 3). The number of individuals in the private sector at time *t* is 577. For columns 4-6, the sample includes individuals who are employed in the public sector at time *t*, and either remain in their sector of work at time *t+1*, or became unemployed (column 1), move to the private sector (column 2), or move to an international organization or NGO (column 3). The number of individuals in the public sector at time *t* is 518. *Additional controls* include: household size and household number of children. See Table A1 for the definition of all the variables. The sample includes all household heads residing in the Gaza Strip who were between 19 and 65 years old in 2013.

Table 3
Conflict exposure and labour income in the Gaza Strip.

	Labour income			
	All (1)	All (2)	Private sector (3)	Public sector (4)
Number of Conflict Events$_{i,t-1}$	-0.0004** (0.0002)	-0.0004** (0.0002)	-0.0014** (0.0004)	-0.0001 (0.0001)
Age	-0.0318*** (0.0071)	-0.0414*** (0.0079)	-0.0061 (0.0151)	-0.0557** (0.0170)
Received (any) assistance (1 = Yes)		-1.5515*** (0.1217)	-0.8767** (0.2890)	-0.4250*** (0.1156)
Additional controls	No	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	5172	5172	1599	1191

Note: OLS estimated coefficients. Standard errors (in parentheses) are robust and clustered at the individual level. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level. An intercept is included, but not reported. The dependent variable is *Labour* income, a continuous variable measuring the **average monthly (log) value of total earnings** due to any type of work done by the household head *i* from household *j* living in locality *l* at time *t* (i.e., earnings from agriculture, fisheries and animal husbandry; or wages from the public or private sector, or from international agencies). *Additional controls* include: household size and household number of children. See Table A1 for the definition of all the variables. The sample includes all household heads residing in the Gaza Strip who were between 19 and 65 years old in 2013.

Table 4
Conflict exposure and number of hours worked in the Gaza Strip.

Sample	Number of hours worked			
	All (1)	All (2)	Private sector (3)	Public sector (4)
Number of Conflict Events$_{i,t-1}$	-0.0002** (0.0001)	-0.0002** (0.0001)	-0.0004** (0.0002)	-0.0001 (0.0001)
Age	-0.0336*** (0.0029)	-0.0324*** (0.0032)	0.0021 (0.0064)	0.0070 (0.0070)
Received (any) assistance (1 = Yes)		-0.6851*** (0.0547)	-0.2542** (0.1216)	0.0328 (0.0881)
Additional Controls	No	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	5172	5172	1599	1191

Note: OLS estimated coefficients. Standard errors (in parenthesis) are robust and clustered at the individual level. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level. Intercept included but not reported. The dependent variable is *Number of hours worked*, a variable which has four categories: 1) "no hours worked"; 2) "works less than 14 hours a week", 3) "works 15-34 hours a week"; 4) "work 35 hours a week or more". *Additional controls* include: household size and household number of children. See Table A1 for the definition of all the variables. The sample includes all household heads residing in the Gaza Strip who were between 19 and 65 years old in 2013.

opportunities in the public sector as a buffer mechanism against the conflict-induced economic slowdown (Brown, 2012).[22]

5.1.2. Labour income

Table 3 shows the results of estimating model (1) using as dependent variable *Labour income*$_{ijlt}$, i.e., the average monthly (log) earnings due to any type of work done by household head *i* from household *j* living in locality *l* at time *t*. As before, we report both the results for the baseline regression (column 1) and the specification including additional controls (column 2).

Results show that conflict exposure reduces the labour income for Palestinian workers in the Gaza Strip: the higher the number of conflict events that occurred close to the individual's place of residence, the lower the labour income. Computing the magnitude of the effect, we find that one standard deviation increase in the number of conflict-related events (i.e. 598 events) during the previous 12 months decreases the labour income by 24%. In column 2, we include the full set of additional controls. The magnitude of the effect does not change.[23] Using these estimates we can calculate the reduction in the aggregate labour income that is attributable to conflict exposure in our sample. Setting the value of the coefficient of conflict exposure equal to zero in Eq. (1), we predict the value of labour income for each individual that we would have observed in absence of the conflict and we compare it with the predicted value from Table 3 column 1.[24] We find that labour income would have been around 35.4% higher if individuals in our sample had not been exposed to any conflict event during the period 2013-2018.

5.1.2.1. Robustness checks. The negative effect of conflict exposure on the labour income is robust to several checks. First, we augment our regression specification by including a full set of locality-specific time trends. These accounts for all observable and unobservable locality-specific characteristics which vary with time, for instance, the local-level economics conditions, the structure of the local labour market, etc. Regression estimates reported in Table A6 column (1) show that the negative effect of conflict exposure on the labour income increases in magnitude and remains highly significant. Next, we run several checks on the explanatory variable, namely our measure of conflict exposure. In columns (2) and (3), we use as a proxy for conflict exposure the number of conflict-related violent events within a different buffer than considered in our baseline estimates, i.e. we consider events within the 15 km and the 20 km radius from the place of living of the individual, respectively. For both measures of conflict exposure, a higher number of conflict events has a negative and significant effect on the labour income. In column (4), we account for the possible effects of abnormal values of our conflict measure by scaling the total number of conflict events using z-score standardization. This transformation makes our conflict exposure measure have zero mean and a standard deviation of one. The effect of higher conflict exposure is negative and significant also in this case. Column (5) shows the results when we build our measure of conflict exposure considering an expanded list of conflict events (see Table A2). The effect of conflict exposure when using this alternative measure does not change with respect to the baseline results. Finally, in column 6 we include as an additional control the number of Palestinian fatalities that occurred during the last 12 months before the interview in the 10 km radius from the centroid of the respondent's residential locality. Results indicate that the coefficient for the number of fatalities is not significant while the effect of our measure of conflict exposure is unchanged, remaining negative and highly significant. This suggests that our measure of conflict exposure is able to capture the negative effect of the conflict situation above and beyond the intensity of conflict-related violence *per se* as proxied by the number of fatalities that occurred close to the individual. We provide additional robustness checks for our measure of conflict exposure in Tables A7 and A8. In Table A7, we built alternative measures combining different distance radius, different types of events, and different normalization procedures. Results are robust and consistent across all these alternatives. In Table A8, we replicate Table 3 with the only difference that the number of conflict events to which the individual is exposed to is measured at the locality level, the more disaggregated administrative level for the Gaza Strip. Results are unchanged also in this case.

5.1.2.2. Heterogeneity. Table A9 explores possible heterogeneities in the effect of conflict exposure on the labour income. Column (1) indicates that the effect of conflict exposure does not change with the age of the individual. Results reported in column (2) show that receiving aid significantly reduces the negative impact of conflict exposure on the labour income. Given the negative correlation between labour income and receiving aid, this suggests that in the context of the Gaza Strip aid assistance is not only well-targeted but also effective in providing support to those more in need having experienced higher conflict exposure. Columns (3)–(5) show that the negative effect of conflict on the labour income is smaller for those employed in agriculture and for those who are self-employed. Instead, the effect of conflict exposure is more negative for those employed in a (non-farm) family business.

Finally, we look at the effect of conflict exposure on the labour income for individuals employed in the private sector and for those employed in the public sector. This is a relevant distinction in the context of the Gaza Strip given that the public sector is more secure and provides more benefits compared to the private one (World Bank, 2019). Results reported in Table 3 columns (3) and (4) confirm that the effect of conflict is different across the two sectors. While an increase in conflict exposure tends to reduce the labour income in both sectors, the effect is statistically significant only for those employed in the private sector.

5.1.3. Number of hours worked and wages

Conflict-induced changes in the labour income are the result of the combined variation in the number of hours worked and in the wage due to the exposure to conflict events. In the following, we look at the effect of conflict on both these components to understand which of them drives the conflict-induced reduction in the labour income.

To test the effect of an increase in conflict exposure on the number of hours worked, we estimate model (1) using as dependent variable *Number of hours worked*$_{ijlt}$, i.e. the number of hours worked for individual *i* from household *j* living in locality *l* at time *t*. Results are reported in Table 4. Column (1) shows the estimates for the reduced form baseline specification in which we include only the age and the set of fixed effects. Results show that the higher the number of conflict events occurring close to the individual's place of residence, the lower the

[22] World Bank (2019) reports that in the Gaza Strip there is a strong reliance on the public sector for employment and, in fact, public jobs play the role of safety net. Araji and Pesce (2019) argue that in the Gaza Strip public employment has been used to compensate the loss of jobs in the private sectors following episodes of escalation of violence or Israeli military offensives. Focusing on the period of the Second Intifada, Miaari (2020) provides evidence consistent with a situation in which the Palestinian Authority used the expansion of the public sector to maintain the political support.

[23] Mirroring the results for the employment status, aid targeting seems to work well also in this case: the probability of receiving aid is negatively and significantly correlated with the labour income.

[24] We quantify the percentage change in aggregate labour income due to conflict as follows. First, we use the coefficient estimates in column 1 of Table 3 to predict the value of labour income $\widehat{Y}_{ijlt}$ for each individual and survey wave. Second, we predict the value of labour income $\widetilde{Y}_{ijlt}$ that we would have observed if we impose $\boldsymbol{\beta} = 0$ in Eq. (1), i.e. $\widetilde{Y}_{ijlt} = \widehat{Y}_{ijlt} - \widehat{\boldsymbol{\beta}}\ \boldsymbol{Conflict\ Exposure}_{it-1}$. The latter gives us the value of labour income in the absence of conflict events. Finally, we calculate the difference in terms of percentage points between the average value of monthly labour earnings when we assume zero conflict events ($\widetilde{Y}_{ijlt}$) and when we consider their actual number, ($\widehat{Y}_{ijlt}$).

monthly number of hours worked.[25] This result is confirmed when we include our set of additional controls (column 2).[26] The negative effect of conflict exposure on hours worked is also confirmed when we consider as an alternative outcome for our regression the exact number of hours worked (see Table A10).[27]

We further characterize the effect of conflict on the number of hours worked by looking at its possible heterogeneous effects between workers employed in the private sector compared with those in the public sector. Results in Table 4 columns (3) and (4) show indicate that the negative effect of conflict exposure while being negative for both types of employers, it is significant only for the private sector, for which a higher number of conflict events reduces the number of hours worked.

Next, we look at the impact of an increase in conflict exposure on wages.[28] Results reported in Table 5 indicate that when we consider the full sample of workers conflict intensity does not affect the wage: the sign of the coefficient is positive but it is not statistically significant at conventional levels. Interestingly, when we consider the sector the individual is employed into, we find that conflict exposure increases wages in the public sector.

Taken together, our results document that the effect of conflict on the labour income, number of hours worked, and wages is different between the private and the public sector. In particular, our estimates indicate that conflict exposure reduces the labour income in the private sector and that this effect is driven by the reduction in the number of hours worked. At the same time, the non-significant effect of conflict on the labour income for those employed in the public sector is the result of the combined effect of a (weak) reduction in the number of hours worked and an increase in the wage.[29] In the next section, we discuss two possible mechanisms explaining these results.

5.2. Mechanisms

Our results indicate that higher conflict exposure affects labour income, number of hours worked, and wages, with these effects being different across the private and the public sector. In the following, we provide suggestive evidence that these findings are explained by the combination of two mechanisms, namely the conflict-induced changes in the health conditions of the population (which affects labour supply) and in the level of the local economic activity (which affects labour demand).

5.2.1. Health conditions

Conflict exposure has an adverse impact on the health conditions of the population. This in turn is expected to reduce the supply of labour. To test for this mechanism, we begin by looking at the effect of conflict exposure on individual health conditions. To this end, we regress *Health problems*$_{ijlt}$, a dummy variable which takes value 1 if individual i from household j living in locality l at time t report having a health problem[30] and zero otherwise on our measure of conflict exposure, controlling for individual and time fixed effects. Table 6 column (1) shows the baseline estimates of the impact of higher conflict exposure on the probability of reporting a health problem.[31] Results indicate that the higher the number of conflict-related events that occurred close to the place of living of the individual the higher the probability of having a health problem. Results do not change if we include additional controls (see column 2).[32] These results add to the evidence of the negative impact of conflict exposure on the individual psychological and mental health documented by previous research[33] and are consistent with the conclusions of the WHO (2018) report on the health situation in the Gaza Strip documenting a worsening in the general health conditions of the Palestinian population due to the embargo.

As the second step of our argument, we look at the relationship between individual health conditions and number of hours worked. To this end, we regress the number of hours worked on *Health problems*$_{ijlt}$, controlling for individual and time fixed effects. Results are shown in Table 6 column (3). The negative and significant coefficient indicates that having a health problem is negatively correlated with the number of hours worked. When we include additional controls, the magnitude of the coefficient is reduced but it remains negative and highly statistically significant (see column 4). We interpret this set of results as suggestive evidence indicating that conflict reduces the number of hours worked by worsening the health conditions of Palestinian workers.

5.2.2. Level of local economic activity

Conflict negatively impacts the economy in various ways. In particular, conflict may have a negative effect on the level of economic activity of the private sector. For instance, conflict reduces firms' output (e.g. by making more difficult the access to production inputs (Amodio and Di Maio, 2018)) and consumers' demand (e.g. by generating negative shocks to household income (Rozo, 2018)). In all these cases, we expect private sector labour demand to decrease.

We begin by providing suggestive evidence consistent with the conflict negatively affecting the private sector. While data limitations do not allow us to directly explore the link between conflict exposure, firm-level production choices, employment, and hours worked,[34] there is abundant indirect evidence suggesting that the conflict situation has negatively affected the level of economic activity of the private sector. Since 2007, the Gaza Strip is under a land, air, and sea blockade imposed by Israel and Egypt. During this period, Israel also significantly reduced shipments of diesel and gasoline to the Gaza Strip and used energy cuts as a retaliation measure (UNCTAD, 2020).[35] These import restriction

[25] Computing the magnitude of the effect, we find that an increase in 100 conflict-related events during the year decreases the by 2% the probability that the worker moves from one category to a higher one (i.e. from "works less than 14 hours a week", to "works 15-34 hours a week", or from "works 15-34 hours a week" to "work 35 hours a week or more").

[26] Results reported in Table A11 indicate that the negative effect of conflict exposure on the number of hours worked is smaller for those employed in agriculture and for those self-employed. These results are similar to those on the effect of conflict exposure on labour income by type of source of income (see Table 3).

[27] We use the continuous variable for number of hours worked as an outcome in a robustness check and not in our main analysis because of the large number of missing observations we have for this variable.

[28] For this analysis, we are forced to restrict the sample to the sixth wave (which has data for 2015) and the seventh wave (which has data for 2018), the only two waves for which this variable was collected. *Labour income* is available for all waves, but it cannot be used to compute a proxy for wages because in the survey *number of hours worked* is not continuous.

[29] These results are in line with previous studies showing that in the Gaza Strip both the Intifada and the Blockade had smaller negative effects on the public sector than on the private one (Miaari, 2020; Adnan, 2022).

[30] The variable indicates if the person suffered from any difficulties in vision, hearing, or movement (see Table A1).

[31] In our analysis, we use the two waves of the SEFSec survey which report data on health conditions, namely the fifth (which includes data for the 2013) and the seventh (which includes data for 2018).

[32] These findings confirm - for a different sample – those in Di Maio and Sciabolazza (2021). However, their analysis does not consider how the worsening in the health conditions may impact on individual-level labour market outcomes.

[33] Medical studies conducted in the Gaza Strip document that experiencing continuous tension associated with conflict is associated with high levels of behavioural problems, depressive-like states, and psychological disorders (Mataria et al., 2009; RAND, 2015). These are all conditions which may negatively affect labour supply.

[34] The PCBS conducted the Industry Survey in the Gaza Strip only until 2011.

[35] Almost all of Gaza's fuel and about half of its electricity are supplied by Israel. The reduced access to energy has reduced production and increased production costs (OCHA, 2018; UNCTAD, 2019).

Table 5
Conflict exposure and wages in the Gaza Strip.

	Hourly wage			
Sample	All	All	Private sector	Public sector
	(1)	(2)	(3)	(4)
Number of Conflict Events$_{i,t-1}$	0.0006 (0.0004)	0.0006 (0.0004)	0.0003 (0.0010)	0.0006** (0.0002)
Age	-0.1611** (0.0697)	-0.1561** (0.0715)	-0.1545 (0.1131)	-0.0500 (0.0517)
Received (any) assistance (1 = Yes)		-0.0591 (0.1566)	-0.4417 (0.5221)	0.0370 (0.1231)
Additional Controls	No	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	1450	1450	556	648

Note: OLS estimated coefficients. Standard errors (in parentheses) are robust and clustered at the individual level. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level. An intercept is included, but not reported. The dependent variable is *Hourly wage*, a continuous variable registering the hourly wage by the household head *i* from household *j* living in locality *l* during the week before the interview took place. *Additional controls* include: household size and household number of children. See Table A1 for the definition of all the variables. The sample includes all household heads residing in the Gaza Strip who were between 19 and 65 years old in 2013.

Table 6
Conflict exposure, individual health conditions, and hours worked.

Dependent Variable	Has health problems (1==Yes)		Number of hours worked	
	(1)	(2)	(3)	(4)
Number of Conflict Events$_{i,t-1}$	0.0004* (0.0002)	0.0004* (0.0002)		
Has health problems			-0.7594*** (0.0917)	-0.3801*** (0.0888)
Age		0.0542*** (0.0070)		-0.0334*** (0.0032)
Received (any) assistance (1 = Yes)		0.5754*** (0.1507)		-0.8851*** (0.0676)
Additional Controls	No	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	3448	3448	3448	3448

Note: Conditional logit estimated coefficients are reported in columns (1) – (2). OLS estimated coefficients are reported in columns (3) – (4). Standard errors (in parenthesis) are robust and clustered at the individual level. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level. An intercept is included but not reported. In column (1)-(2), the dependent variable is *Has health problems,* a dummy variable which takes value 1 if the household head *i* from household *j* living in locality *l* at time *t* reports suffering from any difficulty in vision, hearing, or movement, and 0 otherwise. In column (3)-(4), the dependent variable is *Number of hours worked* as defined in Table 4. *Additional controls* include: household size and household number of children. See Table A1 for the definition of all the variables. The sample includes all household heads residing in the Gaza Strip who were between 19 and 65 years old in 2013.

measures made it extremely difficult for firms in the Gaza Strip to access production inputs, raw materials, and energy (United Nations, 2017). As a consequence of the increased difficulty in accessing production inputs, firms' output decreased leading to a reduction in labour demand (OCHA, 2015; UNCTAD, 2020).[36] At the same time, conflict-related events also have a direct negative effect on firms' production possibilities. IDF military operations in the Gaza Strip often end up damaging and destroying productive assets thus reducing firms' potential output, contributing to decrease the demand for labour in the private sector (ILO, 2015).[37]

Conflict negatively affects the level of the private sector economic activity also by reducing consumers' demand. This in turn makes firms to decrease output and the demand of production inputs, including labour. To provide evidence in support of this possibility, we begin by looking at the effect of conflict exposure on household consumption. Table A12 shows that higher conflict exposure reduces household consumption (column 1), also controlling for whether or not the household has received aid assistance (column 2).[38] To further corroborate the argument linking conflict and consumer demand, we look at how the level of conflict intensity influences consumer prices. Data show that, during the period under consideration, the (yearly) number of conflict events in the Gaza Strip and the (yearly) consumer price index are negatively correlated (-0.24), indicating that when conflict intensity is higher, then the level of consumer prices is lower.[39] Given that conflict reduces the aggregate supply, this evidence is at odds with the possibility that conflict has increased or left unchanged consumers' demand. Instead, these results are consistent with a situation in which consumers' demand decreases because of the conflict and firms adjust their output by reducing labour demand.

While this evidence indicates that labour demand in the private sector decreases with the level of conflict intensity, our previous findings suggest that this is not the case for the public sector.[40] As the results of the analysis of the effect of conflict on employment transitions indicate (see Table 2), employment in the public sector in the Gaza Strip does not decrease with conflict. As we discussed, this is consistent with anecdotal evidence indicating that the Hamas government has largely used public employment as a buffer mechanism against the conflict-induced

[36] Moghaddasi-Kelishomi and Nistico (2022) show that the imposition of international economic sanctions on Iran has reduced imports of inputs and led to a reduction in the manufacturing employment growth.

[37] During the 2014 Gaza War only, some 420 factories and workshops were destroyed or severely damaged, while much of Gaza Strip farmland and its agricultural infrastructure incurred substantial destruction (IMF, 2014b; FAO, 2014).

[38] Brück et al. (2019b) document that the 2014 Gaza-Israel conflict reduced adaptive of household in the Gaza Strip because of the deterioration of income stability and income diversification.

[39] Data on consumer prices are from Palestinian Central Bureau of Statistics Consumer Price Index Survey. For the West Bank, the correlation between the yearly consumer price index and the number of conflict events is positive (0.34).

[40] Our results on the effect of conflict exposure on employment status transitions (see Table 2) are consistent with labour demand in the private sectors decreasing with conflict intensity while labour demand in the public sector being unaffected.

economic slowdown. This interpretation of our evidence is also in line with World Bank (2019) arguing that the limited job creation in the Gaza Strip is mainly due to the weak demand for labour in the private sector because of the conflict.[41] Based on these observations, we argue that, while we cannot quantify the size of the effect, the conflict-induced reduction in the labour demand in the public sector is likely to be smaller than in the private one. This implies that, for a given reduction in the labour supply (due to the conflict-induced worsening in the health conditions of the worker), the negative effect of conflict on the labour income is to be smaller for workers in the public sector than for those in the private sector, in line with our empirical results.

5.2.2.1. Summing up. Taken together, we interpret these results as suggestive evidence indicating that the combination of two mechanisms, namely the individual health conditions mechanism and the local-level economic activity mechanism, can account both for the negative effect of conflict exposure on the labour income of workers in the private sector and for the null effect of conflict exposure on the labour income for those in the public sector. For those in the private sector, the conflict-induced reduction in the labour supply (due to the worsening in the individual health conditions) coupled with the reduction in the labour demand (due to lower private-sector level of economic activity) is consistent with a decrease in the number of hours worked with a null effect on wages, which implies a reduction in the labour income. For those in the public sector, the conflict-induced reduction in the labour supply (due to the worsening in the individual health conditions) coupled with an unchanged (or increased) labour demand (because of the null (or positive) effect of the conflict on the size of the public sector) is instead consistent with our evidence showing that conflict does not significantly affect the labour income and the number of hours worked while it has a positive effect on wages of these workers.

6. Conclusions

This paper investigated the effect of variations in the intensity of conflict exposure on various individual-level labour market outcomes for Palestinians living in the Gaza Strip during the period 2013-2018. In our analysis, we combined longitudinal individual-level data and geo-localised information on conflict-related events. Our results indicate that an increase in the individual-level conflict exposure does not affect the employment status on average. Yet, for those employed in the private sector, conflict exposure increases the probability of becoming unemployed or employed in the public sector in the next period. For those employed in the public sector, it instead reduces the probability of being employed in the private sector, but it does not increase that of becoming unemployed. We also find that for those in the private sector conflict reduces the labour income and the number of hours worked, while in the public sector the effect of conflict is null on both the labour income and the number of hours worked, and it is positive on wages. Finally, we provide suggestive evidence that these results are explained by the combination of two mechanisms, namely the conflict-induced change in the health conditions of the workers (which affect the labour supply) and in the level of the local economic activity (which affect labour demand).

Our findings contribute to a better understanding of the effect of conflict on the labour market by providing evidence on various individual-level outcomes, on the heterogeneity of the impact across types of jobs, and by documenting which are the mechanisms through which these effects materialize. These are all key aspects to consider in the design of effective policy interventions to mitigate the negative consequences of conflict on the labour market.

[41] World Bank (2019) indicates that the limited job creation in the private sectors is also a consequence of the distortion induced by the higher-wage and better conditions jobs in the public sector.

More specifically, our analysis provides evidence on these effects in the context of the Gaza Strip, one of the most densely populated and poorer regions in the world, which over the past decade has experienced a continuous situation of conflict. While the Gaza-Israel conflict has been attracting much attention both in the media and among researchers in different disciplines, its consequences on the labour market and - more in general - on the well-being of the population are still largely unexplored. One implication of our results is that individuals living in a conflict-affected context may suffer a worsening in their labour market outcomes and economic conditions even if not being direct victims of a violent event and that these effects need to be accounted not to underestimate the consequences of conflict exposure on the local population.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.labeco.2023.102439.

References

Abrahams, A., Berman, E., Khadka, P.B., Klor, E., Powell, J., 2020. Mostly Deterred: An Episodic Analysis of the Israel-Gaza Conflict. The Hebrew University of Jerusalem, Mimeo.

Adnan, W., 2015. Who gets to cross the border? The impact of mobility restrictions on labour flows in the West Bank. Labour Econ. 34, 86–99.

Adnan, W., 2022. From Economic Integration to Near Elimination: The Economic Consequences of Isolation. J. Dev. Stud. 58 (6), 1160–1180.

Amodio, F., Di Maio, M., 2018. Making do with what you have: conflict, input misallocation, and firm performance. Econ. J. 128 (615), 2559–2612.

Amodio, F., Baccini, L., Di Maio, M., 2021. Security, trade, and political violence. J. Eur. Econ. Assoc. 19 (1), 1–37.

Araji, S. and Pesce, O. (2019). Country profile on employment and decent work palestine. Economic and social commission for Western Asia (ESCWA).

Atamanov, A., Palaniswamy, N., 2018. West Bank and Gaza Poverty and Shared Prosperity Diagnostic 2011-2017. World Bank, Washington, DC, World Bank.

B'Tselem (2018). Statistics on fatalities. Jerusalem. Available at https://www.btselem.org/statistics.

Berrebi, C., Ostwald, J., 2016. Terrorism and the labor force: evidence of an effect on female labor force participation and the labor gender gap. J. Conflict Resolut. 60 (1), 32–60.

Bertoni, E., Maio, M.D., Molini, V., Nistico, R., 2018. Education is Forbidden": the effect of the boko haram conflict on education in North-East Nigeria. J. Dev. Econ. 141, 102249.

Brück, T., Di Maio, M., Miaari, S., 2019a. Learning the hard way: the effect of violent conflict on student academic achievement. J. Eur. Econ. Assoc. 17 (5), 1502–1537.

Brück, T., d'Errico, M., Pietrelli, R., 2019b. The effects of violent conflict on household resilience and food security: evidence from the 2014 Gaza conflict. World Dev. 119, 203–223.

Brown, N.J. (2012). Gaza five years on: Hamas settles in. Carnegie Endowment for International Peace.

Cahalan, L., Gitter, S., Fletcher, E., 2020. Terrorism and women's employment in Afghanistan. Oxford Dev. Stud. 48 (2), 195–208.

Calì, M., Miaari, S., 2018. The labor market impact of mobility restrictions: Evidence from the West Bank. Labour Econ. 51, 136–151.

Del Prete, D., Di Maio, M., Rahman, A., 2023. Firms amid conflict: performance, production inputs, and market competition. J. Dev. Econ. 164, 103143.

Di Maio, M., Leone Sciabolazza, V., 2021. Conflict exposure and health: evidence from the Gaza Strip. Health Econ. 30 (9), 2287–2295.

Di Maio, M., Nandi, T.K., 2013. The effect of the Israeli-Palestinian conflict on child labour and school attendance in the West Bank. J. Dev. Econ. 100, 107–116.

Di Maio, M., Nisticò, R., 2019. Effect of parental job loss on child school dropout: evidence from the Palestinian occupied territories. J. Dev. Econ. 141, 102375.

Etkes, H., Zimring, A., 2015. When trade stops: Lessons from the Gaza blockade 2007–2010. J. Int. Econ. 95 (1), 16–27.

Fernández, M., Ibáñez, A.M., Peña, X., 2014. Adjusting the labour supply to mitigate violent shocks: Evidence from rural Colombia. J. Dev. Stud. 50 (8), 1135–1155.

Galdo, J., 2013. The long-run labor-market consequences of civil war: evidence from Shining Path in Peru. Econ. Dev. Cult. Chang. 61 (4), 789–823.
ILO, 2015. The situation of workers of the occupied Arab territories. Report of the Director-General. International Labour Conference. 104th Session. International Labour Organization, Geneva.
ILO, 2018. The situation of workers of the occupied Arab territories. Report of the Director-General. International Labour Conference. 107th Session. International Labour Organization, Geneva.
ILO, 2019. The situation of workers of the occupied Arab territories. Report of the Director-General. International Labour Conference, 108th Session. International Labour Organization, Geneva.
International Crisis Group (2021). The Israel-Palestine crisis: causes, consequences, portents (https://www.crisisgroup.org/middle-east-north-africa/eastern-mediterranean/israelpalestine/israel-palestine-crisis-causes-consequences-portents).
Islam, A., Ouch, C., Smyth, R., Wang, L.C., 2016. The long-term effects of civil conflicts on education, earnings, and fertility: evidence from Cambodia. J. Comp. Econ. 44 (3), 800–820.
Jürges, H., Stella, L., Hallaq, S., Schwarz, A., 2022. Cohort at risk: long-term consequences of conflict for child school achievement. J. Popul. Econ. 35, 1–43.
Jaeger, D.A., Klor, E.F., Miaari, S.H., Paserman, M.D., 2012. The struggle for Palestinian hearts and minds: violence and public opinion in the Second Intifada. J. Public Econ. 96 (3-4), 354–368.
Justino, P., Leone, M., Salardi, P., 2014. Short-and long-term impact of violence on education: the case of Timor Leste. World Bank Econ. Rev. 28 (2), 320–353.
Kondylis, F., 2010. Conflict displacement and labor market outcomes in post-war Bosnia and Herzegovina. J. Dev. Econ. 93 (2), 235–248.
Korovkin, V., Makarin, A., 2023. Conflict and inter-group trade: evidence from the 2014 Russia-Ukraine Crisis. Am. Econ. Rev. 113 (1), 34–70.
Krahnert, K., Bruck, T., DI Maio, M., Nisticò, R., 2019. The effects of conflict on fertility: Evidence from the Rwanda genocide. Demography 56 (3), 935–968.
Ksoll, C., Macchiavello, R., Morjaria, A., 2022. Electoral violence and supply chain disruptions in Kenya's floriculture industry. Rev. Econ. Stat. 11, 1–45.
Leon, G., 2012. Civil conflict and human capital accumulation: The long-term effects of political violence in Perú. J. Hum. Resour. 47 (4), 991–1022.
Loewenthal, A., Miaari, S., and Abrahams, A.. (2021). How civilian attitudes respond to the state's violence: lessons from the Israel-Gaza Conflict. IZA DP No. 14776.
Mansour, H., Rees, D.I., 2012. The effect of prenatal stress on birth weight: evidence from the al-Aqsa Intifada. J. Dev. Econ. 99 (1), 190–199.
Mansour, Hani., 2010. The effects of labor supply shocks on labor market outcomes: Evidence from the Israeli-Palestinian conflict. Labour Econ. 17 (6), 930–939.
Mataria, A., Giacaman, R., Stefanini, A., Naidoo, N., Kowal, P., Chatterji, S., 2009. The quality of life of Palestinians living in chronic conflict: assessment and determinants. Eur. J. Health Econ. 10 (1), 93. -10.
Miaari, S., Zussman, A., Zussman, N., 2011. Ethnic conflict and job separations. J. Popul. Econ. 25 (2), 419–437.
Miaari, S., 2020. An analysis of the public–private wage differential in the Palestinian labour market. Defence Peace Econ. 31 (3), 289–314.
Minoiu, C., Shemyakina, O.N., 2014. Armed conflict, household victimization, and child health in Côte d'Ivoire. J. Dev. Econ. 108, 237–255.
Moghaddasi-Kelishomi, A., Nistico, R., 2022. Employment effects of economic sanctions in Iran. World Dev. 151, 105760.
OCHA (2015). The humanitarian impact of the blockade. United Nations office for the coordination of the humanitarian affairs occupied Palestinian territories. East Jerusalem.
OCHA (2018). Humanitarian Bulletin. United Nations Office for the Coordination of Humanitarian Affairs of the Humanitarian affairs occupied Palestinian territories. East Jerusalem.
PCBS, 2014. Socio-Economic & Food Security Survey 2013. Palestinian Central Bureau of Statistics. West Bank, Ramallah.
PCBS, 2015. Socio-Economic & Food Security Survey 2014. Palestinian Central Bureau of Statistics. West Bank, Ramallah.
PCBS, 2016. Report on the Socio-Economic & Food Security Survey 2014. Palestinian Central Bureau of Statistics. West Bank, Ramallah.
PCBS, 2018. Socio-Economic & Food Security Survey 2018. Palestinian Central Bureau of Statistics. West Bank, Ramallah.
RAND, 2015. The Cost of the Israeli-Palestinian Conflict. RAND Corporation, US.
Rozo, S., 2018. Is murder bad for business? Evidence from Colombia. Rev. Econ. Stat. 100 (5), 769–782.
Shemyakina, O., 2015. Exploring the impact of conflict exposure during formative years on labour market outcomes in Tajikistan. J. Dev. Stud. 51 (4), 422–446.
Shilliday, A. and Lautenschlager J. (2012). Data for a Global ICEWS and Ongoing Research. Available at https://dataverse.harvard.edu/dataverse/icews.
UNCTAD, 2020. The Economic Costs of the Israeli Occupation for the Palestinian People: The Impoverishment of Gaza Under Blockade. UNCTAD/GDS/APP/2020/1, Geneva.
UNCTAD, 2019. Report on UNCTAD assistance to the Palestinian people: Development. July, Geneva. Available at: https://unctad.org/system/files/official-document/tdbex68d4_en.pdf.
United Nations, 2017. Gaza - Ten Years Later - United Nations Country Team in the Occupied Palestinian territory Report.
Utar, H. (2020). Firms and labor in times of violence: Evidence from the Mexican Drug War. LACEA Working Paper 40.
Verwimp, P., Justino, P., Bruck, T., 2019. The microeconomics of violent conflict. J. Dev. Econ. 141, 102297.
WHO, 2018. Health Conditions in the Occupied Palestinian Territory, Including East Jerusalem, and in the Occupied Syrian Golan. World Health Organization, Geneva. A71/27.
World Bank, 2013. West Bank and Gaza - Area C and The Future of the Palestinian Economy. World Bank, Washington, DC. Technical Report AUS2922.
World Bank, 2018. Economic Monitoring Report to the Ad Hoc Liaison Committee. World Bank, Washington, DC. March.
World Bank, 2019. Jobs in West Bank and Gaza Enhancing Job Opportunities for Palestinians. World Bank, Washington, DC.