

# Education under attack? The Indirect Impact of Localized War on Schooling Achievements

Lusine Ivanov-Davtyan

Erasmus University Rotterdam  
EEA 2024

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact
  - on economic and social outcomes, including education
  - thus, on the most important resource, human capital

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact
  - on economic and social outcomes, including education
  - thus, on the most important resource, human capital
- Spillover impacts of war on non-conflict areas are understood less

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact
  - on economic and social outcomes, including education
  - thus, on the most important resource, human capital
- Spillover impacts of war on non-conflict areas are understood less
  - ✓ Localized wars: South Osetia 2008, Donbas 2014, Nagorno-Karabagh 2020

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact
  - on economic and social outcomes, including education
  - thus, on the most important resource, human capital
- Spillover impacts of war on non-conflict areas are understood less
  - ✓ Localized wars: South Osetia 2008, Donbas 2014, Nagorno-Karabagh 2020
  - ✓ 468 million children, accounting for 18.8% of world children population live in conflict-ridden countries, but outside the violent areas(Østby et al., 2022).

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact
  - on economic and social outcomes, including education
  - thus, on the most important resource, human capital
- Spillover impacts of war on non-conflict areas are understood less
  - ✓ Localized wars: South Osetia 2008, Donbas 2014, Nagorno-Karabagh 2020
  - ✓ 468 million children, accounting for 18.8% of world children population live in conflict-ridden countries, but outside the violent areas(Østby et al., 2022).
- Open questions:
  - How conflict affects education outcomes at non-conflict areas?

# Motivation

- Wars and violent conflicts are still widespread in 21 century and have an enormous impact
  - on economic and social outcomes, including education
  - thus, on the most important resource, human capital
- Spillover impacts of war on non-conflict areas are understood less
  - ✓ Localized wars: South Osetia 2008, Donbas 2014, Nagorno-Karabagh 2020
  - ✓ 468 million children, accounting for 18.8% of world children population live in conflict-ridden countries, but outside the violent areas(Østby et al., 2022).
- Open questions:
  - How conflict affects education outcomes at non-conflict areas?
  - Is the impact different across pupils who were impacted by the localized war to a different extent (social versus personal affectedness)



# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

- ✓ The war was localized, short and intensive

# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

- ✓ The war was localized, short and intensive
  - Localized war:

# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

- ✓ The war was localized, short and intensive
  - Localized war: shut down the main mechanisms, e.g. school closure, infrastructure destruction, etc.

# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

- ✓ The war was localized, short and intensive
  - Localized war: shut down the main mechanisms, e.g. school closure, infrastructure destruction, etc.
  - Short and intensive war: no ex-ante risk management strategy (Justino,2012), no updated beliefs on education outcome

# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

- ✓ The war was localized, short and intensive
  - Localized war: shut down the main mechanisms, e.g. school closure, infrastructure destruction, etc.
  - Short and intensive war: no ex-ante risk management strategy (Justino,2012), no updated beliefs on education outcome
- ✓ Access to a unique individual-level data

# The setting and Research Question

This paper explores whether and how the closeness to war-related deaths affect the schooling performance outside the conflict area with the case of Armenian-Azerbaijani war of 2020.

- ✓ The war was localized, short and intensive
  - Localized war: shut down the main mechanisms, e.g. school closure, infrastructure destruction, etc.
  - Short and intensive war: no ex-ante risk management strategy (Justino,2012), no updated beliefs on education outcome
- ✓ Access to a unique individual-level data → community versus personal affectedness

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)



## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)

**This paper**

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)

## This paper

- ✓ Short, intensive and localized war

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)
- Quantitative outcomes of schooling, e.g. education enrolment, attendance (Swee, 2015; Justino et al., 2014)

## This paper

- ✓ Short, intensive and localized war

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)
- Quantitative outcomes of schooling, e.g. education enrolment, attendance (Swee, 2015; Justino et al., 2014)

## This paper

- ✓ Short, intensive and localized war
- ✓ Quality of education: average grade from different subjects

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)
- Quantitative outcomes of schooling, e.g. education enrolment, attendance (Swee, 2015; Justino et al., 2014)
- School-level treatment and analyzes

## This paper

- ✓ Short, intensive and localized war
- ✓ Quality of education: average grade from different subjects

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)
- Quantitative outcomes of schooling, e.g. education enrolment, attendance (Swee, 2015; Justino et al., 2014)
- School-level treatment and analyzes

## This paper

- ✓ Short, intensive and localized war
- ✓ Quality of education: average grade from different subjects
- ✓ Individual-level analyzes

## Existing papers

- Direct exposure to war (Rohner & Thoenig, 2021; Korovkin & Makarin, 2020)
- Long, continuous non-intensive violent conflicts or wars ( Mironova & Whitt, 2021; Fize & Louis-Sidois, 2020; Couttenier et al., 2019; Brück et al., 2019; Poirier, 2012)
- Quantitative outcomes of schooling, e.g. education enrolment, attendance (Swee, 2015; Justino et al., 2014)
- School-level treatment and analyzes

## This paper

- ✓ Short, intensive and localized war
- ✓ Quality of education: average grade from different subjects
- ✓ Individual-level analyzes → Social versus personal impact



# Historical Background: Nagorno-Karabakh(Artsakh) Conflict

▶ Map

▶ Casualties

First war - 1991 after the collapse of Soviet Union

## Result

- Unrecognized Republic of Artsakh under Armenian control
- Frozen conflict between Armenia and Azerbaijan with occasional ceasefires

# Historical Background: Nagorno-Karabakh(Artsakh) Conflict

▶ Map

▶ Casualties

First war - 1991 after the collapse of Soviet Union

## Result

- Unrecognized Republic of Artsakh under Armenian control
- Frozen conflict between Armenia and Azerbaijan with occasional ceasefires

Second war - 2020

# Historical Background: Nagorno-Karabakh(Artsakh) Conflict

▶ Map

▶ Casualties

First war - 1991 after the collapse of Soviet Union

## Result

- Unrecognized Republic of Artsakh under Armenian control
- Frozen conflict between Armenia and Azerbaijan with occasional ceasefires

Second war - 2020

## Result

- Significant part of Artsakh fell under Azerbaijani control
- Almost 4000 victims from the side of Armenia
- Around 10000 pupils migrated to Armenia from Artsakh

# Treatment variables and Data Matching

I use two treatment variables to compare the extent of exposure to war-related deaths outside the conflict zone on schooling

- **Community-level:**

# Treatment variables and Data Matching

I use two treatment variables to compare the extent of exposure to war-related deaths outside the conflict zone on schooling

- **Community-level:**

Victims Dataset				
Victim's Name	Victim's Surname	Father name	Date of birth	District
Davit	Adamyan	Arthur		
George	Sargsyan	Sergey		

Registry Dataset				
Victim's surname	Victim's father name	District	"-->	Exact address
Adamyan	Arthur			
Sargsyan	Sergey			

# Treatment variables and Data Matching

I use two treatment variables to compare the extent of exposure to war-related deaths outside the conflict zone on schooling

- **Community-level:**

Victims Dataset				
Victim's Name	Victim's Surname	Father name	Date of birth	District
Davit	Adamyan	Arthur		
George	Sargsyan	Sergey		

Registry Dataset				
Victim's surname	Victim's father name	District	"-->	Exact address
Adamyan	Arthur			
Sargsyan	Sergey			

**Treatment** is assigned a value of one if there is a war-related victim in the school-district and zero otherwise

# Treatment variables and Data Matching

- **Personal-level:** captures the direct effect of a localized war and is based on whether a pupil has lost his brother during the war.

Student id	Name	Surname	Father name	Date of birth	Sex	school id	semester	subject A grade	subject B grade
1	Alex	Adamyán	Davit						
2	Anna	Sargsyan	Sergey						

# Treatment variables and Data Matching

- **Personal-level:** captures the direct effect of a localized war and is based on whether a pupil has lost his brother during the war.

School Dataset									
Student id	Name	Surname	Father name	Date of birth	Sex	school id	semester	subject A grade	subject B grade
1	Alex	Adamyán	Davit						
2	Anna	Sargsyan	Sergey						

Victims Dataset				
Victim's Name	Victim's Surname	Father name	Date of birth	District
Davit	Adamyán	Arthur		
George	Sargsyan	Sergey		





# Treatment variables and Data Matching

- **Personal-level:** captures the direct effect of a localized war and is based on whether a pupil has lost his brother during the war.

School Dataset									
Student id	Name	Surname	Father name	Date of birth	Sex	school id	semester	subject A grade	subject B grade
1	Alex	Adamyany	Davit						
2	Anna	Sargsyan	Sergey						

Victims Dataset				
Victim's Name	Victim's Surname	Father name	Date of birth	District
Davit	Adamyany	Arthur		
George	Sargsyan	Sergey		

 Father victim

 Brother victim

Using unique individual-level data and an arguably exogenous spatial variation of war-related death exposure in Armenian villages and cities outside the conflict zone

Using unique individual-level data and an arguably exogenous spatial variation of war-related death exposure in Armenian villages and cities outside the conflict zone

## → Difference in Differences (DID)

**Treatment:** Presence of war-related deaths in the unit of analysis

$$Y_{ist} = \beta_1(\text{FamilyExp}_i \times \text{Post}_t) + \beta_2(\text{CommunityExp}_s \times \text{Post}_t) \\ + X_{it}\delta_1 + Z_{st}\delta_2 + \gamma_i + \lambda_t + \epsilon_{ist}(1)$$

- $\text{FamilyExp}_i$  : dummy treatment variable, equal to 1 if a student lost his brother during the war
- $\text{CommunityExp}_s$ : indicates the exposure to war at community-level, equaling to one if there was a victim of war in 1 km buffer of a school.

# Identification Strategy: Features of Armenian army

- Mandatory for all young males aged 18 to 27

# Identification Strategy: Features of Armenian army

- Mandatory for all young males aged 18 to 27
- Randomly distribution to a military division and specialization

## Identification Strategy: Features of Armenian army

- Mandatory for all young males aged 18 to 27
- Randomly distribution to a military division and specialization

**Exogenous variation of soldiers' location during the war → Arguably exogenous variation of victims across districts**

# Identification Strategy: Features of Armenian army

- Mandatory for all young males aged 18 to 27
- Randomly distribution to a military division and specialization

**Exogenous variation of soldiers' location during the war → Arguably exogenous variation of victims across districts**

▶ Balance Table

▶ Correlation maps

# Identification Strategy: Features of Armenian army

- Mandatory for all young males aged 18 to 27
- Randomly distribution to a military division and specialization

**Exogenous variation of soldiers' location during the war → Arguably exogenous variation of victims across districts**

▶ Balance Table

▶ Correlation maps

Checks provide supportive evidence for exogeneity assumption → DID



# Preview of The Findings

The spillover impact of the exposure to war-related deaths is different depending on the level of treatment:

# Preview of The Findings

The spillover impact of the exposure to war-related deaths is different depending on the level of treatment:

- Community-level affectedness: school-level treatment

# Preview of The Findings

The spillover impact of the exposure to war-related deaths is different depending on the level of treatment:

- Community-level affectedness: school-level treatment
  - Increased performance from the language of most popular migration direction, while decreased from homeland related studies (Tapsoba, 2023)
  - Might be driven by increased influence of Russia and/or higher potential migration

# Preview of The Findings

The spillover impact of the exposure to war-related deaths is different depending on the level of treatment:

- Community-level affectedness: school-level treatment
  - Increased performance from the language of most popular migration direction, while decreased from homeland related studies (Tapsoba, 2023)
  - Might be driven by increased influence of Russia and/or higher potential migration
- Family-level affectedness: personal treatment
  - Increased performance from Armenian related studies.
  - Might be driven by an increased connection to the motherland and increased patriotism (parochialism).

# Preview of The Findings

The spillover impact of the exposure to war-related deaths is different depending on the level of treatment:

- Community-level affectedness: school-level treatment
  - Increased performance from the language of most popular migration direction, while decreased from homeland related studies (Tapsoba, 2023)
  - Might be driven by increased influence of Russia and/or higher potential migration
- Family-level affectedness: personal treatment
  - Increased performance from Armenian related studies.
  - Might be driven by an increased connection to the motherland and increased patriotism (parochialism).
- Higher positive impact on average performance for females compared to males (Valente, 2014)

# Preview of The Findings

The spillover impact of the exposure to war-related deaths is different depending on the level of treatment:

- Community-level affectedness: school-level treatment
  - Increased performance from the language of most popular migration direction, while decreased from homeland related studies (Tapsoba, 2023)
  - Might be driven by increased influence of Russia and/or higher potential migration
- Family-level affectedness: personal treatment
  - Increased performance from Armenian related studies.
  - Might be driven by an increased connection to the motherland and increased patriotism (parochialism).
- Higher positive impact on average performance for females compared to males (Valente, 2014)
- Significant impact on lower tail (Brück et al., 2019)

## Results: Family versus Community level Treatment

**Treatment:** Having a victim in a family level(family exposure) or in school-district(communitv wxposure)

# Results: Family versus Community level Treatment

**Treatment:** Having a victim in a family level(family exposure) or in school-district(communitiy wxposure)

	(1) GPA	(2) Russian	(3) Foreign	(4) Armenian	(5) IT	(6) Math
CommExp x post	0.0485 (0.0442)	0.148*** (0.0554)	-0.0414 (0.0528)	-0.138** (0.0658)	0.238*** (0.0768)	0.0628 (0.0952)
FamExp x post	0.0225 (0.0381)	0.0340 (0.0566)	0.0774 (0.0696)	0.149** (0.0722)	-0.153 (0.101)	0.0290 (0.133)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Student FE	Yes	Yes	Yes	Yes	Yes	Yes
Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	57865	57447	53731	47793	50085	57584

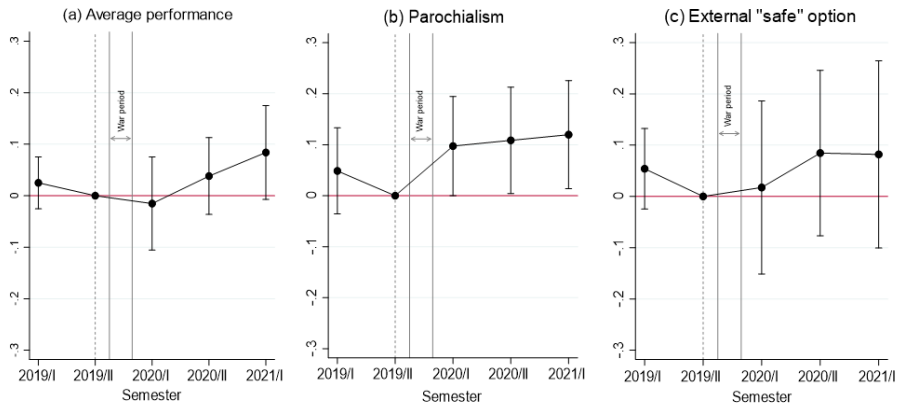


# Results: Family-level Treatment: Event Study

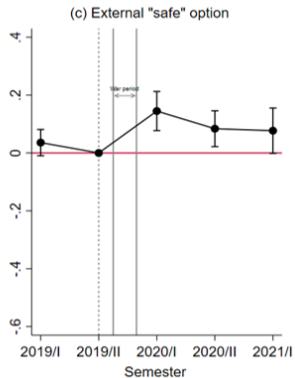
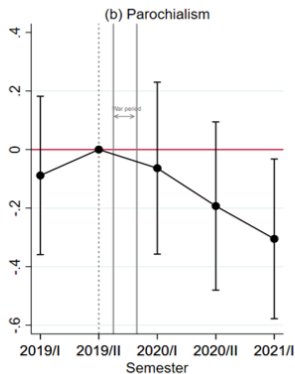
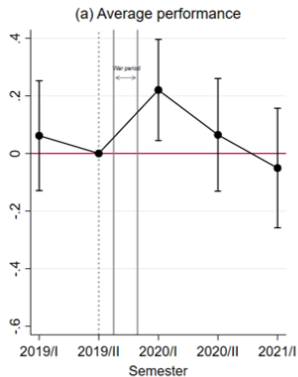
**Treatment:** Having a victim of war inside the family

# Results: Family-level Treatment: Event Study

**Treatment:** Having a victim of war inside the family



# Results: Community-level Treatment



## Community-level affectedness: Possible Channels

- 96% of migrants choose Russia as their main direction

## Community-level affectedness: Possible Channels

- 96% of migrants choose Russia as their main direction
- 93.5% of migrants are males [▶ Heterogeneity analyses](#)

# Community-level affectedness: Possible Channels

- 96% of migrants choose Russia as their main direction
  - 93.5% of migrants are males [▶ Heterogeneity analyses](#)
- **Potentiality of migration:**

# Community-level affectedness: Possible Channels

- 96% of migrants choose Russia as their main direction
  - 93.5% of migrants are males [▶ Heterogeneity analyses](#)
- **Potentiality of migration:**
- Only 24.7% of migrants have higher education

# Community-level affectedness: Possible Channels

- 96% of migrants choose Russia as their main direction
- 93.5% of migrants are males ▶ Heterogeneity analyses

## → Potentiality of migration:

- Only 24.7% of migrants have higher education

**Table 1:** Russian Language Proficiency: Impact on Lower GPA Quantiles

	(1) q10	(2) q25	(3) q50	(4) q75	(5) q90
CommExp x post	0.145**	0.158*	0.0820	0.0708	0.113
	(0.0650)	(0.0882)	(0.347)	(0.394)	(0.189)
Controls	Yes	Yes	Yes	Yes	Yes
Student FE	Yes	Yes	Yes	Yes	Yes
Semester FE	Yes	Yes	Yes	Yes	Yes
Observations	57,477	57,477	57,477	57,477	57,477
Number of groups	15,290	15,290	15,290	15,290	15,290



## Increased influence of Russia

- Russia considered as a guarantee of the peace

# Community-level affectedness: Possible Channels

## Increased influence of Russia

- Russia considered as a guarantee of the peace
- Russian became the second official language of Artsakh



Figure 1: Post-war protests

## Family-level affectedness: Possible Channels

- **Psychological literature:** The impact of violent conflicts is significantly different for subjects who have a martyr or a POW in the family compared to those who are indirectly exposed (Mironova & Whitt, 2021; Abdullatif, 1995; Kos et al., 1998).
- **Experimental literature:** Exposure to inter-group conflicts increases parochialism (the sense of group identity)(Bauer et al., 2014).
- **Anecdotal evidence:** Event to the 70th anniversary of the Victory of the Soviet people over Nazi Germany in the Great Patriotic War. Pupils' research on their grandfathers → Those who learnt they are sons of veterans, claim to become more proud and patriotic.

# Conclusion

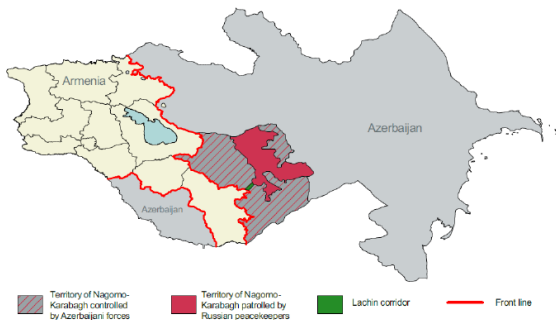
- **Research aim:** Exploit the impact of war-related deaths on schooling quality at individual and school level outside the conflict zone.
- **Methodology:** Difference in differences
- **Results:** Different impact for community vs personal affectedness: Indirect exposure led to higher grades for foreign language and lower grades in Armenian studies, while direct exposure increases performance in Armenian studies.
- **Mechanisms:** Indirect exposure-higher chance of migration, increased influence of Russia Direct exposure- higher connection to the motherland, higher parochialism.
- **Contribution** to the Economics of Education and Conflict Economics 1) by delivering new insights into the spillover impact of a war outside the direct conflict area, and (2) by revealing the differences of the impact at society versus personal level

Thank you !

# Exogeneity check: Balance table

Table 2: Summary Statistics and Balancing

<b>Panel A: Political variables</b>					
	Control		Treatment		
	Mean	SD	Mean	SD	Diff
Republican	0.28	0.10	0.28	0.09	-0.005
Democrat	0.74	0.09	0.75	0.09	0.004
Historically patriotic	0.05	0.06	0.05	0.04	-0.002
Politically active	0.60	0.07	0.60	0.07	-0.000
<b>Panel B: Geographical determinants</b>					
Urban	0.70	0.46	0.72	0.45	0.026
Distance to border	15.56	11.17	15.41	11.79	-0.222
<b>Panel C: Schooling variables</b>					
School Size	327.61	188.03	332.26	186.99	6.842
Average Performance	7.36	1.49	7.37	1.45	0.011
Female	0.48	0.50	0.47	0.50	-0.004
GPA from Russian	7.20	1.81	7.12	1.87	-0.037
GPA from Armenian	6.55	1.79	6.57	1.77	0.093
GPA from Arm_hist	6.57	1.87	6.57	1.93	0.022
GPA from English	6.96	1.87	6.94	1.88	-0.004
GPA from Math	6.21	1.86	6.21	1.74	0.022
GPA from IT	7.06	1.74	7.06	1.70	0.002

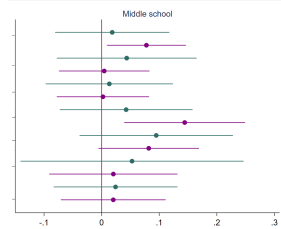
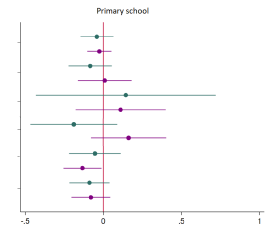
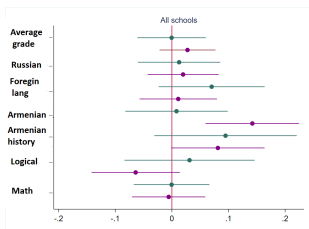
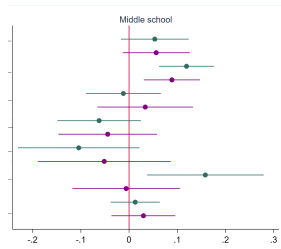
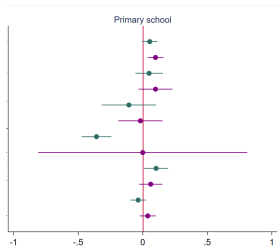
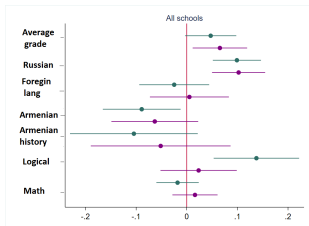


**Notes:** The map depicts the location of Nagorno-Karabakh (the striped and red shaded zones) between Armenia and Azerbaijan. The striped area indicates the part of Nagorno-Karabakh that came under Azerbaijani control as a result of the 2020 war. The red shaded area remained under Armenian control and was patrolled by Russian peacekeepers.<sup>6</sup> The green corridor, known as the Lachin corridor, served as the sole connection between Nagorno-Karabakh and Armenia following the war, and it was also patrolled by Russian peacekeepers. The red line denotes the frontline along Armenian borders.

Figure 2: Map of Nagorno-Karabagh

Source: Own illustration

# Heterogeneity by gender





# Robustness Check: The Impact of Teachers

Table 3: Do Teachers Matter? War Exposure Impact on Exam Scores

	(1)	(2)	(3)	(4)	(5)
	Russian	Armenian	Foreign	Logical	Math
CommExp × post	0.0682*** (0.0124)	-0.0984*** (0.0181)	-0.0194 (0.0151)	0.0766*** (0.0163)	-0.00913 (0.0122)
FamExp × post	0.0139 (0.0335)	0.0611* (0.0347)	0.0378 (0.0370)	-0.0175 (0.0441)	-0.00727 (0.0331)
Controls	Yes	Yes	Yes	Yes	Yes
Student FE	Yes	Yes	Yes	Yes	Yes
Semester FE	Yes	Yes	Yes	Yes	Yes
Observations	57626	53731	47793	50112	57803

# Robustness Check: The Impact of Teachers

Table 4: Intensity of War Exposure

	(1) Avr perf.	(2) Russian	(3) Armenian	(4) Arm History	(5) Logical	(6) Math
Intensity Of Exp $\times post$	0.0640** (0.00420)	0.0466** (0.00681)	-0.0251* (0.0102)	-0.0268* (0.0116)	0.0975** (0.0124)	0.0799** (0.00939)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Student FE	Yes	Yes	Yes	Yes	Yes	Yes
Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	57865	57447	53731	28870	23184	45795