

# **How Do Exporters Cope With Violence? Evidence from Political Strikes in Bangladesh**

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8<sup>th</sup> December, 2016

# Motivation

- **We know:**

- Political violence negatively impacts growth by affecting the factors of production - capital and labor
- Full supply chain: Procurement of inputs, production, trade, transportation  
Impact depends on relative length and importance of each segment
- Political violence dampens investors' confidence and thus whole business environment

- **Less understood:**

- How do firms cope with this political violence?
- Political strike in Bangladesh provides a unique set-up
  - shock works only through transportation channel
  - cleanly identify the impacts and the coping strategies from data

# Questions

- **The impact of political strike on the behaviour of RMG exporters**
- **Impact**
- What is the likelihood of shipment on the day of strike? [extensive margin]
- Does the value of shipment go down on the day of strike [intensive margin]
- How do the impacts vary with the characteristics of firms and strike?
- **Coping strategies**
- What are the coping strategies the exporters use to mitigate the adverse impact:
  - Reallocation of shipment dates
  - Shift to costlier air shipment
- **Costs**
- What is the size of the extra transportation cost due to strike?

# Literature review

- **Microeconomic impact of political violence on firms**
- Ksoll et al. (2014): Kenya, floriculture industry, election related violence in 2008, weekly export 38% ↓
- Shonchoy and Tsubota (2015): BD, hartal, firm level data, productivity ↓
- Guidolin and La Ferrara (2007): civil conflict in Angola, stock market return
- Abadie and Gardeazabal (2003): end of truce in Basque, stock market return

# Literature review

- **Impact of conflict on trade**
- Blomberg and Hess (2006): examine how various types of conflict affect bilateral trade between countries.
- Glick and Taylor (2010): historical data, 1870-1997, effect of conflict on bilateral trade.
- Martin, Thoenig and Mayer (2008): gravity equation, impact of civil conflict on bilateral trade

# The context: Why disruption in supply chain of RMG has become costlier?

- **Sourcing method:**
- **Traditional sourcing** in 90s: six months
- problem: fashion changes very fast, mismatch between supply and demand → understock or overstock
- Retailer switched: **QR (quick response)** method of supply chain management
- -Gap between order placed and shipment reduced substantially
- - size of order gets smaller
- → Lead time for exporter has reduced drastically
- → Disruption to supply chain becomes very costly

# Context: Disruptive effect of strike

- **Production is mostly unaffected**
  - workers live nearby → no absenteeism
  - factories are not affected
  - utility infrastructure are not affected
- **Cost of strike for a RMG exporter is due to transportation disruption**
  - Higher transportation cost
  - Longer time to reach port
  - Damage of shipment
  - Cost for security of the consignment
  - Storage cost

# Data

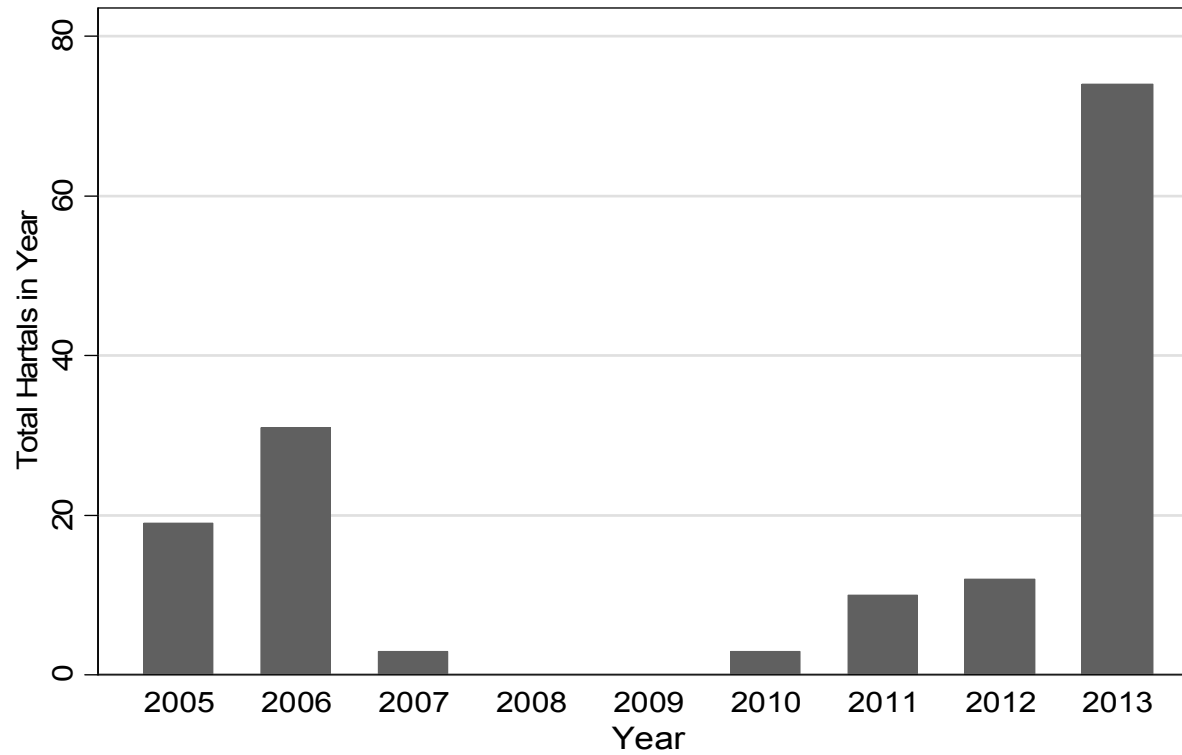
- **Data on strike**
- Data is collected and compiled from Daily Ittefaq and The Daily Star.
- Two RAs independently went through archives of newspapers for each day of our sample period 2005-2013
- Information collected on strike:
  - Date occurred, announcement date, length, severity (injured and killed), reasons for calling
  - To the best of our knowledge, this is the first compilation of the historical data on political strike



# Data on export

- Daily firm level export data from NBR from 2005-2013.
- ASYCUDA++ (Automated System for Customs Data )
- Date of export, exporters' unique identification number, total volume of export, HS codes of the product and ports of export

# Annual trends in strikes



## Characteristics of strikes

Table 1: *Hartals* in Bangladesh

	(1)	(2)	(3)
Years Included	2005- 2013	2005- 2009	2010- 2013
Total <i>Hartals</i>	152	53	99
Fraction of <i>Hartals</i> that spanned:			
Single Day	0.65	0.72	0.60
Two Day	0.18	0.14	0.21
Greater than Two Days	0.17	0.14	0.19
Length of <i>Hartals</i> (in hours)	15.60	14.60	16.13
Notice Provided (in days)	5.55	7.28	4.62
Number of Deaths	1.49	0.52	2.01
Number of Injuries	112.68	132.92	101.84

# Export data

Table 3: Descriptive Statistics of Exports Data

	Mean	Median
Total Number of Exporters	8,161	-
Exporters per Day	623.57 [148.97]	624.00
Daily Firm Exports	4.55 [7.28]	2.31
Number of HS6 Products per Firm per Year	5.41 [5.03]	4.00
Number of Destinations per Firm per Year	5.40 [6.20]	4.00
Number of Firm Shipment Days per Year	92.75 [69.12]	73.00
Fraction of Shipments Made Using Air Transport	0.22 -	-

# Working sample: 2010-13

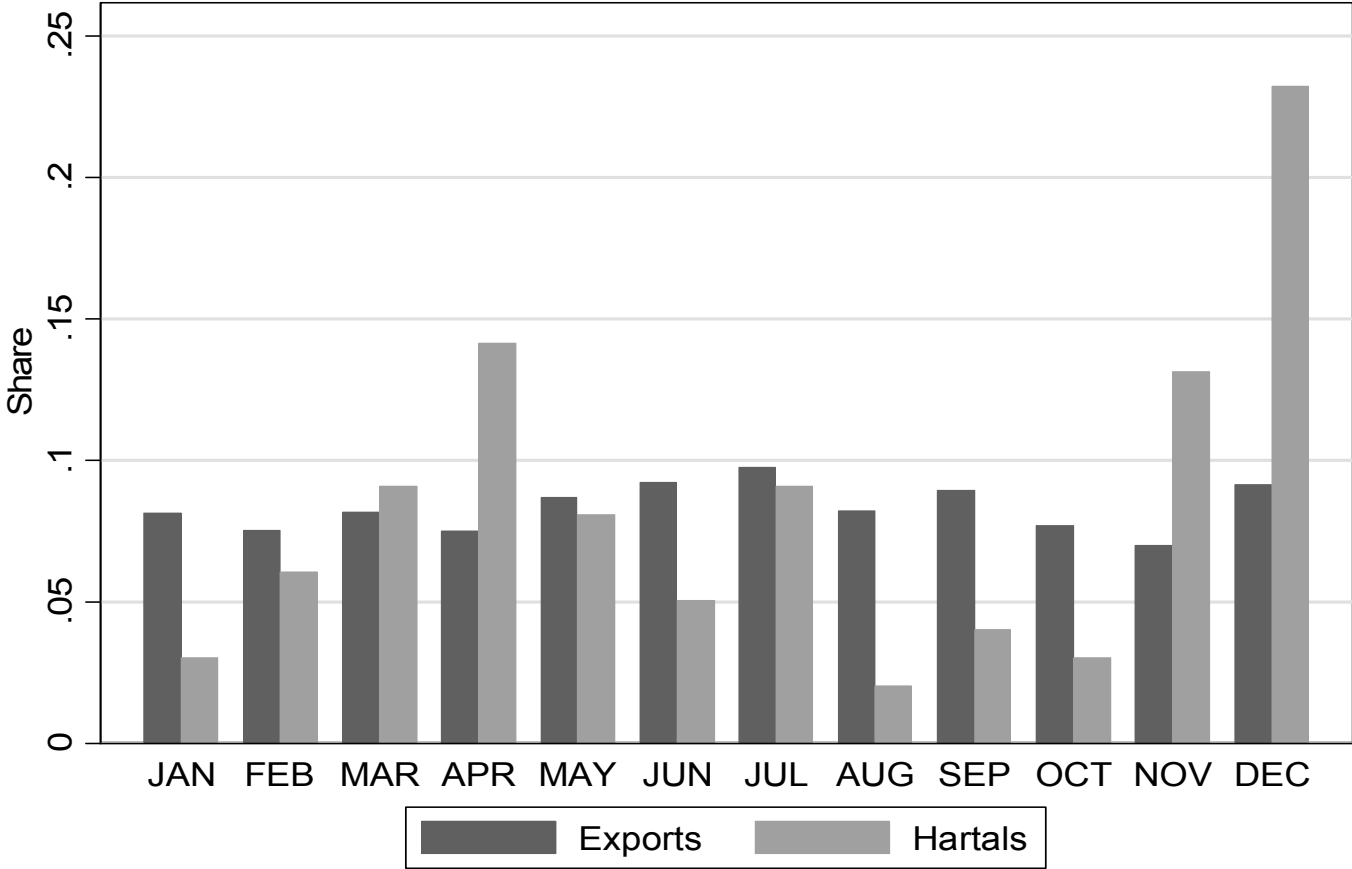
Table 2: Validation of the Customs Exports Data			
Year	World Bank	Customs	Customs/ World Bank
2005	577,769	571,766	1.011
2006	914,655	792,638	1.154
2007	860,018	631,699	0.735
2008	1,050,898	1,054,508	0.997
2009	1,059,283	1,037,734	1.021
2010	1,340,978	1,327,932	1.010
2011	1,803,050	1,739,932	1.036
2012	2,168,282	1,988,230	1.091
2013	2,212,223	2,327,139	0.951
Total	11,758,837	11,699,897	0.995

# Econometric issues: Identifying assumptions

- Hartal is not a response to economic shock which in turn affects export
  - 99% hartals were called for non-economic issues
- If the peak of hartal and export coincide we may spuriously picking up the effect of hartal.
  - there is hardly any seasonality of export
  - control for all kinds of seasonality

# Figure 4: Distribution of *hartals* and daily exports by month.

(The correlation coefficient between these two variables is 0.05)



# Econometric specifications

$$\Pr[X_{it} > 0] = \alpha_1 + \sum_{s=-1}^6 \beta_s H_{t-s} + \theta_d^w + \theta_d^y + \theta_y + \varepsilon_{it}$$

$$\ln X_{it} = \alpha_1 + \sum_{s=-1}^6 \beta_s H_{t-s} + \theta_d^w + \theta_d^y + \theta_y + \varepsilon_{it}$$

When  $s=0$ ,  $H_t$  is an indicator variable for whether there was a *hartal* on that day. For all other values of  $s$ ,  $H_{t-s}$  takes the value of one if there was a *hartal*  $t-s$  days ago and there wasn't a *hartal* on day  $t$ .

$\varphi_d^y$  : day-of-year trend in our capturing any seasonal factors

$\theta_d^w$  : day-of-week fixed effects

$\theta_y$  : year fixed effects to capture macro-level factors

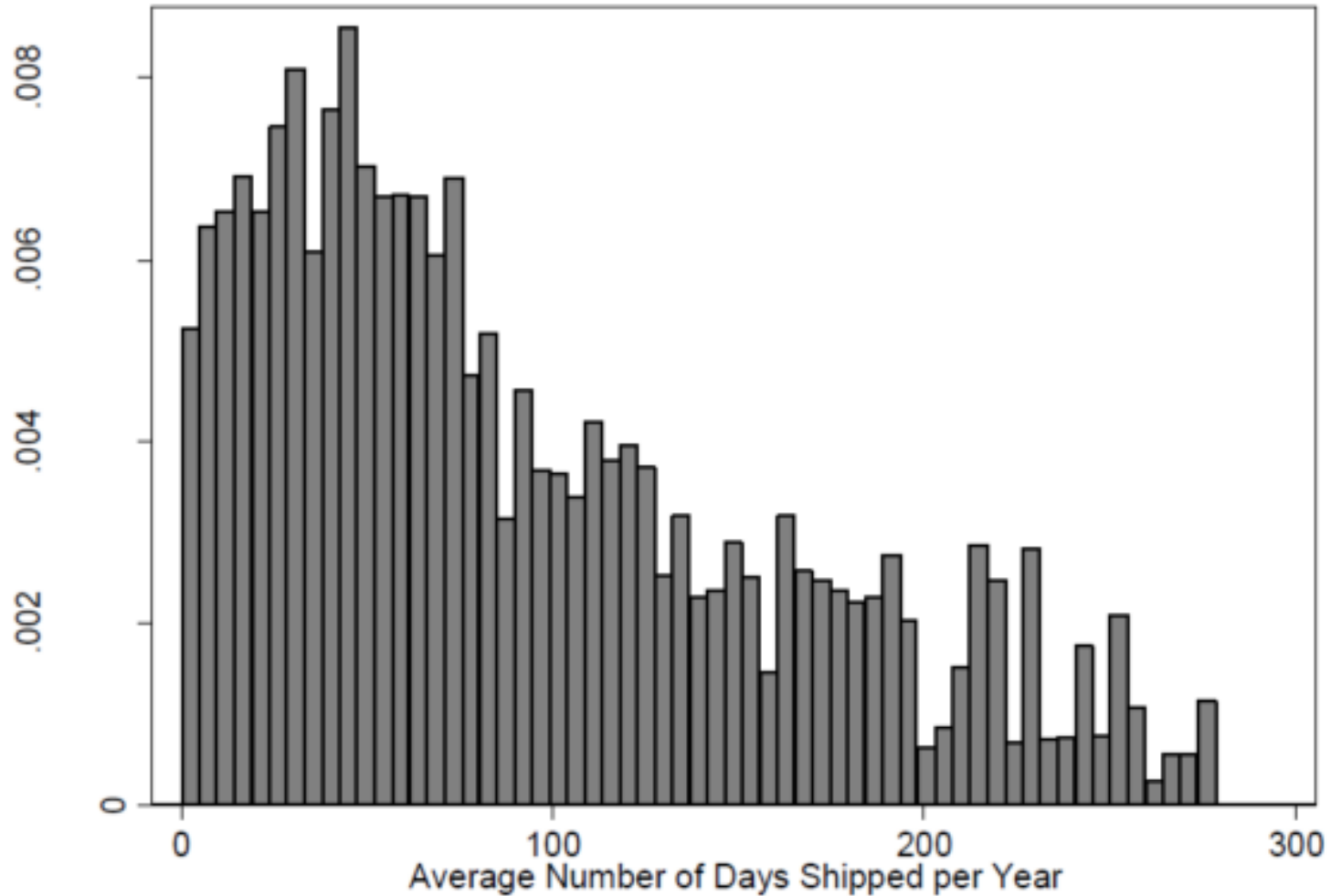


# How to capture the adjustment process: choice of window

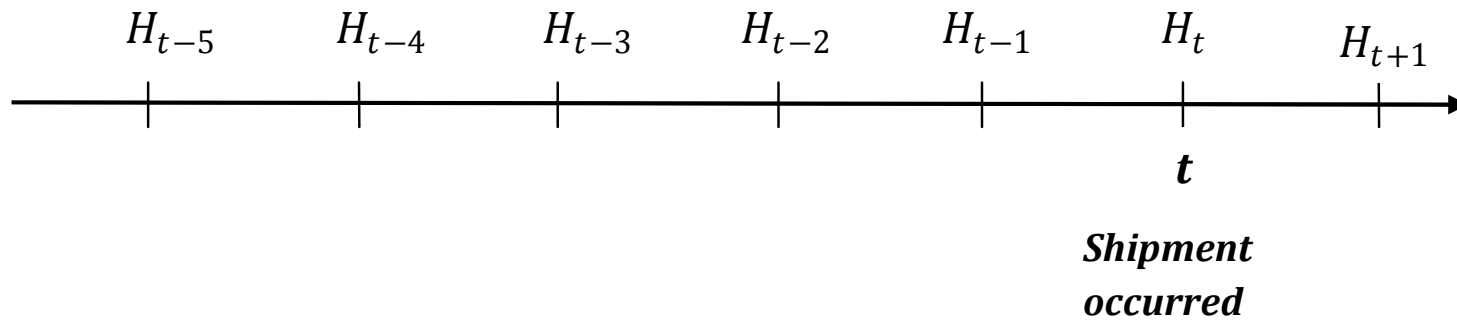
- lag structure with which *hantals* will affect the decision to export → adjustment behavior of the firms
- Trade off: short vs. long window
- Theory can't help → data driven approach
- average gap between shipment days is 6.29 days
- average exporter in our sample exports 92.75 days per year
- → high frequency firms
- Sensitivity: how results change with the size of window

# Determination of window size

- 



# Regression results: Notations



$H_{t+1}$  = Hartal occurred one day after shipment

$H_t$  = Hartal occurred on the day of shipment

$H_{t-j}$  = Hartal occurred  $j$  day(s) before shipment ( $j=1..5$ )

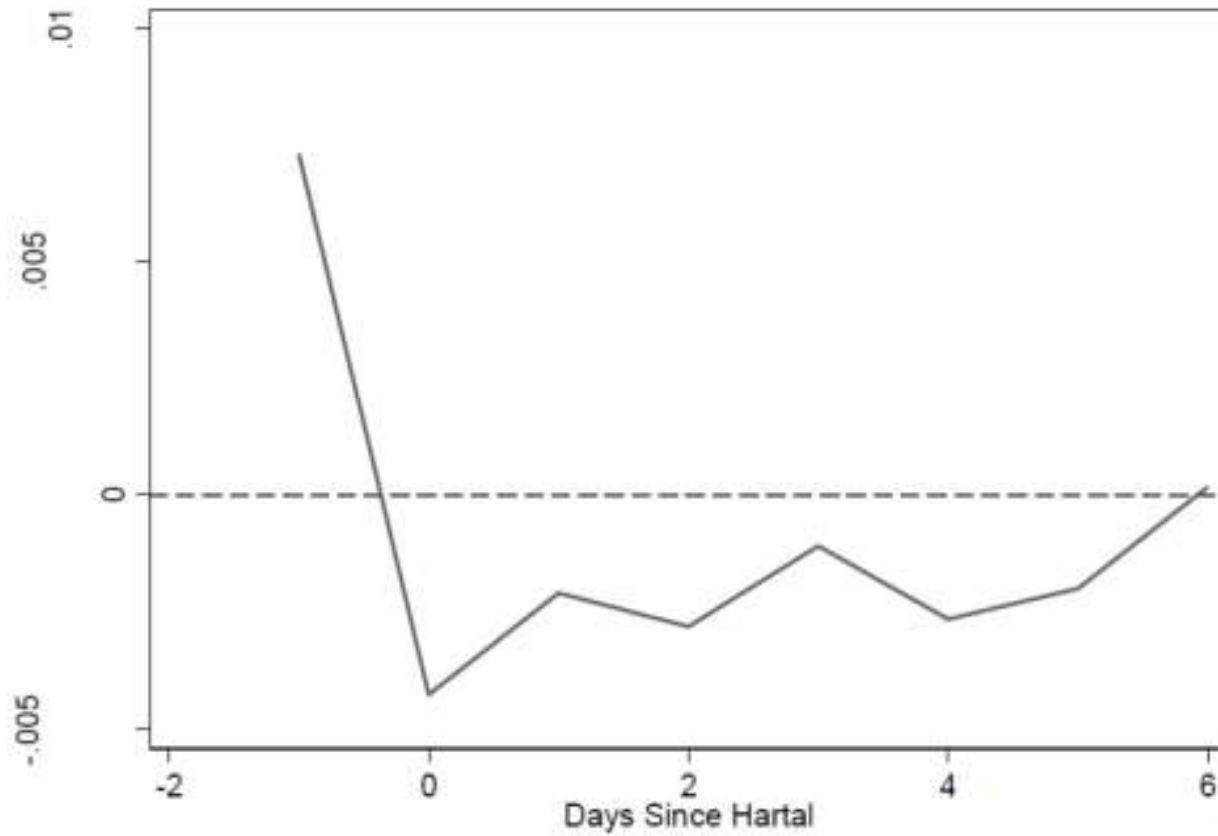


# Results....

- Two types of effect:
  1. Contemporaneous/immediate
  2. Cumulative effect (8 day effect)
- Contemporaneous/immediate effect: *hartal* reduces the average firm's probability of exporting by 1.30 percentage points
- Firms increase the shipment on the day before the *hartal*
- 8 day cumulative effect: Not significant effect
- → reallocation of shipment dates

# Cumulative effects

(zero on the horizontal axis=day of hartal )



# Strike characteristics

Table 6: *Hartals* and Export Shipments by *Hartal* Characteristic

Dependent Variable	(1)	(2)	(3)	(4)	(5)
	Single-Day	Two to Four Day	Pre-Election	Short-Notice	Long-Notice
$H_0$	0.002 (0.002)	-0.006 (0.004)	-0.021** (0.010)	-0.009*** (0.003)	-0.015*** (0.003)
$H_{01}$	0.009*** (0.002)	0.006 (0.005)	0.005 (0.014)	0.008*** (0.003)	0.007*** (0.003)
$H_{02}$	0.001 (0.002)	-0.030*** (0.007)	0.029** (0.012)	0.003 (0.003)	0.001 (0.003)
$H_{03}$	-0.000 (0.003)	-0.005 (0.007)	-0.007 (0.009)	-0.001 (0.003)	-0.0005 (0.003)
$H_{04}$	0.001 (0.003)	-0.001 (0.005)	0.003 (0.009)	-0.0002 (0.003)	0.005 (0.003)
$H_{05}$	-0.002 (0.003)	-0.0002 (0.005)	-0.003 (0.010)	-0.003 (0.003)	0.0005 (0.003)
$H_{06}$	0.001 (0.002)	-0.001 (0.004)	0.016* (0.009)	-0.002 (0.002)	0.006 (0.003)
$H_{07}$	0.004 (0.002)	-0.0004 (0.004)	-0.002 (0.008)	0.003 (0.002)	0.002 (0.003)
$H_{08}$		0.003 (0.004)			
$H_{09}$		-0.007 (0.005)			
$H_{10}$		-0.004 (0.005)			
$H_{11}$		-0.006 (0.005)			
Cumulative effect ( $\sum H_{0i}$ )	0.016**	-0.051***	0.020	-0.0002	0.003
P-value ( $H_0: \sum H_{0i} = 0$ )	[0.037]	[0.002]	[0.513]	[0.982]	[0.652]
Observations	11,311,146	11,205,053	851,605	11,572,298	11,335,629

## Firm characteristics

Table 7: The Role of Exporter Characteristics

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Exporter Characteristic	Indicator for Exporter					
	Small	Large	First Export In or After 2010	First Export Before 2010	Infrequent Shipper	Frequent Shipper
H <sub>0</sub>	-0.004*** (0.001)	-0.019*** (0.004)	-0.006*** (0.002)	-0.018*** (0.004)	0.001 (0.001)	-0.024*** (0.005)
H <sub>0-1</sub>	0.002* (0.001)	0.012*** (0.004)	-0.001 (0.003)	0.017*** (0.004)	0.0001 (0.002)	0.015*** (0.005)
H <sub>0-1</sub>	0.001 (0.001)	0.003 (0.004)	0.002 (0.004)	0.003 (0.005)	0.0001 (0.002)	0.004 (0.005)
H <sub>0-2</sub>	-0.001 (0.001)	-0.0004 (0.004)	0.000 (0.003)	-0.002 (0.005)	-0.0001 (0.002)	-0.001 (0.005)
H <sub>0-3</sub>	0.0001 (0.001)	0.003 (0.004)	0.002 (0.003)	0.001 (0.005)	0.001 (0.002)	0.003 (0.005)
H <sub>0-4</sub>	0.0001 (0.001)	-0.003 (0.004)	-0.001 (0.003)	-0.002 (0.005)	0.001 (0.002)	-0.004 (0.005)
H <sub>0-5</sub>	-0.000 (0.001)	0.001 (0.003)	0.002 (0.003)	-0.0005 (0.004)	0.001 (0.002)	0.0005 (0.004)
H <sub>0-6</sub>	0.001 (0.001)	0.004 (0.003)	0.005 (0.003)	-0.001 (0.004)	0.002 (0.002)	0.002 (0.004)
Cumulative effect ( $\sum H_{0-i}$ )	-0.001	0.001	0.003	-0.003	0.005	-0.005
P-value (H <sub>0</sub> : $\sum H_{0-i} = 0$ )	[0.811]	[0.905]	[0.759]	[0.802]	[0.201]	[0.636]
Observations	5,928,240	5,929,693	6,359,781	5,498,152	5,973,283	5,884,650
R-squared	0.001	0.004	0.032	0.007	0.002	0.004



# Results

- **Hartal characteristics**
- **Single day hartal:** 8-day cumulative effect is positive
- **2-4 day hartal:** 5 percentage point decrease in likelihood of export in 12-day window
- **Pre-election (5<sup>th</sup> Jan, 2014) period- July-Dec. 2013:** Insignificant cumulative effect → similar adjustment behavior
- **Short vs. long notice :** instantaneous effect is higher for long notice hartal; → lower exposure to hartal with long notice
  
- **Firm Characteristics**
- **Small vs. large firms:** larger exporters are better able to renegotiate shipment dates with their buyer → lower exposure
- **New vs. old firms:** reduction on hartal day is higher for old firms and also increase in shipment before hartal → adjust better
- **Frequent vs. infrequent shippers:** Frequent shippers are better able to lower the exposure to hartal

## Volume of export and air shipment

Table 9: The Impact of *Hartals* on Export Value and Export Mode

Dependent Variable	Ln(Daily Exports)		Indicator For Air Shipment	
	OLS	Firm FE	OLS	Firm FE
$H_t$	-0.033 (0.020)	-0.037** (0.017)	0.031*** (0.007)	0.031*** (0.006)
$H_{t-1}$	0.017 (0.024)	0.028 (0.022)	-0.013 (0.010)	-0.004 (0.007)
$H_{t-2}$	0.019 (0.022)	0.039* (0.021)	-0.014* (0.009)	-0.010 (0.007)
$H_{t-3}$	0.020 (0.019)	0.022 (0.018)	0.008 (0.008)	-0.003 (0.006)
$H_{t-4}$	0.012 (0.020)	0.006 (0.018)	-0.004 (0.008)	0.004 (0.005)
$H_{t-5}$	0.006 (0.020)	-0.003 (0.019)	0.006 (0.008)	0.006 (0.007)
$H_{t-6}$	0.048** (0.020)	0.031* (0.019)	-0.026*** (0.009)	-0.020*** (0.007)
$H_{t-7}$	0.007 (0.019)	0.022 (0.017)	-0.004 (0.017)	0.006 (0.020)
Cumulative effect ( $\sum H_{t-s}$ )	0.096*	0.109**	-0.017	0.011
P-value ( $H_0: \sum H_{t-s} = 0$ )	[0.090]	[0.019]	[0.400]	[0.481]
Observations	826,858	826,858	826,858	826,858
R-squared	0.009	0.248	0.013	0.196

# Results

- In case of volume of export, contemporaneous impact is negative, but cumulative effect is positive in 8-day window.
- a *hartal* increases the probability of air shipment on the day of the *hartal* by 3 percentage points
- The cumulative effect over a 8-day period is a insignificant

# Added transportation cost

- Contract = { Q, P, T }
- Value of export = V
- The cost of transporting a shipment to the port on a non-*hartal* day is  $fVi$ , where  $0 \leq f \leq 1$
- $f$  is the cost of transporting a shipment worth one Taka.
- The cost of transporting the same shipment to the port on a *hartal* day is  $\gamma fVi$ , where  $\gamma > 1$
- $\gamma$  is the transportation cost premium due to a *hartal*
- the cost of not exporting on a *hartal* day is the penalty,  $\varphi$ , per Taka of shipment

**An exporter will choose to ship on the day of hartal, if and only if,**

$$\varphi \geq \gamma f$$

the penalty for missing the agreed shipment date is greater than or equal to the added cost of shipping on the *hartal* day

- Cut-off point:  $\gamma = \varphi / f$
- How to calculate  $\gamma$ ?
- $\varphi \rightarrow$  Hummels and Schaur (2013): 2.1% of V
- $f \rightarrow$  Doing Business Report, WB 2016

Domestic transport cost for a standardized shipment of RMG in Bangladesh: USD 231 (Tk. 18,112)

We divide this value by the average size of consignment in our sample to get  $f$

- $\gamma = 1.69$

*hartals* increase the cost of transporting a consignment by 69 percent.

# Conclusion and policy implications

- This is the first systematic attempt to study the impact of political strikes on the export behaviour.
- The exporters in our sample were resilient enough to reallocate their shipment dates to ensure that there was no overall reduction in shipments as a result of a *hartal*.
- Regardless of size, export history, and frequency of shipments, all exporters use the adjustment behavior that we identified in our baseline results.
- Our results provide important insights on how policy makers in other developing countries can shield their firms from the adverse effects of political violence
- ➔ As long as production is not affected, firms can cope with shocks to other phases such as transportation
- ➔ It informs us about what the maximum size of a bail-out package could be if the government were to compensate firms for the extra transportation cost