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Political Strikes and its Impacts on Trade

Evidence from Bangladeshi Transaction-Level Export Data

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1. Introduction

Delays are an important barrier to international trade. Djankov, Freund, and Pham (2010) estimate that an additional day spent prior to shipment reduces trade by more than 1 percent.[1]Similarly, Hummels and Schaur (2012) estimate that each day spent in transit costs a firm 0.6–2.1 percent of its shipment's value. Such delays are extremely costly for several reasons. First, delays impose significant inventory-holding costs. Second, delays are costly for firms that export or import perishable goods as well as goods that have seasonal demand. The existing literature has focused on two key sources of these delays: (a) weak domestic infrastructure and procedural barriers at ports (Djankov et al. 2010) and (b) the mode of transport used (Hummels 2007; Hummels and Schaur 2010, 2013). In this paper we examine a third source of delays for exporting firms: political instability. In particular, we examine how instability due to political strikes impact exports in Bangladesh during the period 2005−2013.

These strikes, locally known as *hartals*, are organized by opposition political parties and interest groups in Bangladesh as a form of protest against the government. These strikes typically last an entire working day although the duration could either be shorter or longer. While hartals trace their roots to earlier episodes of civil disobedience against colonialism in South Asia, their prevalence in Bangladesh has increased dramatically in recent years.[2] Hartals are especially costly because they are used to coercively shut down factories, roads, ports, as well as all private and public institutions. The requirement that such activities/institutions be halted is enforced by the threat of violence. For example, during a recent hartal on December 11, 2012, pro-hartal 'activists' set several vehicles on fire in the capital Dhaka. Such acts of violence

[1] This includes the time spent transporting a product from the factory to the port along with the time required to complete the procedures needed to export.

[2]UNDP (2005) reports that there were a total of 1,072 hartals in Bangladesh between 1987 and 2002. In other words, on average, there was a hartal every 5.4 days in Bangladesh over this period. This report also speculates that the cost of hartals during the 1990s was 3–4 percent of Bangladesh's GDP.

provide a strong incentive for local businesses to keep factories closed and to not use the roads to transport products.

In this paper we estimate the impact of these hartals on firm exports using daily, firm-level exports data from Bangladesh. In addition to quantifying the magnitude of this effect, we exploit the richness of our data to examine how firms cope with the disruption caused by hartals. That is, we examine how firms attenuate the adverse effect of hartals. In particular, we focus on two coping strategies: (a) the shifting of export shipments to several days following a hartal and (b) switching to the far costlier air shipment to meet shipment deadlines.

We examine these issues using two sets of data: (a) data on hartals and (b) daily, firm-level data on exports. The data on hartals were collected from two daily newspapers in Bangladesh for the period 2005−2013. We collected information on the date and duration (half day, full day, etc.) of each hartal. We also collected information on when a hartal was announced to capture the amount of time that firms had to adjust their shipment plans. In addition, we also collected information on the following characteristics of hartals: (i) the extent of violence during a hartal, (ii) the stated reason for calling a hartal, and (iii) the party or organization that called the hartal (e.g. the main opposition party, bus-truck owners' association, etc.). To our knowledge, such comprehensive data on hartals in Bangladesh during this time period are not available elsewhere.

We then combine our hartal data with firm-level, administrative trade data for Bangladesh. These data, which are collected by the National Bureau of Revenue (NBR), include the universe of export transactions for Bangladesh and also cover the period 2004 – 2013. We use these data to construct a firm and day panel. This is important as it allows us to include firm and various time fixed effects to control for confounding factors. The NBR also collects information on the port of export for each transaction. This allows us to distinguish between shipments made by sea and by air for all exports. As mentioned before, hartals may force exporters to

transport their products by costlier means (e.g. by air) to meet their deadlines. We can use our data to examine the extent to which this occurs.

Our results suggest that hartals have an adverse effect on firm exports that is both statistically and economically significant. In particular, we find that on the day of a hartal, firm exports decline by 6.6%. However, we also find that firms cope with the disruption caused by hartals by delaying their exports by several days. As a result of this coping strategy, the contemporaneous effect mentioned above represents the upper bound (in terms of magnitude) of the effect of hartals on firm exports. When we consider firm exports over a seven-day period that starts with the day before a hartal and extends to five days after a hartal, we find that the cumulative effect of a hartal is a reduction in firm exports of 4.5%. We interpret this as evidence that firms attenuate the effect of a hartal by increasing their shipments several days after the hartal itself. Our results also suggest that hartals have stronger effects on smaller exporters as well as exporters producing lower-priced, generic products.

Another coping strategy that we identify in the data is the increased use of air shipment in response to a hartal. In particular, we find that on the day of a hartal, firm exports by air increase by 3 percentage points. In our data, 19.8% of shipments are made by air. Thus, this estimated impact represents a significant increase in the likelihood of air shipment. Once again, we find that firms attenuate the adverse effects of a hartal by lowering air shipments several days after a hartal itself. When we consider the use of air shipment over a seven-day period that starts with the day before a hartal and extends to five days after a hartal, we find that the cumulative effect of a hartal is an increase in the likelihood of air shipment of 2.1 percentage points. In other words, in response to a hartal, firms increase the use of air shipment on the day of the hartal itself but reduce it several days after the hartal.

This paper is related to a literature that uses the gravity model to examine the impact of conflict on trade. For instance, Blomberg and Hess (2006) examine how various types of conflict affect bilateral trade between countries. Their estimates suggest that violent conflict is a greater barrier to trade than traditional tariff barriers. This result is supported by Glick and Taylor (2010), who use historical data spanning the period 1870−1997 to estimate the effect of conflict on bilateral trade. Their results suggest that conflict has large and persistent adverse effects on trade. Lastly, Martin, Thoenig and Mayer (2008) also use a gravity equation to examine the impact of civil conflict on bilateral trade between countries. Their findings suggest that, a year after a conflict, a country's trade is reduced by 25 percent relative to its trade in the absence of a conflict.

This paper is also related to a nascent literature examining the impact of natural disasters on trade. A recent contribution to this literature is Besedes and Murshid (2014). They examine how the eruption of the Icelandic volcano, Eyjafjallajökull, impacted exports from the affected countries to the U.S. and Japan. Similarly, Volpe Martincus, and Blyde (2013) study the effect of a Chilean earthquake in 2010 on export volumes. Lastly, this paper is related to an extensive literature on the impact of conflict on firm performance.[3]In particular, our paper is most closely related to Ksoll, Macchiavello, and Morjaria (2010), who examine the impact of the 2007 post-election violence in Kenya on the export of flower producers there. Because flowers are highly perishable, any delays due to conflict are expected to have a strong adverse effects on flower exports. Ksoll et al. (2010) confirm that this is the case. They find that the post-election violence increased worker absenteeism by 50 percent and reduced flower exports by 38 percent. The sudden and unanticipated nature of the violence allows the authors to identify the causal effects of the violence on exports. However, given the unique nature of the floriculture industry, it is

[3] See Blattman and Miguel (2010) for a comprehensive review of the literature on the economic impacts of conflict.

unclear whether their results speak to the general impact of conflict on firm exports. Further, given that the post-election violence was short lived and unexpected, it cannot be used to examine if and how firms cope with the adverse impact of the violence. On the other hand, our setting does allow us to examine such coping behavior.

The rest of the paper is structured as follows. In section 2 we discuss the method we followed to construct our hartal database. In this section we also describe our firm-level export data. In section 3 we discuss the econometric method we use to identify the effect of hartals on firm-level exports. In section 4 we discuss our results.

2. Data

As mentioned above, the data on hartals are not readily available. Hence, we collected and compiled information on hartals from the two most popular Bengali and English language daily newspapers in Bangladesh–. These are The Daily Ittefaq and The Daily Star respectively. Our research assistants went through the archives of these newspapers for each day of our sample period to collect the information on hartal. In order to avoid data collection errors, we had two research assistants independently collect this information. We then compared the entries and corrected any discrepancies.

Apart from collecting the date when the hartal occurred, we also collected the announcement date. Other information about hartal that we collected include length of hartal, extent of violence, the political party(s) calling the hartal and reasons for calling the hartal. The extent of violence is captured by the number of people injured and killed. We take simple arithmetic mean of the reported numbers of the two newspapers. That is why the average number of people killed and injured may be reported as a fraction (Table 1). In general, demonstrations and other political activities also take place one day before the hartal in support

for the hartal of the following day(s). These activities also involve violence. We categorize such violence as being related to a hartal.

The most difficult part of compiling the data was to collect the data on the number of persons injured and killed. In some cases, the exact number is not reported. For instance, the newspaper may state that "dozens of people were injured" or "more than a hundred people were injured". In such cases, if one newspaper reports the number, we use that one only. If both the newspapers are vague about the number, we used a third newspaper, The Prothom Alo, which is another popular Bangla daily newspaper.

Figure 1 illustrates the annual trend in hartals during the period 2005−2013. In the first half of this time period, the prevalence of hartals was increasing immediately before the general elections that were scheduled for 22nd January, 2007. These hartals in the 2005−2006 period were mainly called by the then opposition party, the Awami League, and its coalition partners to protest the legitimacy of the elections to be held in early 2007. In the face of increasingly violent unrest, the Bangladeshi military intervened on 11th January, 2007 and installed a military-backed caretaker government. This government remained in power until the general elections held on 29th December, 2008. As Figure 1 illustrates, this period of military-backed rule was relatively free from hartals. However, the prevalence of hartals again increased during the year preceding the general elections that were held on 5th January, 2014. These hartals were called by the Bangladesh Nationalist Party and its coalition partners, which were in the opposition at the time to protest the 2014 elections that were to be held under a partisan government for the first time since the restoration of democracy in 1991.

Next, as Table 1 demonstrates, not only did hartals become more frequent during the second half of our sample period, the hartals themselves become more intense. The first row confirms the trend depicted in Figure 1. It shows that, of the 152 hartals called during our

sample period, 99 were called during the second half of our sample period (2010−2013). Further, the hartals during this second half were much more likely to be strikes rather than blockades. The former is a nationwide, forced shutdown of factories, roads, and other methods of transportation while the latter is a blockade of all roads and railways into and out of major cities, primarily the capital Dhaka.

Further, the hartals in the second half of our sample period were also called with less notice provided to firms. For instance, during the period 2005−2009, hartals were announced about 7 days before the hartal itself. However, during the period 2010−2013, hartals were announced about 4.5 days before the hartal itself. Lastly, during first half of our sample period, there were about 0.5 deaths per hartal whereas in the second half, there were about 2 deaths per hartal. However, the number of injuries did decrease from about 133 per hartal in the first half to 102 per hartal in second half. Thus, Figure 1 and Table 1 indicate that not only have hartals become more prevalent in Bangladesh in recent years, they have also become more violent and intense.

The data on daily exports are from the National Board of Revenue (NBR), which administers daily custom information using ASYCUDA++. This Automated System for Customs Data is a computerized system designed by the United Nations Conference on Trade and Development (UNCTAD). Our transaction level data on export comes from this ASYCUDA system. While this system compiles a wide range of information regarding a particular transaction, we use only a few of them which have direct bearing on our study. This includes date of export, exporters' unique identification number, total volume of export, HS codes of the product and ports of export. Table 2 provides descriptive statistics of these trade data. All monetary values reported in the paper are in constant 2010 Bangladesh Taka. This table

indicates that the average firm in our data exports 2.4 million Taka worth of goods each day. Of these shipments 20.4 percent are through air transport.

3. Econometric Method

To examine the relationship between hartals and exports, we follow the approach used by earlier papers that examine the effect of a transportation shock on export volume. For example, Besedes and Murshid (2014) use monthly import data to examine the effect of the eruption of Iceland's Eyjafjallajökull volcano in 2010 on exports of affected countries to the U.S. and Japan. Similarly, Volpe Martincus and Blyde (2013) study the effect of a Chilean earthquake in 2010 on export volumes. Finally, Ksoll et al. (2010) examine the effect of election-related violence on flower exporters in Kenya.[4] Implementing such an approach involves estimating the following econometric specification:

$$\ln(X_{it}) = \alpha_1 + \beta H_t + \gamma \varphi_d^y + \theta_i + \theta_d^w + \theta_m + \theta_y + \epsilon_{it} \quad (1)$$

where X_{it} is the value of firm i's total exports on day t.[5] We also use as a dependent variable an indicator for whether a firm uses air shipment to export their goods. Here our aim is to capture whether a firm switches to the far costlier air shipment to ensure that their goods reach their buyers on time.

$H_t$is an indicator variable that is one if there was a hartal on day t and zero otherwise. Thus, β captures the contemporaneous effect of a hartal on firm exports. $\theta_i$are firm fixed-effects that control for unobserved, time-invariant firm characteristics that are correlated with both exports and hartals. We also include a day-of-year trend (φ_d^y) in our econometric specification.

[4] While they do not examine the effect of a transportation shock, Chor and Manova (2013) use a similar approach to estimate the effect of the Global Financial Crisis on international trade flows.

[5] Some firms in our sample make multiple export shipments during a particular day. In such cases, we add together all shipments for such firms during that day. In other words, we have one observation per firm during its export days.

This controls for any seasonal factors that might be correlated with exports. For instance, exports for particular products might exhibit strong seasonal patterns (e.g. summer or winter clothing). Thus, by not including a day-of-year trend, our regression estimates might be picking up spurious changes in the data. We also include day-of-week fixed effects (θ_d^w), which will capture any secular variation in exports during the week. Further, we include month fixed effects (θ_m) to further control for seasonal patterns in exports and year fixed effects (θ_y) to capture macro-level factors that are correlated with hartals as well as a firm's export decision. Lastly, ϵ_{it} is a classical error term.

A limitation of the above approach is the implicit restriction that hartals only affect exports on the day on which it is organized. While this is perhaps appropriate for a sudden, one-time shock such as a volcanic eruption or an earthquake or for a perishable product such as flowers, it is an important shortcoming in our context for the following reason. Unlike a natural disaster or sudden outbreak of post-election violence, hartals are not completely unexpected. While some hartals are announced with less than twenty-four hours' notice, most are announced a few days before the hartal itself.[6] This means that firms have the opportunity to change their shipment dates to ensure that all of its intended export goods are shipped to the buyer. The econometric specification in equation (1) will not be able to capture this coping strategy. To examine whether there is evidence of such shipment reallocations, we estimate the following econometric specification:

$$\ln(X_{it}) = \alpha_2 + \sum_{s=-1}^{5} \beta_s H_{t-s} + \gamma \varphi_d^y + \theta_i + \theta_d^w + \theta_m + \theta_y + \varepsilon_{it} \quad (2)$$

Here H_{t-s} is an indicator variable for whether there was a hartal on day $t-s$. Thus, each coefficient β_s captures the impact of a hartal that occurred s days ago on today's exports. The use

[6] As Figure A1 illustrates, 16.5% of hartals are announced the day before the hartal and 56.6% of hartals are announced with three or fewer days' notice.

of lagged hartal indicators allows us to capture the extent to which firm's reallocate their shipment away from hartal days and towards days immediately following a hartal. Thus, if such reallocation is not prevalent then we would expect β_s to equal zero for all $s \neq 0$. The remaining control variables in equation (2) are as defined before while ε_{it} is a classical error term. To ensure that our inference is correct, we report heteroskedasticity robust standard errors that are clustered at the exporter level.

An important feature of our econometric strategy is that we are capturing short-run effects of hartals. This raises the question of whether we should expect hartals to have such immediate effects. To examine this issue further, we first calculate the number of days each year that firms in our sample make export shipments. The results of this calculation are illustrated in Figure 2. Our data suggest that the median number of days exported per firm per year in our sample is 54. Further, we also find that the median gap between shipments for the firms in our sample is 3 days. These numbers suggest that the firms in our data are high-frequency exporters and that we should expect a hartal on any given day to have an immediate effect on exports. This motivates us to use only five lags of hartals in our econometric model.

In addition to this default measure of hartals, we exploit our rich data and use alternate measures that capture the heterogeneous nature of hartals. For instance, some hartals are announced without much notice, others involve the death of political activists, while some only involve a blockade of the capital city. We examine whether the impact of hartals varies according to these characteristics.

4. Results

4.1 Hartals and Export Value

Table 3 reports the results from estimation equations (1) and (2). In column (1) we estimate the contemporaneous effect of a hartal (equation (1)), i.e. the effect of a hartal on firm exports on that day. The coefficient of the hartal indicator confirms that hartals have a statistically significant, negative effect on firm exports. This effect is also economically significant. The coefficient of the hartal indicator indicates that a hartal lowers the exports of the average firm in the sample by 6.6% on that day.

As discussed above, estimating only this contemporaneous effect ignores the possibility that firms can reallocate their export shipments away from the day of the hartal and towards other days. To the extent that such reallocation is prevalent, it will attenuate the effect of hartals on firm exports. The extent of reallocation is highlighted by Figure 3, where we plot daily exports by month along with indicators for hartal days during 2013. This figure illustrates the tremendous volatility in exports immediately preceding and following the day of a hartal. In fact, in many cases, the increase in exports immediately after a hartal is evident in the raw data.

We examine this adjustment behavior further by estimating equation (2). In column (2) of Table 3 we include two additional hartal indicators. The first is an indicator that is one if there will be a hartal tomorrow and is zero otherwise (H_{t+1}). This indicator measures whether firms change their shipments the day before a hartal takes place. The second hartal indicator is one if there was a hartal yesterday and zero otherwise (H_{t-1}). This indicator measures whether firms change their shipments the day after a hartal takes place.

The coefficient estimate for H_{t+1} is positive, which suggests that firms, on average, increase their shipments the day before a hartal takes place. However, this estimate is not statistically significant. On the other hand, the coefficient estimate for H_{t-1} is negative, which suggests that firms, on average, decrease their shipments the day after a hartal takes place. This is because there is often hartal-related violence and protests the day after a hartal itself. The magnitude of this estimate is also substantial. It suggests that a hartal lowers the exports of the average firm in the following day by 1.1%.

We can use our estimates to calculate the cumulative effect of a hartal on firm exports. We do this by using the following approach. Suppose there is a hartal on day t. From our estimates in Table 3, we know that this hartal will have an effect on exports on day t. We also know that this hartal will affect a firm's shipments on day $t-1$ as well as on day $t+1$. Thus, the sum of these three effects represents the cumulative effect of a hartal over a three-day period that includes the day of the hartal as the midpoint. The impact of a hartal on day $t+1$ on firm exports on day t is given by the coefficient for H_{t+1}.[7] Similarly, the impact of a hartal on day $t-1$ on firm exports on day t is given by the coefficient for H_{t-1}. Thus, the cumulative effect of a hartal over a three-day period that includes the hartal day as the midpoint is $\sum_{s=-1}^{5} \beta_{t-s}$. This cumulative effect is reported at the bottom of column (2). It suggests that a hartal lowers firm exports by 7.2% over this three-day period.

In column (3) of Table 3 we estimate the complete version of equation (2) by including the full set of hartal indicators, $\sum_{s=-1}^{5} H_{t-s}$. The coefficients for H_t, H_{t+1}, and H_{t-1} are similar to column (2). However, the coefficients for the longer-lagged hartal indicators suggest that firms increase their export shipments a few days after the hartal itself. For instance, the coefficient for H_{t-2} suggests that firm exports on day t increase by 1.6% if there was a hartal two days ago.

[7] Recall that the coefficient for H_{t+1} captures how firms adjust their export shipments if there is a hartal tomorrow.

Similarly, firm exports on day t increase by 0.8% and 1.5% if there was a hartal three and five days ago respectively.

The results above suggest that a hartal reduces exports on the day of the hartal itself as well as the day after. However, firms adjust by increasing their exports starting at two days after the hartal. Thus, it is clear that this adjustment attenuates the immediate negative effect of the hartal on exports. To gauge whether this adjustment allows firms to completely overcome the initial export loss due to a hartal, we report the cumulative effect at the bottom of column (3). The cumulative effect of a hartal on firm exports over this seven-day period $[H_{t+1}, H_t, \dots, H_{t-5}]$ is 4.5%. Notice that this cumulative effect is lower than the effect reported at the bottom of column (2), which was calculated over a three-year period. This adjustment behavior is illustrated in Figure 4. It suggests that the cumulative effect reaches its trough the day after a hartal and moves towards zero during the subsequent days.

Next, we examine whether the adjustment behavior of firms depends on the amount of notice that they receive regarding a hartal. From Table 1 we know that the typical hartal is announced 5.5 days before the hartal itself. Naturally, a hartal that has six days' notice will allow firms to adjust their behavior better than a hartal that is announced with two days' notice. To examine whether this is the case, we categorize all hartals into two categories. We define a "hartal with limited notice" as one where the gap between the hartal date and the announcement date is three days or less. All other hartals are categorized as "hartals with notice".

In column (4) of Table 3, we use hartal indicators that are one for only hartals with limited notice. For instance, in column (4), H_t is an indicator variable that is one if there is a hartal today that was announced with three or fewer days notice, i.e. a hartal with limited notice. Importantly, this indicator variable is zero if there is a hartal today that was announced more than three days ago. As we found in column (3), hartals with limited notice have an adverse

effect on firm exports on the day of the hartal as well as the day after a hartal. However, firms increase their exports starting at two days after the hartal. In column (5) we use hartal indicators that are one for only hartals with notice. For instance, in column (5), H_t is an indicator variable that is one if there is a hartal today that was announced with more than three days notice. This indicator is zero for a hartal today that was announced three or fewer days ago. The estimates in column (5) also support the adjustment behavior found in the earlier columns.

In Table 4 we examine whether the impact of hartals on firm exports depends on certain exporter characteristics. In columns (1) and (2) we restrict the samples to small and large exporters respectively. Small exporters are ones with average exports over the entire sample period that is below the sample median. In column (1) we restrict the sample to these firms. The results suggest that the adjustment behavior highlighted before do not apply to small exporters. For these exporters, the cumulative effect on the day of the hartal (a reduction of firm exports by 5.8%) is similar to the cumulative effect over the seven day period (a reduction of firm exports by 6.1%).

In column (2) of Table 4 we restrict the sample to large firms. These are firms with average exports over the sample period that is at or above the sample median. The results suggest that large exporters attenuate the immediate export loss due to a hartal by increasing their exports starting two days after the hartal. For these exporters, the cumulative effect on the day of the hartal (a reduction of firm exports by 6.7%) is greater in magnitude than the cumulative effect over the seven day period (a reduction of firm exports by 2.8%).

In columns (3) and (4) we examine whether the price of a firm's export good has an effect on how its exports are affected by hartals. To the extent that lower-priced goods are generic in nature, international buyers will have a greater ability to acquire the products from another country if a Bangladeshi exporter is unable to meet a delivery deadline due to a hartal. On the

other hand, if higher-priced goods are more customized, then buyers may not be able to switch to another supplier if a Bangladeshi exporter is unable to meet a delivery deadline. This suggests that hartals will have a more adverse effect on the exports of firms that produce lower-priced, generic goods.

To examine the above hypothesis, we restrict the sample to high-priced exporters in column (3). We define high-priced exporters as those with an average price over the entire sample period that is above the sample median. The results in column (3) suggest that the cumulative effect of hartals for these firms is a reduction in export value of 2.8%. In column (4) we restrict the sample to low-priced exports, i.e. exporters with an average price over the entire sample period that is at or below the sample median. The results in column (4) suggest that the cumulative effect of hartals for these firms is a reduction in export value of 6%. Thus, these results confirm that firms producing lower priced, generic products are more adversely affected by hartals.

4.2 Hartals and the Mode of Transportation

One of the ways in which the exporters in our sample may cope with the delays and disruptions caused by hartals is to export their goods through air rather than through the sea. The use of air shipments allows these exporters to potentially overcome the delays caused by hartals. To examine whether firms actually use this strategy, we estimate a version of equations (1) and (2) with a dependent variable that is one for air shipments and zero otherwise. The results are reported in Table 5. In column (1) we estimate the contemporaneous effect of hartals on the probability of air shipment. The results suggest that a hartal increases the probability of air shipment on the day of the hartal by 3 percentage points. In our data, 19.8% of shipments are

made by air. Thus, the impact estimated in column (1) represents a significant increase in the likelihood of air shipment.

In column (2) we examine the cumulative effect of hartals on air shipment over a three-day period with the hartal as the midpoint. The results suggest that firms decrease their use of air shipment the day before a hartal and increase their use of air shipment on the day of a hartal as well as on the day after. The cumulative effect over this three-day period, as reported at the bottom of column (2), is a 3.2 percentage point increase in the probability of air shipment due to a hartal. In column (3) we estimate a version of equation (2) with an indicator for air shipment as the dependent variable. Once again we observe firms altering their shipment mode to attenuate the adverse effect of hartals. For instance, the results suggest that firms decrease air shipments the day before the hartal, increase air shipments on the day of the hartal as well as the day after, and then reduce air shipments a few days after the hartal. This is illustrated in Figure 5. The cumulative effect over a seven-day period is a 2.1 percentage point increase in the probability of air shipment due to a hartal. This is considerably lower than the contemporaneous effect of 3 percentage points.

In columns (4) and (5) of Table 5 we examine whether the impact of hartals on air shipment depends on the notice that firms receive regarding the hartal date. In column (4) we define our hartal indicators as one if there is a hartal on that day that was announced three or fewer days ago (i.e. "hartals with limited notice"). In column (5) we define our hartal indicators as one if there is a hartal on that day that was announced more than three days ago (i.e. "hartals with notice"). In both cases, the cumulative effect over a seven-day period is similar in magnitude.

4.3 Hartal Heterogeneity

In Table 6 we examine if our baseline results change if we focus on particular type of hartals. In columns (1) and (2) we focus on long vs. short hartals. Long hartals are those that are called for more than 12 hours whereas short-hartals are those that are called for less than 12 hours ("half-day hartal"). In both cases, we observe an adjustment pattern that is similar to our previous results. That is, hartals reduce exports on the day of the hartal as well as the day after the hartal is called. However, firms increase their exports starting at several days after the hartal itself. In the case of longer hartals, the cumulative effect of a hartal over a seven-day period is a reduction in export value of 8.5%. On the other hand, for short hartals, the cumulative effect of a hartal over a seven-day period is a reduction in export value of 3.8%.

In columns (3) and (4) of Table 6 we examine whether the severity of the hartal affects the impact on firm exports. In column (3) we define our hartal indicator as one if there was a hartal on a given day where there was a death due to hartal-related violence and zero otherwise. As Table 1 shows, such deaths are not rare. On average, there are 1.5 deaths per hartal during our sample period. The cumulative effect of such hartals on firm exports over a seven-day period is 3.5%. In column (4) we define our hartal indicator as one if there was a hartal on a given day where there wasn't a death due to hartal-related violence and zero otherwise. In this case, the cumulative effect of such hartals on firm exports over a seven-day period is 7.1%.

Finally, in columns (5) and (6) we distinguish between the two types of hartals in our data: (a) strike and (b) blockade. The former involves a countrywide shutdown of major roads and highways while the latter is a blockade of all roads into and out of major cities (typically the capital, Dhaka). Our baseline measure of hartal does not distinguish between these two. We examine whether they have different effects on firm exports in columns (5) and (6) of Table 6. In

column (5) our hartal indicator as one if there was a strike on a given day and zero otherwise. The cumulative effect of such hartals over a seven-day period is a reduction of firm exports of 3.9%. In column (6) our hartal indicator as one if there was a blockade on a given day and zero otherwise. In this case, the cumulative effect of such hartals over a seven-day period is a reduction of firm exports of 3.6%. Thus, these two types of disruptions have very similar cumulative effects on firm export values.

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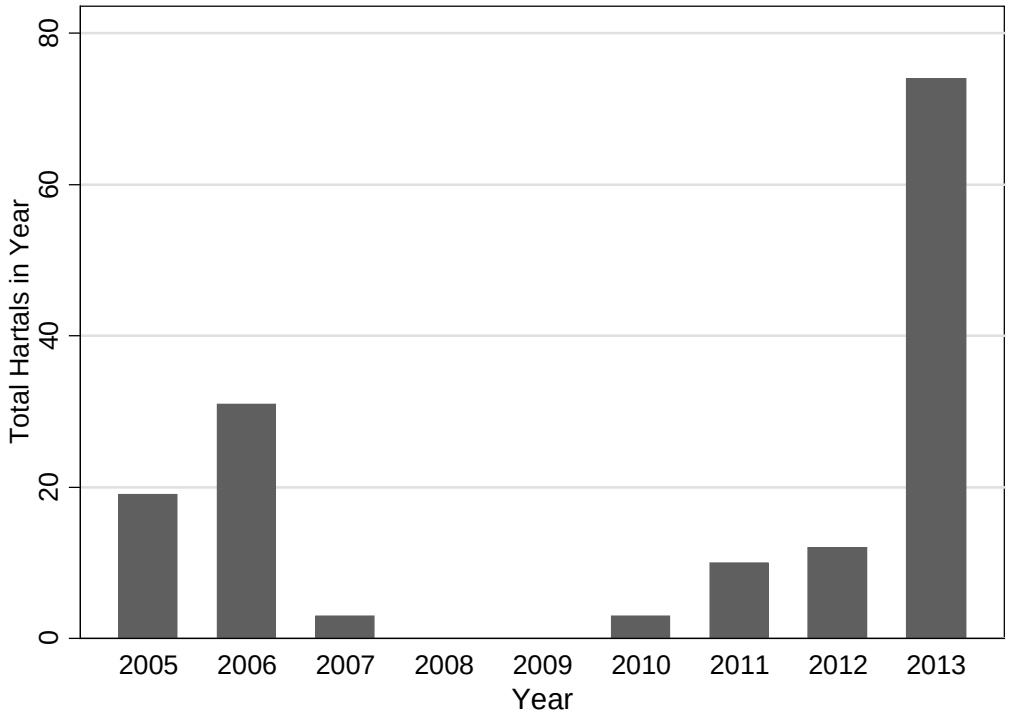

Figure 1: Annual Trend in Hartals

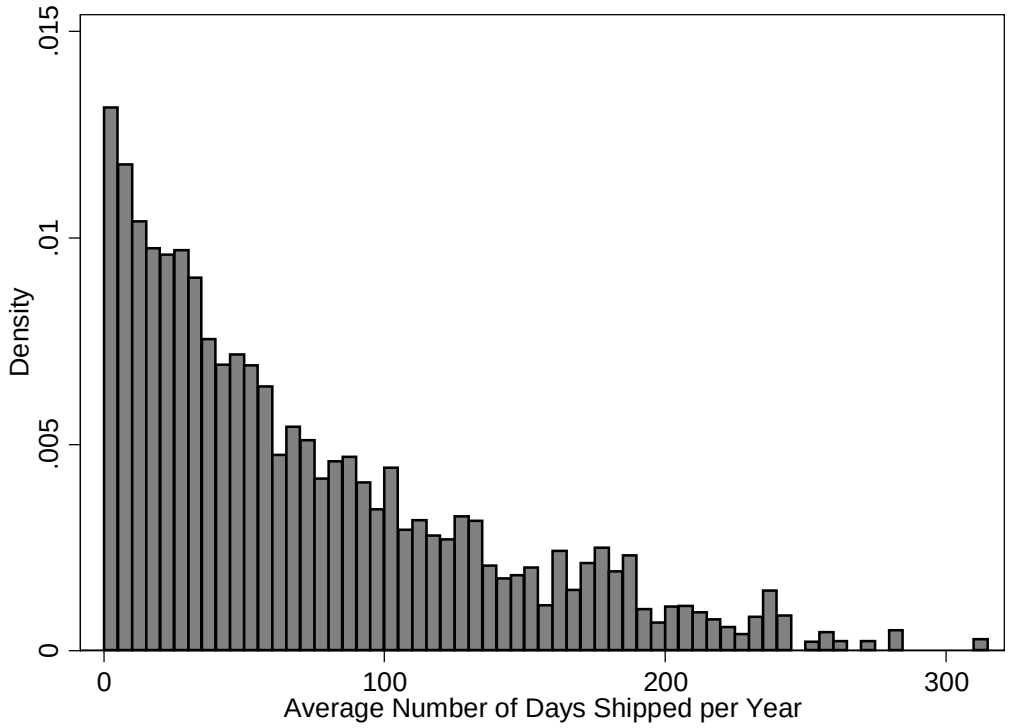

Figure 2: Frequency of Shipments

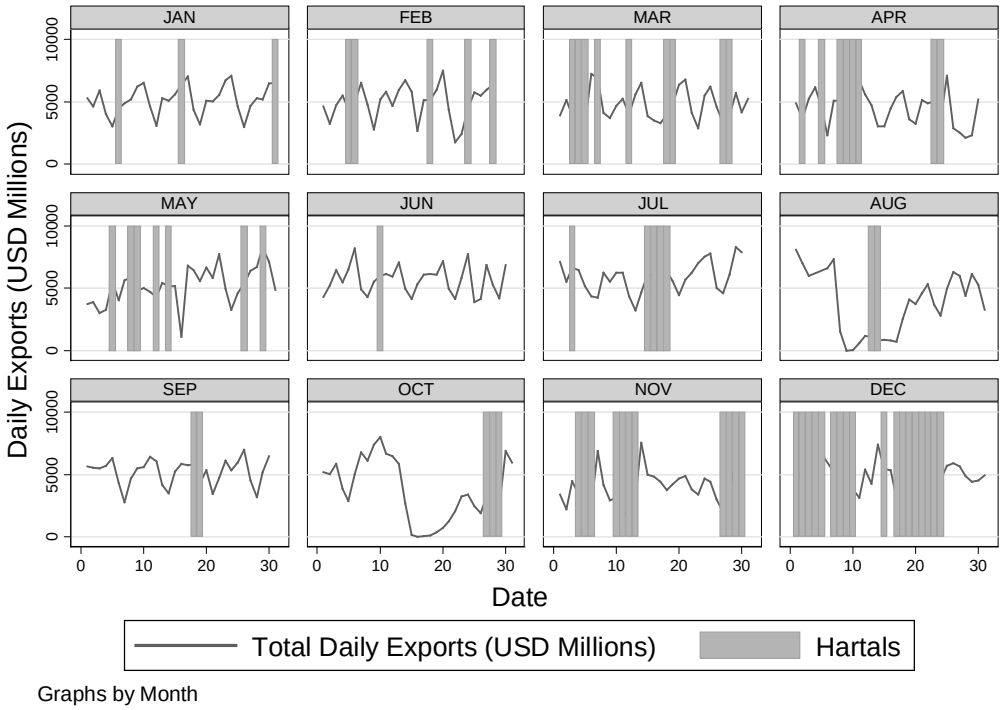

Figure 3: Hartals and Daily Exports in 2013

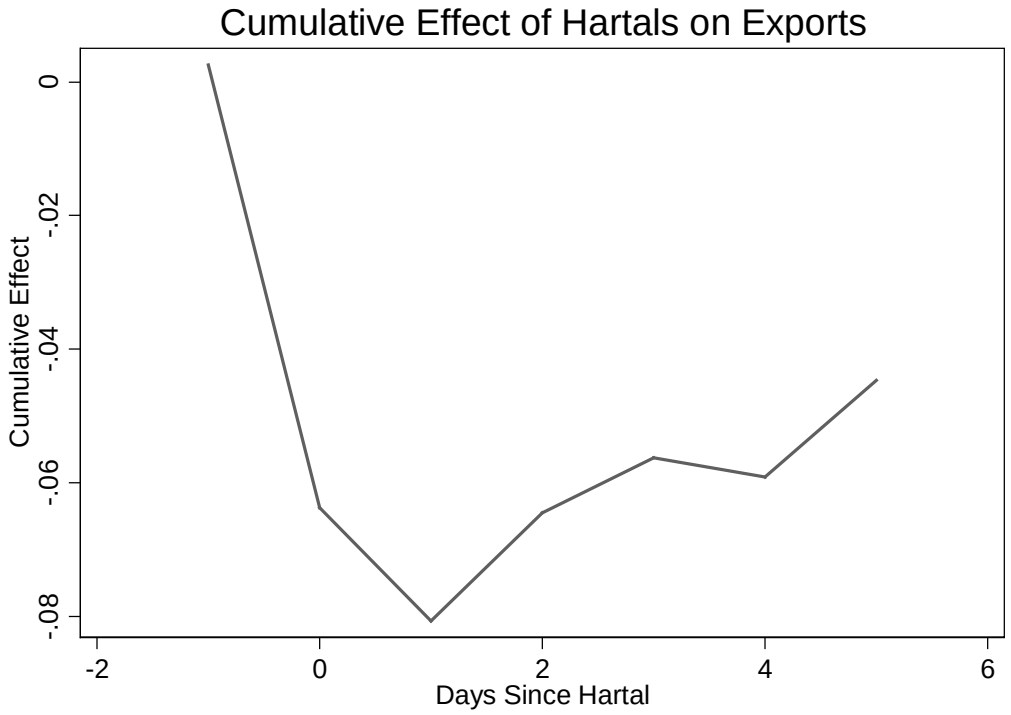

Figure 4: Cumulative effect of a Hartal on exports. A value of zero on the horizontal axis signifies the day of the hartal.

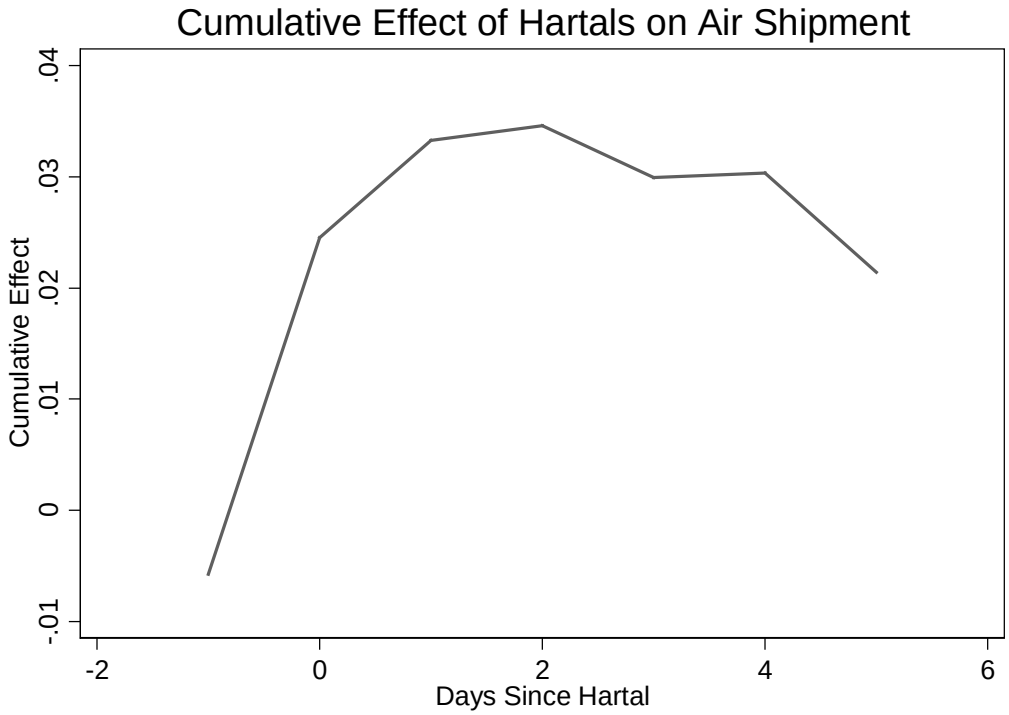

Figure 5: Cumulative effect of a Hartal on the probability of air shipment. A value of zero on the horizontal axis signifies the day of the hartal.

Table 1: Hartals in Bangladesh

	(1)	(2)	(3)
Years Included	2005-2013	2005-2009	2010-2013
Total Hartals	152	53	99
Fraction of Hartals that were:			
Strikes	0.74	0.66	0.78
Blockades	0.26	0.34	0.22
Spanned multiple days	0.49	0.51	0.48
Average Notice Provided (in days)	5.55	7.28	4.62
Average Number of Deaths	1.49	0.52	2.01
Average Number of Injuries	112.68	132.92	101.84

Table 2: Descriptive Statistics of Trade Data

	(1)	(2)
	Obs.	
Ln(Total Daily Exports)	2,043,514	0.876
		[1.473]
Ln(Price of Exported Goods)	1,746,663	6.496
		[1.079]
Indicator for Air Shipment	2,043,514	0.204
		[0.387]

Notes: Column (2) reports the mean and standard deviation (in brackets). The export values are in millions of constant 2010 Bangladesh Taka. The price values are in constant 2010 Bangladesh Taka.

Table 3: The Impact of Hartals on Daily Exports

	(1)	(2)	(3)	(4)	(5)
Dependent Variable		Ln(Total Daily Exports)			
Type of Hartal		All		Limited Notice	With Notice
H_t	-0.066***	-0.064***	-0.066***	-0.051***	-0.034***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.007)
H_{t+1}		0.004	0.003	0.018***	-0.074***
		(0.005)	(0.005)	(0.006)	(0.008)
H_{t-1}		-0.011**	-0.017***	-0.011*	-0.021***
		(0.005)	(0.005)	(0.006)	(0.007)
H_{t-2}			0.016***	0.010	0.010
			(0.005)	(0.006)	(0.007)
H_{t-3}			0.008*	0.016***	-0.002
			(0.005)	(0.006)	(0.007)
H_{t-4}			-0.003	-0.005	0.006
			(0.005)	(0.006)	(0.007)
H_{t-5}			0.015***	-0.007	0.038***
			(0.005)	(0.006)	(0.007)
Constant	0.653***	0.652***	0.652***	0.650***	0.652***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
R-squared	0.008	0.008	0.008	0.008	0.008
Cumulative effect ($\sum H_{t+s}$)	-	-0.072	-0.045	-0.031	-0.077
P-value (H_0: $\sum H_{t+s} = 0$)	-	[0.00]	[0.00]	[0.01]	[0.00]

Notes: N = 2,041,427. Hartals with limited notice are defined as hartals that were announced less than four days before the hartal itself. Hartals with notice are defined as ones where the hartal was announced more than three days before the hartal itself. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 4: The Role of Exporter Characteristics

	(1)	(2)	(3)	(4)
Dependent Variable	Ln(Total Daily Exports)			
Exporter Characteristic	Small	Large	High-Price	Low-Price
H_t	0.001	0.006	0.011	-0.005
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t+1}	-0.059***	-0.073***	-0.087***	-0.045***
	(0.006)	(0.008)	(0.008)	(0.006)
H_{t-1}	-0.005	-0.029***	-0.020***	-0.014**
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t-2}	0.000	0.031***	0.020***	0.012*
	(0.006)	(0.007)	(0.007)	(0.007)
H_{t-3}	-0.001	0.018**	0.024***	-0.008
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t-4}	-0.008	0.002	0.001	-0.007
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t-5}	0.011*	0.018**	0.021***	0.007
	(0.006)	(0.007)	(0.007)	(0.006)
Constant	0.161***	1.148***	0.746***	0.556***
	(0.013)	(0.020)	(0.019)	(0.015)
R-squared	0.010	0.008	0.009	0.008
Cumulative effect ($\sum H_{t+s}$)	-0.061	-0.028	-0.028	-0.060
P-value (H_0: $\sum H_{t+s} = 0$)	[0.00]	[0.06]	[0.05]	[0.00]

Notes: N = 1,021,628. Small exporters are ones with average exports over the entire sample period that is below the sample median. The remaining firms are classified as large exporters. High-price exporters are ones with average price over the entire sample period that is above the sample median. The remaining firms are classified as low-price exporters. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 5: The Impact of Hartals on Air Shipment

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Indicator for Air Shipment				
Type of Hartal		All		Limited Notice	With Notice
H_t	0.030***	0.030***	0.030***	0.024***	0.034***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
H_{t+1}		-0.006***	-0.006***	-0.007***	0.002
		(0.001)	(0.001)	(0.001)	(0.002)
H_{t-1}		0.008***	0.009***	0.013***	0.002
		(0.001)	(0.001)	(0.002)	(0.002)
H_{t-2}			0.001	0.006***	-0.000
			(0.001)	(0.001)	(0.002)
H_{t-3}			-0.005***	-0.007***	-0.000
			(0.001)	(0.001)	(0.002)
H_{t-4}			0.000	-0.003*	0.002
			(0.001)	(0.001)	(0.002)
H_{t-5}			-0.009***	-0.001	-0.017***
			(0.001)	(0.001)	(0.002)
Constant	0.226***	0.226***	0.227***	0.228***	0.227***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
R-squared	0.019	0.019	0.019	0.019	0.019
Cumulative effect ($\sum H_{t+s}$)	-	0.032	0.021	0.025	0.023
P-value (H_0: $\sum H_{t+s} = 0$)	-	[0.00]	[0.00]	[0.00]	[0.00]

Notes: N = 2,041,427. Hartals with limited notice are defined as hartals that were announced less than four days before the hartal itself. Hartals with notice are defined as ones where the hartal was announced more than three days before the hartal itself. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 6: The Impact of Hartals on Exports by Other Hartal Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Ln(Total Daily Exports)					
Type of Hartal	Long	Short	With Deaths	Without Deaths	Strike	Blockade
H_t	-0.102***	-0.039***	-0.076***	-0.049***	-0.056***	-0.102***
	(0.010)	(0.005)	(0.008)	(0.006)	(0.005)	(0.013)
H_{t+1}	0.060***	-0.026***	0.012*	-0.016***	0.001	0.035***
	(0.008)	(0.005)	(0.007)	(0.006)	(0.005)	(0.012)
H_{t-1}	-0.150***	0.023***	-0.022***	-0.018***	-0.008	-0.044***
	(0.011)	(0.005)	(0.007)	(0.006)	(0.005)	(0.014)
H_{t-2}	0.071***	-0.000	0.038***	-0.013**	0.019***	0.000
	(0.009)	(0.005)	(0.007)	(0.006)	(0.005)	(0.014)
H_{t-3}	0.013	-0.009*	0.023***	-0.014**	0.009*	0.004
	(0.008)	(0.005)	(0.006)	(0.006)	(0.005)	(0.013)
H_{t-4}	0.005	-0.004	-0.004	0.005	-0.006	0.010
	(0.009)	(0.005)	(0.007)	(0.005)	(0.005)	(0.013)
H_{t-5}	0.018**	0.017***	-0.007	0.034***	0.002	0.061***
	(0.008)	(0.005)	(0.007)	(0.006)	(0.005)	(0.011)
Constant	0.649***	0.651***	0.650***	0.652***	0.652***	0.649***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
R-squared	0.008	0.008	0.008	0.008	0.008	0.008
Cumulative effect ($\sum H_{t+s}$)	-0.085	-0.038	-0.035	-0.071	-0.039	-0.036
P-value (H_0: $\sum H_{t+s} = 0$)	[0.00]	[0.00]	[0.02]	[0.00]	[0.00]	[0.04]

Notes: N = 2,041,427. Long Hartals are those that last more than 12 hours. All remaining Hartals are classified as short. All regressions include month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Appendix

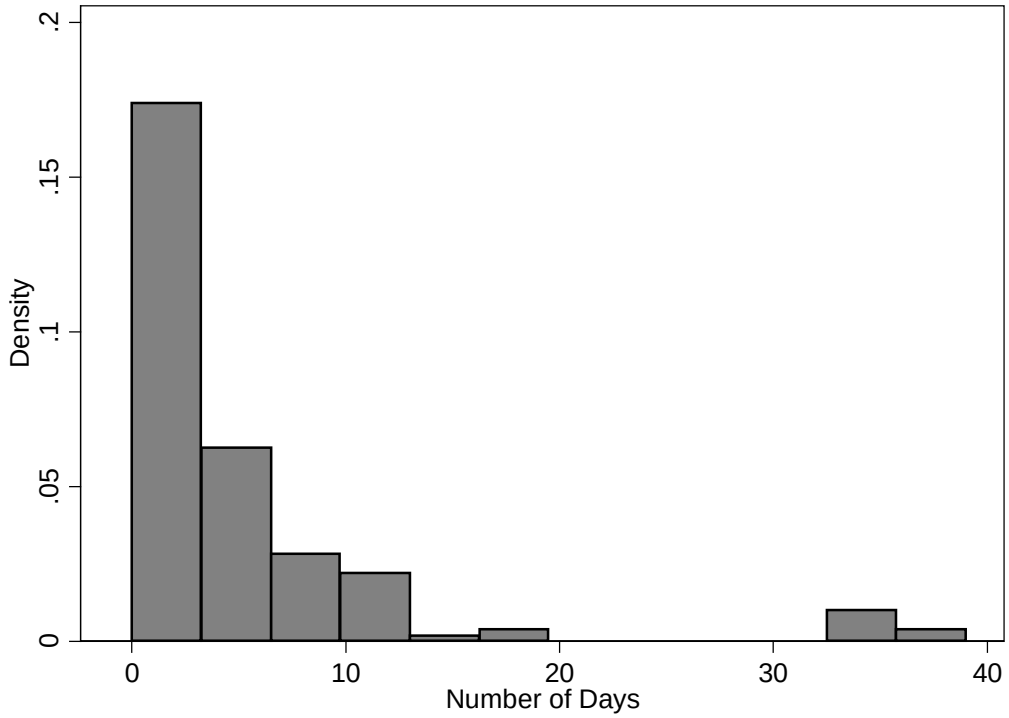

Figure A1: Distribution of the gap between a hartal date and the announcement date.

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