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Abstract

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Key Words: Political strikes, Translog cost function, Factor biased technology
JEL Classification Codes: D24, D74, O14

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Economic Impact of Political Protests (Strikes) on Manufacturing Firms: Evidence from Bangladesh[1]

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ABSTRACT

Political protests in the form of strikes, locally known as *hartal*, remain quite common in the Indian subcontinent countries. Such a form of protests is associated with mass movement, intended to cause a total shutdown of economic activities and often results in coercion, violence, and damage to both public and private properties. Utilizing the World Bank Enterprise survey data of 2007 and 2013 of Bangladesh, this study examines the impacts of *hartals* on manufacturing firms. We find that political protests significantly increase costs for firms. Using flexible cost function based on factor analysis we see that the factor-neutral effect of strikes is positive and statistically significant, showing evidence of a reduction in firm productivity due to *hartals*. However, we did not find any evidence for systematic factor re-optimization by firms – in response to political strikes – suggesting that firms do not reallocate factor shares to tackle uncertain and irregular shocks like *hartals*.

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1. Introduction:

Substantial historical evidence shows that public protests, in the form of demonstration, are successful in promoting political changes. Occurrences of such events dated from the French Revolution to the anti-colonial movement against the British Raj in the Indian subcontinent, and to the recent incidents of the Arab Spring. While these events encompass various types of demonstration activities, political protests in the form of strikes are still quite common in the Indian subcontinent countries, a reflection of a legacy initiated through Mohandas K. Gandhi's movement of civil disobedience against colonialism. Locally, this form of political protest is known as *"hartal,"* a term that originated from a Gujarati word meaning "*closing down shops and warehouses*" (Islam 2005).[2] The definition and execution of *hartal* has evolved from civil disobedience to a form of mass protest causing partial, or at times total, shutdown of economic activities. Though Gandhi's non-cooperative movement involved strictly non-violent demonstrations of political protest,[3] coercion, violence, and damage to both public and private properties frequently occurred during *hartals* since the 1930s and, especially in recent decades.[4]

Hartals have been instrumental in strengthening democratic progress in sub-continent during and after the anti-colonial struggles. However, even long after the post-colonial period had ended and democracy had been restored; *hartals* remain a prominent political culture for this part of the world. Along with Bangladesh, both India and Nepal still face a concerning number of *hartals* annually, and their occurrence has risen quite rapidly over the years (Rudolph and Rudolph 1987). For example, Figure 1 demonstrates the chronological incidents of *hartals* in Bangladesh from 1947 to 2013, indicating an ascending trend. In fact, after the 1990's democratic system initiation in Bangladesh, the number of *hartal* days per year has dramatically increased, compared with those previously observed under autocratic regimes. In addition, the occurrence of *hartals* tends to rise significantly during pre-election years or regime shifts (CPD 2013). It appears that the opposition parties in Bangladesh, either out of desperation or strategic moves to regain political power, increasingly depend on this form of political protest to raise their voice when the parliament is non-functional and the oppositions are

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2 Another word to express such political protests is "Bandhs."

3 For example, hunger strikes or boycotts.

4 The current practice of observing a *hartal* day in Bangladesh is the following, opposition parties call for a protest on an issue, usually a day or two before the actual *hartal* day and circulate the announcement through press and electronic media. On the day of *hartal*, picketers and supports of the *hartal* occupy important streets and highways. Motorized vehicles and long-distance transportation are usually not under operation during a *hartal* day. Due to this transportation network breakdown, all sorts of economic activity slow down during a *hartal* day.

suppressed, both politically and economically.

The advocates of *hartals* claim this form of political protest as an exercise of their rights to *freedom of expression* and *freedom of assembly*; however, exercising such a form of "freedom" can become costly for the economy (UNDP 2005). *Hartals* hinder the regular movement of general citizens and often associated with severe conflicts and violence that frequently cause injuries, coupled with damage to both public and private properties (see footnote 4 to get an overall understanding of a typical *hartal* day in Bangladesh). *Hartals* have wide-ranging effects: firms lose valuable working hours; factories miss labor days; poor people lose days' worth of income; students miss classes; patients miss doctors' appointments; shipments get delayed; meetings get postponed, and overall the economy misses its desired target. Though political parties often call *hartals* in the name of the people, in reality, *hartals* directly and indirectly impinge upon ordinary citizens, especially those belonging to the lower and lower-middle income brackets of the economy.[5,6,7,8]

The largest impact of *hartals* is the violence led loss of human lives as well as injuries and long-term suffering borne by the victims and their families; however, estimating such an impact in monetary term is nearly impossible. Besides these irreplaceable losses, *hartals* have significant negative aftermaths across the entire economy, such as increasing the price of necessary consumer goods. Sectors like transportation are prone to significant revenue loss owing to severe service disruptions and substantial damage to vehicular properties due to *hartals*, all of which lead to irregular and even missed payments for the workers. *Hartals* also affect the manufacturing sector, though indirectly, by increasing the cost of production (for example, increased input costs due to interrupted transportation links or using more night shifts on non-*hartal* days that increase labor costs and energy bills) or by decreasing the total production (due to missing labor inputs). Thus, *hartals* eventually have long-term adverse consequences on the entire business sector of the economy.

In response to *hartals*, firms have developed several strategies to recoup some of the losses, as noted in Khundker (2005). Commonly utilized strategies, especially by firms in retail, manufacturing, and service sectors, are operating on the weekends and extending operating hours on regular days. In general, wages are not cut due to *hartals'* absences; however, firms also do not offer any extra payment for working on weekends

[5] http://www.thedailystar.net/news-detail-261167
[6] http://www.thedailystar.net/news-detail-237167
[7] http://www.thedailystar.net/news/transport-owners-count-huge-losses
[8] http://www.thedailystar.net/news-detail-260928

or extended working hours on days of normal operation, to make-up for the loss due to *hartals*. Nevertheless, such coping strategies are inadequate to compensate for the losses incurred by the delay in shipments and using expensive modes of transportation, as well as loss due to supply chain interruption, postponement and damage of inventory, which lead to higher production cost. Moreover, in the case of prolonged and consecutive days of *hartals,* firms are unable to recover their losses using the typical coping strategies stated above.

Numerous attempts have been made by business communities, international organizations, and think tanks to estimate the economic impact of *hartals*. These attempts range from using a holistic approach [converting GDP by total working days in a year and multiplying this by the total number of *hartal* days to find the loss of GDP, which is approximately 5% according to an estimate by the World Bank in 2001] to using a computable general equilibrium (CGE) model that estimates losses [employing CGE estimates, the loss due to *hartals* is 4.7% of GDP, (CPD 2013)].

Two recent studies have evaluated the effect of *hartals* on firms more systematically than these earlier works. Ahsan and Iqbal (2015) paper looked into the exporting sector of Bangladesh and find that *hartals* leads to a reduction in firms exports by 4.5 percent. Ashraf *et. al.* (2015) paper, on the other hand, focused on a subset of large ready-made garment factories located in Dhaka and compared the effect of *hartals* with labour unrest by estimating the impact on labor productivity and absenteeism. Our study contributes to this literature by evaluating the impact of *hartals* on manufacturing firms in Bangladesh, especially employing a flexible cost function approach, to understand how firms manage these uncertain political shocks and whether they rearrange their factors of production, inspired by the study of Fisher *et al.* (2015), which explored the impacts of electricity scarcity on firms. If firms are unable to rearrange their factors share of the production process in response to strikes in the short run, they may have to experience high factor-neutral loss in productivity. Our study uses World Bank enterprise survey data of various years with regional variation of *hartal* occurrences – as the source of identification – for estimating the impact. To validate our result with the potential concern of endogeneity, we employed time- and division-specific shares of parliament seats held by the majority party as an instrument for our estimation. For robustness checks, we also ran size, type, and sector-specific regressions.

We find that the political protests in the form of *hartals* are costly for firms. Using factor analysis we see the factor-neutral effect of strikes is strongly positive and statistically significant, showing evidence of reduction of firm productivity due to *hartals*. However, we did not find any evidence for systematic factor re-optimization by

firms by substituting among factors inputs – in response to political strikes – suggesting that firms do not strategically reallocate factor shares to tackle uncertain and irregular shocks like *hartals*. Our sub-sample analysis, based on size, type, and industry specific regressions showed impact heterogeneity, where *hartals* reduce the use of labor and increase the energy and material cost-share of production for certain type of firms. One interpretation of this increase in the material cost share is a larger dependency on outsourcing or sub-contracting where instead of producing, firms move to buying intermediate goods, which leads to a rise of shadow or unregistered informal noncompliant factories, noticeably found in garments manufacturing sector in Bangladesh (Khundker 2005, Labowitz, S. and Baumann-Pauly, D. 2014, 2015).

Our study is related to three strands of literature; firstly on the impact of labor protest or unrest on firms. The evidence from firm-level measures of output (and output per worker) is found to be deteriorated during the times of labor unrest (Katz, Kochan and Gobeille 1983; Freeman and Medoff 1984; Kleiner, Leonard and Pilarski 2002; Kruger and Mas 2004; and Mas 2008). Another strand of literature related to our study is the impact of political instability on economic outcomes (Aisen and Veiga 2011; Alesina *et al.* 1996; Alesina and Perotti 1993; Aisen and Veiga 2006; Svensson 1998; and Overland, Simons and Spagat 2005). The third strand of literature where this paper contributes is the effect of external shocks on firms' performance (Advaryu *et al.* 2015, Alcott *et al.* 2016 and Ksoll et al. 2010).

The rest of the study is organized as follows. Section 2 presents the background of political conflicts in Bangladesh and offers some discussion on previous literature examining the impact of political conflicts on state economic activity. Section 3 focuses on the methodology. Section 4 discusses the data used in the study. Section 5 comprehensively discusses the estimations used in the study. Section 6 presents the various robustness checks of our estimations conducted in this study. Section 7 concludes the study.

2. Background

Political unrest has been a cause of concern for many countries around the world, irrespective of their political regime or stage of development. Evidence from the literature examining this topic in many different countries suggests that political conflicts can have a significant detrimental impact on an economy. Indeed, domestic conflicts under certain conditions could push countries toward a "fragile state" status. Fragile and conflict-ridden countries lack the ability to develop mutually rewarding and constructive relationships within their societies and often suffer from a weak capacity to

undertake governance functions (OECD 2012). These countries are more vulnerable to internal and external shocks, and thus face the threat of instability. Arguably, given the informal sector's dominance in economies such as Bangladesh, the adverse impact of *hartals* – a form of political unrest – could be lower when compared with more developed countries.

The legacy of *hartal* culture in Bangladesh has deep roots in regional history, and *hartals* are listed as "*a constitutionally recognised political method for articulating any political demand*" in the national Encyclopedia of Bangladesh (Banglapedia 2006). Political protests in the form of student movements, street demonstrations, and agitation were instrumental during the 1952 language movement against the former East Pakistan government who wanted to impose Urdu as the state language of Pakistan. This form of protest continued until 1958, when it was outlawed by the institution of martial law by the Ayub Khan regime, before being reinstated in the 1960s, albeit with limits. In 1969, a massive outbreak of mass movements against the authoritarian government, mostly in the form of political strikes and *hartals*, triggered the independence war of Bangladesh in 1971.

Hartals continued to play a role even after the independence and have been associated with every important political event in Bangladesh (Rashiduzzaman 1997). Capitalizing on this legacy, unfortunately, and regrettably, all leading political parties have increasingly overused and abused *hartal* as a vehicle to demonstrate protest and to express demands. Consequently, this form of political practice, on most occasions, does not receive supports from the general public or the parties' followers and devotees. Hence, to make these frequent and often unnecessary *hartals* effective, political parties often hire people, mostly those who are relatively young, poor, unemployed and want to make quick money. These "paid" *hartal* supporters occupy the major streets of the city and terrorize ordinary citizens and businesses with blockades, violence, and other forms of intimidation (such as inhibiting vehicular movement by picketing as well as bombing, burning, or damaging vehicles and public transportation, and so on).[9,10]

As demonstrated in Figure 2, general strikes have become increasingly frequent over the years and have also been decentralized, as we observed large regional-level as well as nationwide general strikes (CPD 2013). Also, firms suffer transportation strikes, – both nationwide and regional – another form of politically motivated protest increasingly being used by the political parties. Firms typically suffer during a *hartal* day mainly due to the transportation interruption from blockades; these create supply

[9] http://www.thedailystar.net/news/hartal-for-hartal-against
[10] http://www.thedailystar.net/news-detail-264163

shocks; production and distributional disruptions; and delay product deliveries (Hussain *et al*. 2014). In order to avoid being picketed, firms often ask their workers to come and leave the offices at late hours, or work extra hours on non-*hartal* days, which can increase labor costs due to overtime payments. This practice could also increase the energy costs of production due to working at nights, and shipment cost for using expensive modes of transportation like air-shipment to maintain commitment (Ahsan and Iqbal 2015).

3. Methodology

This section formally demonstrates the channels through which *hartals* could have an impact on firms, considering that this form of political protest creates constraints on firms' capacity to produce. Let us assume that a *hartals* happens unpredictably, while firms need to continue and adjust their production. We demonstrate this situation as a firms' problem in a standard cost function analysis.[11] We assume that during the production process, a typical firm uses labor (L), capital (K), material (M), and energy (E) to produce output (Y). We assume that firms minimize their total cost of production under the regular condition (i.e., without *hartals*), which is expressed as

$$TC_R = C(p_L, p_K, p_M, p_E, Y).$$

Suppose the probability of a *hartals* is $\theta > 0$ and the occurrence of a *hartals* is denoted by *H*. Thus θ can capture the intensity of a *hartal* and the number of occurrences. The impact of *hartals* can be considered temporary, and firms consider this as a constraint on production. We can rewrite the constrained cost function with *hartals* as the following:

$$TC_H = C(p_L, p_K, p_M, p_E, Y, H).$$

Since *hartals* can take several forms, including blockades of roads and transportation as well as violence, it can prevent workers from commuting to plants on time, delay shipments from intermediaries to plants, and delay delivery to the merchants or to ports. For simplicity, we assume two main channels of *hartals*' impacts on firms' total costs. The direct effect of a *hartals* lies in its interruption channel on the regular production

[11] Having blackouts as unexpectable negative shocks for firms, Fisher-Vanden *et al.* (2013) examine the impacts and associated possible adjustments, such as outsourcing and self-generation of electricity. We follow their methodology based on cost function.

process, which leads to underutilization of capital, creates stocks of unused raw materials, and delays in shipments (which may push firms to opt for more expensive mode of transportation), which increase costs. The indirect effects of *hartals* are channelled through changes in factor prices. Both of these effects increase total costs of production and act as additional restrictions on firms' cost minimization problem.

Taking the log of cost function, the risk-neutral firm would expect the total cost function for producing a given amount $\bar{Y}$ as the following:

$$E[\ln TC(\bar{Y})] = \theta \ln TC_H(\bar{Y}) + (1-\theta)\ln TC_R(\bar{Y}).$$

As *hartals* increase costs by imposing constraints on firms, we expect to have $\frac{\partial \mathrm{E}[\ln TC(\bar{Y})]}{\partial \theta} = \ln TC_H(\bar{Y}) - \ln TC_R(\bar{Y}) > 0$. It is natural to assume that given higher factor prices, total costs are higher when *hartals* occur. From the indirect effects, the share of each factor would change. Based on Shephard's Lemma, $\frac{\partial \ln TC}{\partial \ln p_i} = \frac{\partial TC}{\partial p_i}\frac{p_i}{TC}$, such changes are expressed as

$$\frac{\partial \mathrm{s_i}}{\partial \theta} = \frac{\partial^2 \ln TC}{\partial p_i \, \partial \theta} = \frac{\partial \ln TC_H}{\partial p_i} - \frac{\partial \ln TC_R}{\partial p_i} \text{ for } i \in [\mathrm{L, K, M \text{ and } E}].$$

where s_i expresses the cost share of input i. The sign for each input *i* shows the relative increase in the factor's share resulting from the occurrence of *hartals*. If firms are located in a region where a greater number of *hartals* have been observed, they may reduce their own production and purchase materials that reduce their labor, capital, and energy inputs. The above arguments are summarized in Figure 3, inspired by the study of Fisher-Vanden and Jefferson (2008). Without occurrence of a *hartal*, firms would choose the input share by factor prices at *A* under the budget constraint drawn by $\mathrm{P}_A\mathrm{P}_A$. With a *hartal*, the factor prices of firms increase. When they do not change their factor inputs, then to maintain the same level of production, the budget constraint shifts to $\mathrm{P_A}'\mathrm{P_A}'$, and it is shown as the shift to A'. This can be regarded as the *factor-neutral* effects of *hartals*. On the other hand, if firms adopt a different production strategy to cope with *hartals*, they may change their input share according to the changes in factor prices. For increased labor cost (employing workers for longer hours requires overtime payments) and energy cost (extended hours of work, especially later in the evening), firms may choose to increase material purchases and may opt for outsourcing or sub-contracting. Such behavior can be captured by the *factor-biased* effects of *hartals*, which affect the optimal combination of inputs. This change can be captured by a shift from AA' to AB'. In sum, the impacts of *hartals* can be decomposed into factor-neutral

and factor-biased effects.

[Figure 3 is about here]

Finally, firms may reduce their output level ($\bar{Y}' < \bar{Y}$) compared to the level without *hartals*. This difference comes to the shift from B' to B''. From these theoretical underpinnings, we hypothesize the following two predictions:

I. Decrease in productivity: We expect *hartals* will increase unit costs of production, due to the shock faced by firms with no immediate remedy to respond.
II. Re-optimization: Firms may re-optimize their factor share of production inputs based on the response to *hartals*.

4. Empirical Model

4.1 Identification Strategy

Identifying the impact of *hartals* is very difficult in Bangladesh where there hardly exists any scope for a counterfactual. One exception was in the year of 2007-08 when the military-backed interim government took power and no *hartal* was observed, which makes it an ideal candidate to measure the impact using a natural experimental framework. However, the impact that could be measured from this exercise will be a combined effect of interim government and no-*hartal* occurrence effect, and isolating these two factors is extremely difficult.

Instead of pursuing in that direction, the identification strategy employed in this study is the regional variation in *hartal* occurrences at the division level (see Figure 2). Various studies have argued that the political culture of *hartal* has recently been decentralized, and we observe that more regional-level *hartals* are being organized by political parties compared with the old trend of nationwide *hartals* (see Khundker 2005 and CPD 2014). A *hartal* can be called any day of the week[12] by the opposition parties, hence it is usually hard to predict *ex-ante*. Reasons claimed by the opposition parties in calling for *hartals* have been quite erratic, as they range from issues such as imprisonment or police harassment of their leaders and followers to general price hikes due to tax increments, to government disallowing the holding of assemblies or demonstrations in the street, and so on. As a result, identifying political events that are more likely to trigger a call for a *hartal* by the opposition is very difficult. Although a

[12] Typically *hartals* are not called on weekends and on national holidays.

systematic pattern might exist in the number of *hartals* occurrences before the immediate pre-election years (more occurrences) and after the election (fewer occurrences*)*, the actual number of such events (and actual timing and duration of the event) remains difficult to predict *ex-ante* by firms. Hence, it is extremely tough, if not impossible, for firms to forecast the exact days and numbers of occurrences of future *hartals* events. Moreover, *hartals* are typically not announced well ahead of time to enable firms to adjust their production process. In most cases, *hartals* are announced just a day or two prior to their actual occurrences, forcing firms to take extreme measures or quick–fixes to cope with the situation.

However, endogeneity issues may arise with our choice of *hartal* variable in the econometric setting. We defined the *hartal* variable as the number of days (or weeks) in which protests by opposition parties occurred in a year. Even though we captured regional, year, and industry classification-based fixed effects in the empirical analysis, unobserved characteristics of firms located in a particular region could impact the number of *hartal* observed in that location (for example, an influential local firm connected with political elites may promote protests), which could also influence the output and cost changes experienced by firms. To tackle this potential endogeneity issue, we introduced instrument variables (IV) that may capture the variations in regional occurrences of *hartals* but not directly affect the cost or output of firms located in that region. We employed time- and division-specific shares of seats held by the majority parties[13] in the parliament, and its interaction with time and division dummies, as the set of instruments. Since *hartal* is predominantly a form of political protest and to conduct a successful *hartal*, one needs to have a strong political presence in the region, this set of IVs should strongly influence the number of *hartal* occurrences in the region, but not directly influence firms' costs.

A reasonable concern, although, could arise based on the validity of the exclusion restriction of our instrumental variable, as one could argue that a powerful ruling party, who has a dominant presence in the region and in the parliament, could carry out massive infrastructure development that might reduce costs for firms. To invalidate this concern, we checked the correlation of division-wise regional infrastructure development (proxied by kilometres of road construction) with share of parliamentary seats in the region by the ruling party (a reasonable proxy for political power in the region) for our survey years using the Bangladesh Bureau of Statistics

[13] Bangladesh has four major parties, namely Bangladesh Awami League (AL), Bangladesh Nationalist Party (BNP), Jatiya Party and Bangladesh Jamaat-e-Islami (BJI). However, for the last two decades, a two-party system is evolving as AL and BNP created two coalition of like-minded parties.

(BBS) national dataset. For our Enterprise survey dataset of 2007 from which we used the data of 2005-06, we checked the correlation of last parliamentary election result of 2001 with infrastructure data of 2004 and found the correlation coefficient is 0.28 and statistically insignificant (see Figure 4a). Additionally, doing the same exercise for 2013 Enterprise survey data (where the survey was done in 2012), by comparing parliamentary election result of 2008 with infrastructure development in 2011, the correlation coefficient found to be -0.32 and statistically insignificant (see Figure 4b). As depicted in Figure 4a and 4b, we do not see any clear or systematic pattern of the correlation, and if anything, the correlation is very weak. These exercises give us some confirmation that the identification strategy may not violate any fundamental properties of the instrumental variable approach in our estimation.

4.2 Factor Analysis

We specify the flexible translog cost function of firm *f* in industry *k* during year *t* in region *r* in response to a *hartal* as the following:

$$\ln TC_{ft} = \alpha_0 + \alpha_Y \ln Y_{ft} + \frac{\gamma_Y}{2}(\ln Y_{ft})^2 + \sum_{j=1}^{J} \alpha_j \ln P_{jft} + \frac{1}{2}\sum_{i=1}^{J}\sum_{j=1}^{J} \beta_{ij} \ln P_{ift} \ln P_{jft} + \sum_{j=1}^{J} \beta_{Y_j} \ln Y_{ft} \ln P_{jft} + \delta_0 \ln H_{rt} + \delta_Y \ln H_{rt} \ln Y_{ft} + \sum_{j=1}^{J} \delta_j \ln H_{rt} \ln P_{jft} + \eta_k + \kappa_r + \mu_t + \epsilon_{ft}. \quad (3)$$

Here, TC_{ft} and Y_{ft} are the total production costs and the output of firm *f* at time *t*, respectively. P_{jft} is the firm- and time-specific factor price *j* (where *j* is labor, capital, material, or energy) and H_{rt} measures *hartals* in region *r* at time *t*. We also included dummies for industries (η_k), regions (κ_r), and years (μ_t). Here, the factor-neutral effect of *hartals* would be δ_0 and δ_Y, by permitting the factor-neutral effect to vary by output, whereas δ_j is the factor-bias effects of *hartals*.

From Shepard's lemma, we could simultaneously estimate the share equation for each factor *j* as well, which is

$$S_j = \alpha_j + \frac{1}{2}\sum_{i=1}^{J} \beta_{ij} ln P_{ift} + \delta_j ln H_{rt} + \beta_{Y_j} ln Y_{ft} + \omega_{ft}. \quad (4)$$

Since equations (1) and (2) show a system of equations where the impact of *hartals* on factor shares are likely to be correlated with the translog cost equation, we need to use the seemingly unrelated regression (SUR) technique to estimate such a model efficiently. To ensure that the coefficient shows typical properties, such as homogeneity and

symmetry, we imposed the following constraints on the function:

$$\beta_{ij} = \beta_{ji}, \sum_{j=1}^{J} \alpha_j = 1, \sum_{i=1}^{J} \beta_{ij} = \sum_{i=1}^{J} \beta_{Y_j} = \sum_{i=1}^{J} \delta_j = 0. \quad (5)$$

Our translog flexible cost function estimation technique had to deal with two potential endogeneity issues: one resulting from using the output as a regressor and the other concerning the number of *hartal* occurrences. Finding appropriate instruments to proxy for output or demand shifts is extremely difficult in the context of Bangladesh, which is a small country with an integrated population and economic activities. Due to data limitations, we employed imprecise proxy for output, namely firm profit which is a recognized practice in this literature (for example see Fisher-Vanden et al. 2015). Moreover, we control for industry, region, and year fixed effects to address some of the concerns regarding endogeneity issue related to output.

In our regression estimates, we report estimations based on IVs, which is termed as IV-SUR regression throughout the paper.

Marginal effects and aggregate effects of *hartals*

To further examine the impacts of *hartals*, our specification enables us to obtain the marginal and average effects. Differentiating the equation to be estimated by the *hartal* variable, the marginal effects are written as

$$\frac{\partial TC_{ft}}{\partial H} = \frac{TC_{ft}}{H}[\alpha_0 + \alpha_1 \ln Q_{ft} + \sum_{j=1}^{J} \beta_j \ln p_{jft}]. \quad (4)$$

There are three components of the effects from *hartals*. One is the direct impact reflecting the increase in total costs in α_0. Second is the increase in unit costs shown in α_1. Third is the changes in factor input shares in β_j. The first, two terms in the bracket are the factor-neutral effects and the last terms are the factor-biased effects in Figure 3.

5. Data

We use two nationally representative enterprise survey dataset on Bangladesh collected by the World Bank. The firms surveyed by the World Bank are not a random sample of entire manufacturing firms of Bangladesh. The dataset focused on medium and large firms in Bangladesh and hence the findings of the analysis are not generalizable for micro, small or cottage industries. The first survey was conducted in 2005–2006 (called "Enterprise survey 2007") and the second in 2012 (called "Enterprise survey 2013"). The Enterprise survey 2007 data includes survey year data as well as retrospective data

of firms for the past several years, however, due to the susceptible nature of retrospective data, we are only using survey year data of 2005 and 2006. The 2013 dataset, on the other hand, reports information for the 2012 survey year. We restrict our samples only for those manufacturing firms who do not have any missing information for input costs, sales, and regional location. In total, we have 1232 observations for manufacturing sector firms from six divisions of Bangladesh for three survey years (2005, 2006 and 2012), hence the dataset is repeated cross-sectional in nature.[14] Since our main focus of the research is to see the impact of political protests on manufacturing firms, we used only the major manufacturing sectors in Bangladesh (namely Food, Garments, Leather, Textiles, and Chemicals) which represent 73.5% of the total manufacturing sector of Bangladesh (Shonchoy and Tsubota, 2014).[15] The issue of sample selection, nevertheless, remains due to the limitation of the data we have from the Enterprise survey, which could make our estimates biased and sensitive; hence caution should be exercised in interpreting the results of this paper. Although main findings of the paper are convincingly robust using various measures of *hartals* and different sub-sample analysis, the sample selection issue, admittedly, remains an important caveat of this paper.

The *hartals* dataset was compiled from newspaper archives, cross-verified using two leading newspapers of Bangladesh, Bangla daily the *Prothom-Alo;* and English daily *The Daily Star*. The national parliamentary election results have been compiled from statistical reports produced by the Bangladesh Election Commission. The summary statistics of *hartals* statistics and election results have been depicted in Tables 1 and 2, respectively.

The summary statistics of the factors of production and factor prices, which are mostly expenditure averages, are given in Table 3A. In our estimation, the price of labour (wage) is obtained by dividing a firm's total wage bill with its number of permanent workers. The cost of fixed assets reported in the enterprise survey is used as the price of capital. The survey directly asked for information on material costs, and we convert this data to unit cost by dividing total sales to obtain the price of materials. Energy costs were also available in the survey. However, as the classifications of energy

[14] This dataset also contains a small panel survey where observations come from only 122 firms, and unfortunately, some key information from this study was missing from the panel version of the dataset, hence we could not use it.

[15] To obtain the classifications of industry and regional variations, we had to conduct some small re-classification because some classifications are limited to the respective enterprise survey (for example, there are 13 industrial classifications for the 2007 dataset but 27 classifications for the 2012 dataset). To ensure comparability, we merge the finer classifications of 2012 to those of 2007.

and electricity slightly differ for each survey, we take the total of both as energy costs and obtain the price of energy by dividing their sum by total sales. Other expenses are subtracted from the total costs to make the sum of input share to be equal to one. In Table 3B, we have the cross-tabulation for industry classification and year of our sample.

[Table 1, 2A, 2B and 3 about here]

6. Estimation

6.1 Factor Analysis Regressions:

Main Regression

The results of factor analysis regressions are reported in Table 4 estimated with IV-SUR regressions. Columns (1) and (2) report our main specification of interest where *hartal* has been measured as a weekly occurrence (number of weeks firms faced interruption due to the strikes or *hartals*). In Column (1), we used the *hartal* measure as the general strikes, whereas in column (2) we used combined measures of general and transportation *hartals*. As a robustness check, in column (3) and (4), we used day-counts of *hartal* occurrences both for general and combined with transportation *hartals*, respectively. In our regression, we controlled for size and export classification, which is based on the number of permanent employees (firms with more than 100 employees are considered large firms) that each firm employs and whether the firm exports. In all regressions, we have controlled for industry fixed effects, regional fixed effects, time effects, factor prices, its squares, and the cross-factors interaction terms. All our estimations have the correct sign for various input price and quantity measures, which satisfies the properties of the factor analysis regression.

Our results suggest that political strikes have positive impacts on the costs of production. The factor-neutral effect $(\alpha_0 + \alpha_Y)$ of strikes is positive and strongly statistically significant, reflected in the coefficient of the *hartals* alone, which means that interruption faced by the firms due to the general strikes or *hartals* is particularly costly for firms. This finding suggest that 1% increase in the *hartal* interruption faced by the firms increases total cost of production by about 1.17 percent (using the specification of column (2)). This finding is consistent throughout the different measures of *hartal* estimations (weekly, daily, general or combined with transportation strikes) which support the first hypothesis of our theoretical setting. However as a

conservative measure, we like to use the specification of *hartal* measures by week, as depicted in column (1) and (2), as our preferred specifications, as firms may take precautionary measure during the week (like working extra hours before or after the day of *hartals*). Therefore, week-specific measure of *hartals* seems more desirable for our estimation. Also, we emphasised combined strikes (a summation of transportation and general strikes) as our preferred estimations as regional transportation *hartals* also interrupts the transportation network of the country which has important implication for firms' cost of production. Hence, for the rest of the paper, we present various regressions based on the specification of column (2) of Table 4.

Although our results indicate that the direct (factor-neutral) effect of *hartal* is quite substantial for manufacturing firms, we do not see any statistically significant evidence that firms manipulate their input factors (factor-bias effect) in response to strikes. We see some weak evidence that *hartal* leads to a decrease in the use of factor share of labour, but the magnitude of such an impact is quite small. Sign-wise, the factor input substitutions due to strikes have the expected properties, factor share of labour and capital interacted with *hartal* has negative sign whereas energy and material use has positive, however, none of the coefficients are statistically significant. This is not surprising as the political strike is one particular type of shock for firms (like labour unrest or protest), which is very difficult to predict *ex-ante*. Therefore, firms do not necessarily change their factor inputs systematically in response to unknown and irregular shocks like politically motivated strikes. This is also consistent with the paper of Fisher-Vanden *et al.* (2015) which finds that firms heavily re-optimize their factor inputs in response to electricity scarcity, which is a regular and anticipated shock for firms. The overall net effect of *hartal* on firms, however, would be a combination of factor-bias and factor-neutral effect, which we will explore at the end of this section.

[Table 4 about here]

Regression based on firm categorization

Table 5 reports the regressions of sub-samples constructed on firm-size classification – based on the specification used in column (2) and (4) of Table 4. Columns (1) and (2) of Table 5 report the regression estimations for large firms whereas Columns (3) and (4) report small firms. Our results show that the factor neutral effect of strikes is statistically significant and positive for large firms whereas the effect is not statistically pronounced for the small firms, although the sign of the effect is positive. We also see a sizable and significant productivity loss for large firms; however for small

firms, the effect is not significant. In terms of factor-biased effects, we see a pattern similar to our main findings; that large firms hardly re-adjust their factor share of inputs in response to *hartals.* Interestingly, for small firms we see evidence for re-optimization, as small firms reduce their factor share from labour towards energy to cope with such political shocks. These findings indicate that for large production units, the direct effect of *hartal* is substantial, which leads to productivity loss as well as an increase in the cost of production, and large firms do not seem to have any re-adjustment mechanisms to absorb this shock. On the other hand, for small production units, such shocks get internalized by firms by short-run quick factor re-optimization. It appears that small firms substitute the labor share of production with energy, indicating that firms may operate for extra working hours (without providing extra-wage or compensation) to cover the loss of production.

[Table 5 about here]

Table 6 reports our estimates for the impact of *hartals* on firm categorization based on production, targeted for domestic or international markets. Columns (1)-(2) report estimations using sub-sample data for exporting firms and columns (3)-(4) report for domestic firms. It is important to note that the factor-neutral effect of the strike is significant for both types of firm, which is consistent with the earlier findings of Ahsan and Iqbal (2015) who used transaction-level export data from Bangladesh and found that *hartal* increases the cost of production for export-oriented firms as these firms choose expensive means of shipments (like air-shipments) to meet delivery deadlines. The sign and magnitude of *hartals* effect on domestic-market oriented firms are also similar with export-oriented firms; however, the reason for such direct effect could be very different (may be due to supply bottleneck of inputs due to an interruption in the transportation network due to strikes).

Now regarding factor-bias effects of political strikes, we see export-oriented firms significantly reduce the factor-share for labour inputs in response to *hartal*, and increase other input-shares, but none of these substitutions are statistically significant. However, for domestic-market oriented firms, we see two significant substitutions by firms, reduction for labour inputs and increase of energy inputs.

[Table 6 about here]

Industry Heterogeneity

Table 7 reports the industry-specific sub-sample regressions where columns (1)

- (4) report *hartals* measured as weeks of occurrence whereas columns (5)-(8) show days of occurrences, following the IV-SUR regression specification used in Table 3. Our regression results, using samples for each industry, are largely consistent with our previous findings of large factor-neutral effects of strikes on firms' cost functions, which is statistically significant for food and textiles industries and weakly significant for garment industries. Our results suggest that food and textile industries face sizable productivity loss due to *hartals.* This finding is not surprising as both sectors depend on the smooth movement of supply chain inputs. Food industries use raw materials that are typically perishable in nature; and strikes cause such industries to face substantial direct cost due to transportation interruption. Similarly, textile industries face substantial direct cost due to *hartals,* which is also very difficult to avoid as the price of raw materials and shipment is severely affected during strike days (Islam *at el.* 2013).

Interestingly the factor neutral effect of *hartals* is weakly significant for garment factories, one of the leading industrial and export sectors in Bangladesh (80% of Bangladeshi export come from the ready-made garments sector). This finding is consistent with the recent paper by Ashraf *et al.* (2015) where they collected detailed daily line operation information for the 33 large garment factories and found that productivity does not get affected by *hartals* for garment factories as reported absenteeism is very low on *hartal* days, because most of the workers live close to the factory facilities. Moreover, it appears that garment factories do respond to political strikes by re-optimizing their factor share: by substituting away labour with a material share of production. One obvious candidate for such increase in material costs is due to sub-contracting to sub-standard and noncompliant "shadow" factories for outsourcing some portion of production. In a series of influential research work by Liebowitz, S., and Baumann-Pauly, D. (2014, 2015) reveal this hidden practice of sourcing from informal "shadow" factories by the garment industries in Bangladesh which helps factories to cope with situations like political protests and also to make a profit. These shadow factories do not fulfil the basic requirements for compliance and the wage provided to their workers is below the standard of the industry, which enables these "shadow" factories to offer an attractive sub-contracting price below the cost of production in the originally assigned firms. With this practice, garment factories are still able to meet the deadlines and also make a profit. Padmanabhan *et al.* (2015) have a detail business case-study explaining this practice of sub-contracting in garment industries in Bangladesh.

Leather industries, on the other hand, appears more resilient to *hartals* as this industry does not face any significant productivity loss due to political strikes. This is partly due to the unregulated industrial environment and, cheap and available sources of

raw leather, which enables leather industry firms to maintain productivity even during the events of *hartals*. However, we see that leather factories re-optimize the factor of production in response to such a shock, making a substitution in favour of labour input share of and weekly reducing energy share. Our findings are largely consistent when using weekly or daily measures of *hartals*.

[Tables 7 about here]

6.2 Aggregate effect:

Table 8 reports the overall effect of *hartals* on production costs and offers a detailed breakdown of firms' cost structures, using both week and day-based counts of *hartals.* The marginal effect estimations were obtained from Equation (4) by evaluating them at the sample mean. The sample average results suggest a substantial overall effect of *hartals*, consistent with our earlier findings, where *hartal* occurrences increase the total costs of production - as the factor-neutral effects surpass the cost-reducing factor-bias effects. The main contributor to the cost rise is the increase in the direct effect of *hartals*, which considerably increases firms' cost of production. Our results suggest that these findings remain consistent in other specifications (not reported) based on sub-sample analysis of firm size and firm type. Overall, one additional *hartal* day in a year, than the average, leads to a rise of a factor neutral cost effect of 2.1 percent, of which only a mere 0.1 percent gets absorbed by firms by factor relocation leaving a hefty net increase in cost by 2%, on an average. To give a perspective, if a firm is located in Dhaka, which observed 6 more days of *hartals* in 2005 than the average, the total cost of production for this firm rose by 12% due to *hartals*. In other words, had the firm been located in Barishal in 2005, where the occurrences of *hartals* were 5 fewer days than the average, the firm would have saved 10% of the production cost which is due to a lower number of *hartal* occurrences in that region, holding all other things constant.

7. Concluding remarks

The World Bank Enterprise survey produced several reports on Bangladesh over the years and one key comparison in these documents was reported obstacles faced by the business owners of the survey firms (See Figure 5). In the 2007 survey, the biggest reported obstacle faced by firms was access to electricity. Noticeably, political instability was ranked as the third major impediment faced by the firms in 2007; however, in the 2013 survey, political instability was reported as the biggest obstacle faced by the firms. One obvious element of this political instability is the culture of

calling for strikes (*hartals*), which creates a considerable obstruction in day-to-day operations, as well as the business environment in Bangladesh.

As pointed out by the business owners as well as reported in numerous articles in print and electronic media, we found that political protests in the form of *hartal* significantly increase costs for firms. Using factor analysis we see the factor-neutral effect of strikes is positive and strongly statistically significant, showing evidence of the reduction of firm productivity due to *hartals*. However, we find that firms do not necessarily re-optimize in response to political strikes by significantly substituting among factors inputs. We found some moderate evidence of factor re-optimization in response to *hartals* in sub-sample regressions, mostly in the direction of reduced use of labor and capital and increased the use of material and energy. One interpretation of the increase in the material cost share of production is outsourcing or sub-contracting, where firms shifts from "making" to "buying" intermediate goods from unregulated, noncompliant informal "shadow" factories; where the cost of procuring is profitable for firms. Our marginal calculation shows that one unit increase in *hartals* leads to a net 2% rise in the cost, on an average, from the mean. Overall, we find evidence that political strikes lead to a substantial rise in production costs that cannot be mitigated by the well-known coping strategies employed by the firms in Bangladesh.

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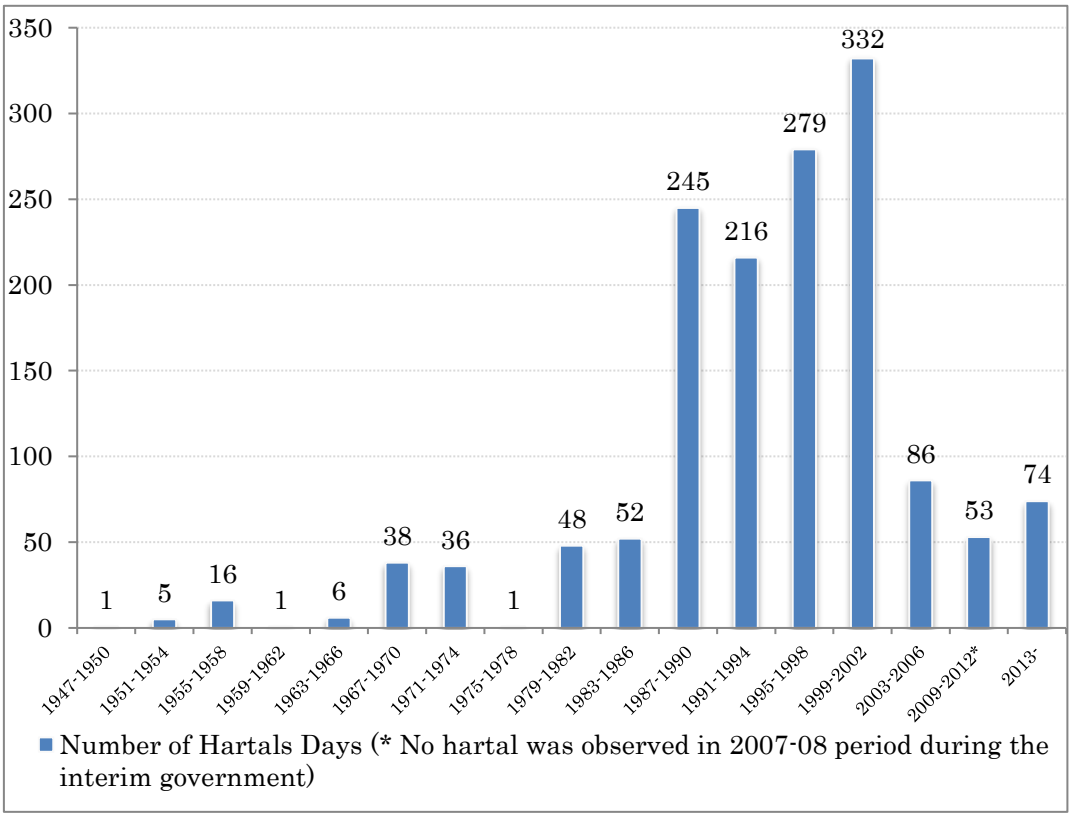
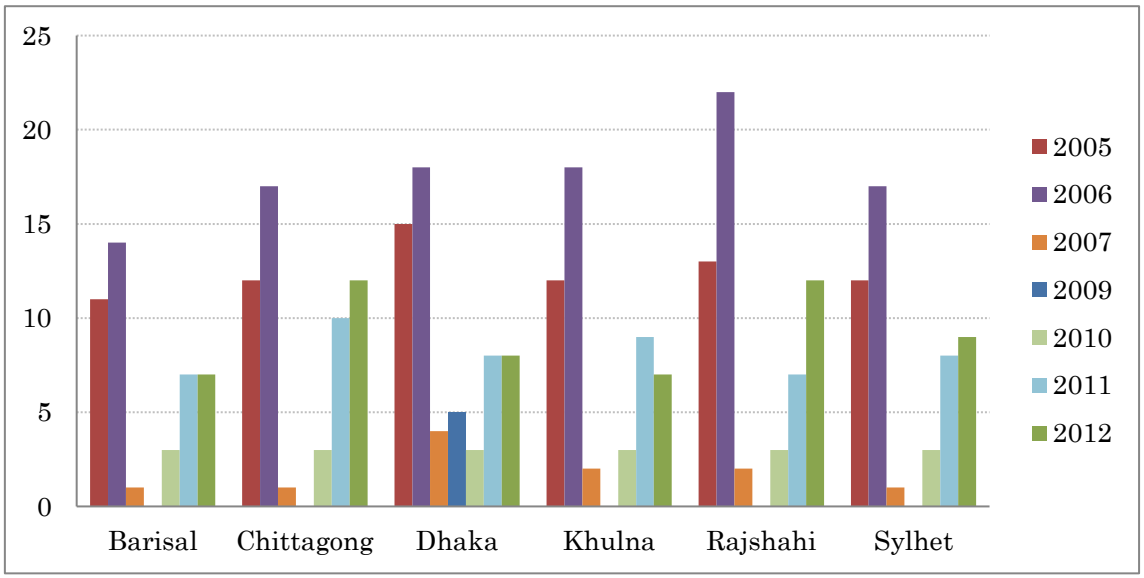
Figure 1: Chronology of *Hartals* (1947 - 2013)



Source: Dasgupta (2001); Imtiaz (2011); and compiled from various newspapers

Figure 2: Number of General *Hartals* weeks (Regional and Countrywide)



Source: Compiled from national English newspaper "The Daily Star" and "The Daily Prothom-alo" online archive.

Figure 3: Technology change and *Hartals*

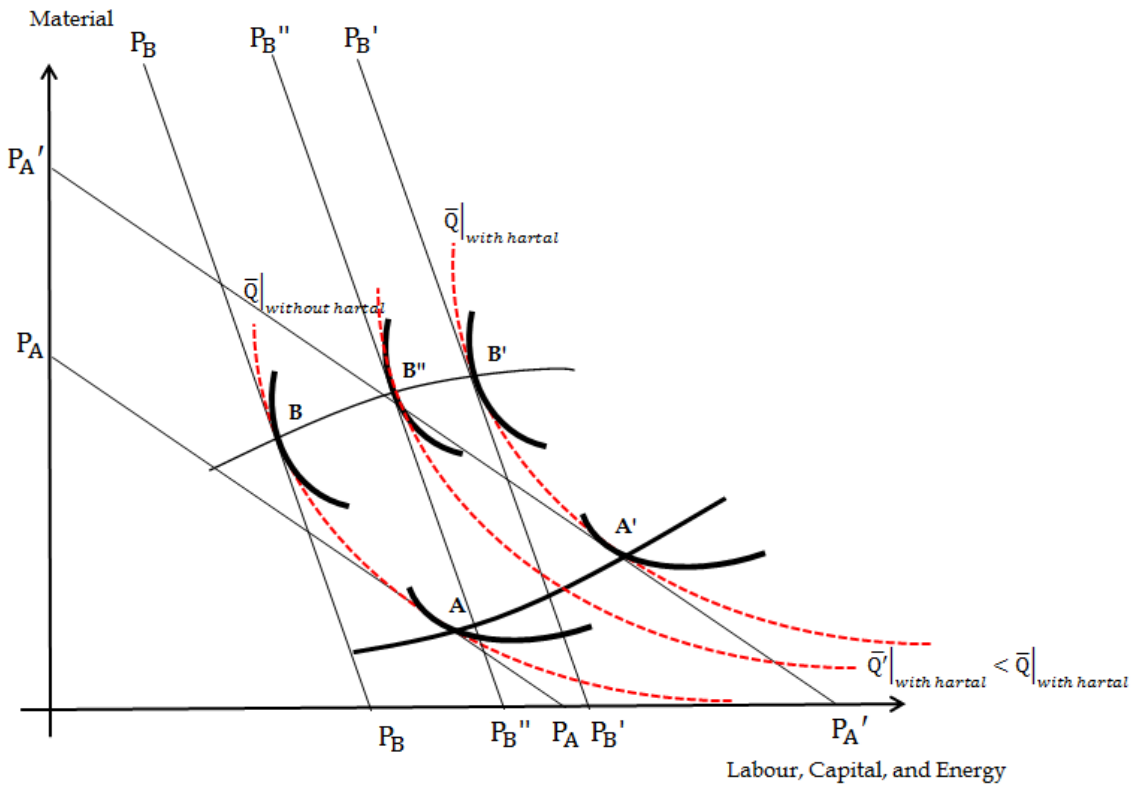


Figure 4a: Correlation of infrastructure development in 2004 (division wise total road construction as a percentage of total) and share of parliamentary seats by the ruling party in 2001 (Correlation coefficient is 0.28)

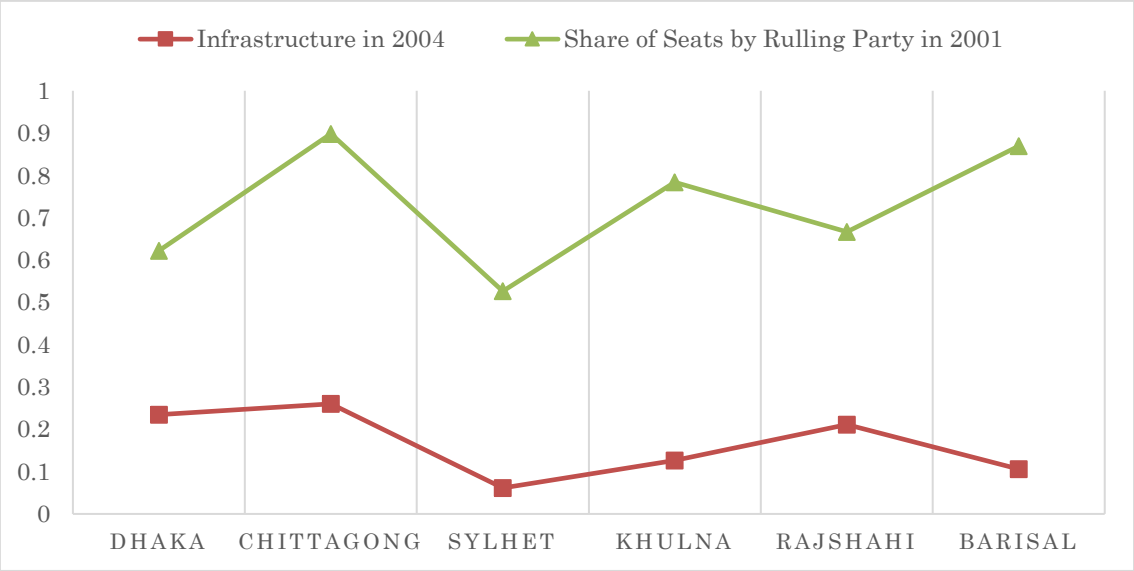


Figure 4b: Correlation of infrastructure development in 2011 (division wise total road construction as a percentage of total) and share of parliamentary seats by the ruling party 2009 (Correlation coefficient is -0.322)

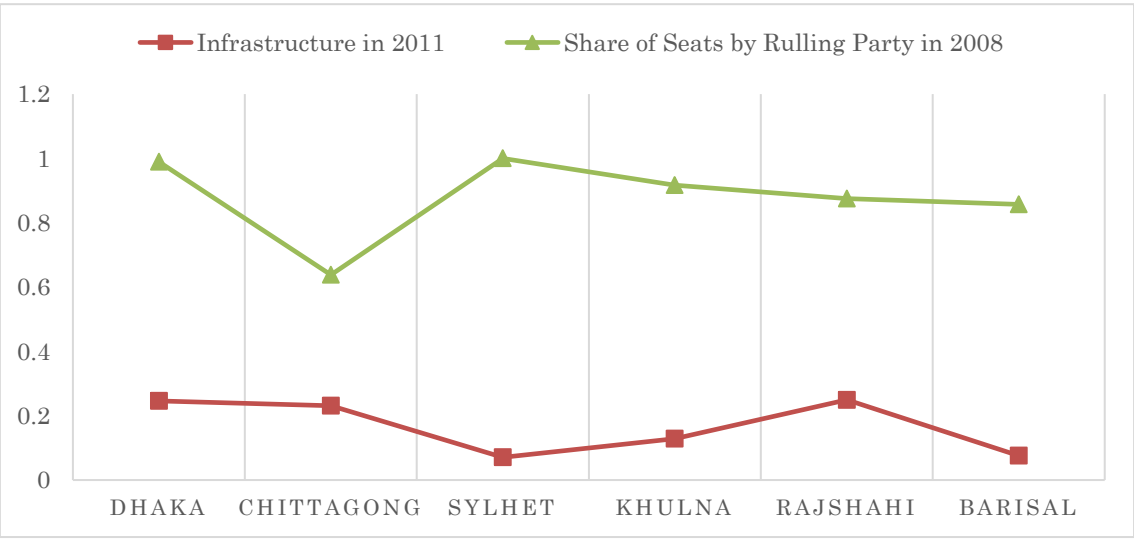
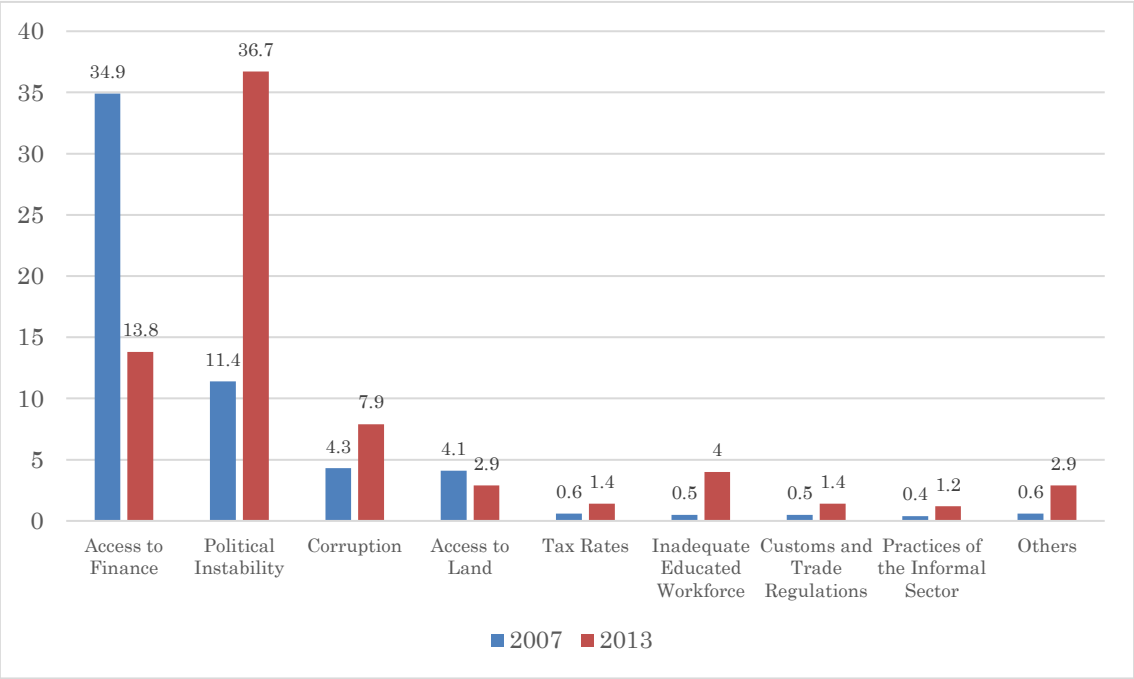


Figure 5: Reported biggest obstacles of doing business in Bangladesh by business owners and top managers of surveyed firms in Bangladesh Enterprise Survey.



Source: Compiled from World Bank Enterprise Survey Bangladesh Country Profile Report of 2007 and 2013.

Table 1: Summary of *Hartal* Statisitcs

Year	Division	General *Hartal* days	General *Hartal* weeks	Combined *Hartal* days (General plus transportation *hartals)*	Combined *Hartal* weeks (General plus transportation *hartals)*
2005	Dhaka	31.5	15	41	20
2005	Chittagong	28	12	33	16
2005	Rajshahi	24	12	34	16
2005	Khulna	19	12	31	15
2005	Sylhet	24	12	27.5	14
2005	Barisal	19	11	23	13
2006	Dhaka	33.5	18	42	24
2006	Chittagong	31	17	38.5	22
2006	Rajshahi	29.5	19	37	23
2006	Khulna	29.5	18	35.5	22
2006	Sylhet	25	17	37.5	23
2006	Barisal	24	14	32.5	19
2012	Dhaka	22	8	29	13
2012	Chittagong	26.5	12	46.5	20
2012	Rajshahi	27	12	51	20
2012	Khulna	20	7	55	18
2012	Sylhet	23	9	30.5	13
2012	Barisal	20	7	32.5	12

Table 2: Summury statistics of Parlimentary election on Bangladesh

Election Statistics	Year	Rajshahi	Khulna	Barisal	Dhaka	Sylhet	Chittagong	Total
Number of seats	2001	72	37	23	90	19	59	300
Number of seats by majority party	2001	48	29	20	56	10	53	216
Number of votes	2001	14947934	7421180	3235950	17233630	3385751	9512180	55736625
Number of votes to majority party	2001	6525339	3580869	1691955	7390895	1356431	5293810	25839299
Share of seats by majority party	2001	0.66666667	0.78378378	0.8695652	0.6222222	0.5263158	0.89830508	0.72
Share of votes to majority party	2001	0.43653785	0.48252017	0.5228619	0.4288647	0.4006293	0.55652963	0.46359641
Number of seats	2008	72	36	21	94	19	58	300
Number of seats by majority party	2008	63	33	18	93	19	37	263
Number of votes	2008	18191623	8541684	4001711	22193190	4296820	12405239	69630267
Number of votes to majority party	2008	10575870	4563650	2170600	13591910	2572194	6047142	39521366
Share of seats by majority party	2008	0.875	0.91666667	0.8571429	0.9893617	1	0.63793103	0.87666667
Share of votes to majority party	2008	0.58135934	0.53427989	0.542418	0.6124361	0.5986274	0.48746679	0.56758889

Table 3A: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Costs (in BDT)	1232	161000000	523000000	118000	8840000000
Profit (in BDT)	1232	44600000	145000000	13000	1850000000
Sales (in BDT)	1232	206000000	623000000	133000	9740000000
Price of Labour (in BDT)	1232	65776.73	112512	1333.333	2666667
Price of Capital (in BDT)	1232	2718368	12800000	900	300000000
Price of Energy (in BDT/sales)	1232	0.0330643	0.0402366	0.0003148	0.3505
Price of Material (in BDT/sales)	1232	0.5444198	0.2031375	0.0017973	0.9833333
Value share of Labour	1232	0.2256925	0.1644768	0.0016848	0.931522
Value share of Capital	1232	0.0423456	0.0601374	0.0001146	0.6242197
Value share of Energy	1232	0.0451649	0.0574166	0.000337	0.5740741
Value share of Materials	1232	0.686797	0.2054642	0.0111288	0.9952534
Large firm dummy	1232	0.4732143	0.4994848	0	1
Export firm dummy	1232	0.4715909	0.499395	0	1

Table 3B: Cross Tabulation of Industry and Year

Industry	2005	2006	2012	Total
Food	30	92	80	202
Garments	89	187	148	424
Leather	18	152	75	245
Textiles	36	72	116	224
Chemicals and Others	21	76	40	137
Total	194	579	459	1232

Table 4: The cost of strikes on Manufacturing firms (all results for main specification)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of total cost	General *hartals*	General and trasnportation *hartals*	General *hartals*	General and trasnportation *hartals*
	Weeks	Weeks	Days	Days
ln(Profit, Q)	0.830***	0.840***	0.976***	0.849***
	(0.103)	(0.098)	(0.191)	(0.096)
ln(Wage, P_L)	0.580***	0.618***	0.806***	0.626***
	(0.116)	(0.109)	(0.222)	(0.105)
ln(Price of Capital, P_K)	0.232***	0.138**	0.242**	0.106**
	(0.057)	(0.054)	(0.109)	(0.053)
ln(Price of Energy, P_E)	0.0969**	0.100**	0.00294	0.101**
	(0.045)	(0.043)	(0.085)	(0.042)
ln(Price of Materials, P_M)	0.0908	0.143	-0.0508	0.168
	(0.125)	(0.117)	(0.236)	(0.113)
Large firm dummy	0.189	0.137	0.171	0.115
	(0.217)	(0.216)	(0.216)	(0.216)
Export firm dummy	0.498**	0.541**	0.527**	0.564***
	(0.214)	(0.214)	(0.214)	(0.214)
ln*(No of Hartal, H)*	1.595**	1.167**	2.727***	0.854**
	(0.621)	(0.521)	(0.950)	(0.399)
ln(Q)*ln(H)	-0.0315	-0.0298	-0.0658	-0.0258
	(0.034)	(0.029)	(0.054)	(0.023)
ln(P_L)*ln (H)	-0.0522	-0.0617*	-0.105*	-0.0529**
	(0.039)	(0.033)	(0.063)	(0.026)
ln(P_K)*ln (H)	-0.0279	0.00468	-0.0250	0.0121
	(0.019)	(0.016)	(0.030)	(0.013)
ln(P_E)*ln (H)	0.0207	0.0182	0.0432*	0.0149
	(0.014)	(0.012)	(0.023)	(0.010)
ln(P_M)*ln (H)	0.0593	0.0389	0.0870	0.0259
	(0.041)	(0.035)	(0.066)	(0.027)
No. of Observations	1232	1232	1232	1232
Control for Industry	Yes	Yes	Yes	Yes
Control for Region	Yes	Yes	Yes	Yes
Control for Year	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes

Note: Estimations are done based on Seemingly-unrelated Regression (SUR) technique. Estimatios of Column (1) and (3) are based on the number of division specific days of general/ political hartals and in column (2) and (4) are combined hartals which includes division specifiq general and transportation strikes. We used share of seats held by majority party and the inteaction of this variables with region and year as instruments. Robust standard errors are reported in the bracket. We denote significance at the 10% (*), 5% (**), and 1% (***) levels.

Table 5: The cost of strikes on Firms, based on size (with General and Transportation hartals)

	(1)	(2)	(3)	(4)
Dependent Variable:	Large Firms		Small Firms	
Log of total cost	Weeks	Days	Weeks	Days
ln(No of Hartal, H)	2.095**	1.942***	1.206	0.709
	(0.903)	(0.746)	(0.816)	(0.589)
ln(Q)*ln(H)	-0.113**	-0.109***	-0.00504	0.00413
	(0.049)	(0.041)	(0.053)	(0.038)
ln(P_L)*ln (H)	-0.0497	-0.0492	-0.0900*	-0.0665*
	(0.045)	(0.037)	(0.048)	(0.035)
ln(P_K)*ln (H)	0.0303	0.0334*	-0.00942	-0.000793
	(0.023)	(0.020)	(0.022)	(0.016)
ln(P_E)*ln (H)	0.00289	0.00393	0.0429**	0.0304**
	(0.017)	(0.015)	(0.017)	(0.013)
ln(P_M)*ln (H)	0.0165	0.0119	0.0566	0.0369
	(0.049)	(0.040)	(0.049)	(0.036)
No. of Observations	583	583	649	649
Control for Industry	Yes	Yes	Yes	Yes
Control for Region	Yes	Yes	Yes	Yes
Control for Year	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes

Note: Estimations are done based on Seemingly-unrelated Regression (SUR) technique. Estimatios of Column (1) and (3) are based on the number of division specific days of general/ political hartals and in column (2) and (4) are combined hartals which includes division specifiq general and transportation strikes. We used share of seats held by majority party and the inteaction of this variables with region and year as instruments. Robust standard errors are reported in the bracket. We denote significance at the 10% (*), 5% (**), and 1% (***) levels.

Table 6: The cost of strikes on Firms, based on type (with General and Transportation hartals)

	(1)	(2)	(3)	(4)
Dependent Variable:	Export Oriented Firms		Domestic Firms	
Log of total cost	Weeks	Days	Weeks	Days
ln*(No of Hartal weeks, H)*	1.833**	1.910***	2.058***	1.311**
	(0.830)	(0.698)	(0.791)	(0.578)
ln(Q)*ln(*H*)	-0.0520	-0.0686*	-0.0558	-0.0386
	(0.042)	(0.036)	(0.050)	(0.037)
ln(P_L)*ln (*H*)	-0.0922**	-0.0792**	-0.109**	-0.0730**
	(0.042)	(0.035)	(0.049)	(0.036)
ln(P_K)*ln (*H*)	0.00723	0.0112	0.00194	0.00725
	(0.022)	(0.019)	(0.023)	(0.017)
ln(P_E)*ln (*H*)	0.0211	0.0200	0.0404**	0.0269**
	(0.017)	(0.014)	(0.018)	(0.013)
ln(P_M)*ln (*H*)	0.0638	0.0480	0.0666	0.0389
	(0.047)	(0.039)	(0.052)	(0.038)
No. of Observations	581	581	651	651
Control for Industry	Yes	Yes	Yes	Yes
Control for Region	Yes	Yes	Yes	Yes
Control for Year	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes

Note: Estimations are done based on Seemingly-unrelated Regression (SUR) technique. Estimatios of Column (1) and (3) are based on the number of division specific days of general/ political hartals and in column (2) and (4) are combined hartals which includes division specifiq general and transportation strikes. We used share of seats held by majority party and the inteaction of this variables with region and year as instruments. Robust standard errors are reported in the bracket. We denote significance at the 10% (*), 5% (**), and 1% (***) levels.

Table 7: The cost of strikes on Firms, by industry classification (with General and Transportation hartals)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Week				Days			
Log of total cost	Food	Garment	Leather	Textile	Food	Garment	Leather	Textile
ln*(No of Hartal, H)*	3.870***	2.045*	0.271	5.336***	2.601***	1.888*	0.140	4.343***
	(1.359)	(1.170)	(1.955)	(1.700)	(0.970)	(1.062)	(1.757)	(1.247)
ln(Q)*ln(*H*)	-0.251***	-0.0256	-0.185	-0.258**	-0.194***	-0.0242	-0.160	-0.210***
	(0.081)	(0.060)	(0.116)	(0.102)	(0.056)	(0.054)	(0.104)	(0.075)
ln(P_L)*ln (*H*)	-0.0191	-0.149**	0.240**	-0.0931	0.00349	-0.136**	0.218**	-0.0949
	(0.090)	(0.061)	(0.095)	(0.086)	(0.063)	(0.055)	(0.086)	(0.061)
ln(P_K)*ln (*H*)	0.0129	-0.0153	-0.0306	-0.00886	0.0176	-0.0138	-0.0274	0.00480
	(0.045)	(0.025)	(0.051)	(0.037)	(0.031)	(0.023)	(0.046)	(0.027)
ln(P_E)*ln (*H*)	0.0180	0.0173	-0.0594*	0.0265	0.0108	0.0161	-0.0545*	0.0213
	(0.031)	(0.020)	(0.032)	(0.027)	(0.022)	(0.018)	(0.029)	(0.019)
ln(P_M)*ln (*H*)	-0.0117	0.147**	-0.150	0.0755	-0.0318	0.134**	-0.136	0.0688
	(0.095)	(0.064)	(0.099)	(0.081)	(0.066)	(0.058)	(0.089)	(0.058)
No. of Observations	202	424	245	224	202	424	245	224
Control for Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm size dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Export status dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Estimations are done based on Seemingly-unrelated Regression (SUR) technique. We used share of seats held by majority party and the inteaction of this variables with region and year as instruments. Robust standard errors are reported in the bracket. We denote significance at the 10% (*), 5% (**), and 1% (***) levels.

Table 8: Impacts of hartal at sample mean

Weekly hartal	Coef.	Std. Err.	z	P>|z|	[95% Conf	. Interval]
Overall effects	8704550	3827705	2.27	0.023	1202386	16200000.00
Factor-Neutral	8940339	3948202	2.26	0.024	1202005	16700000.00
Direct effects	9136462	4078396	2.24	0.025	1142953	17100000.00
Outputs	-196123.5	208584.4	-0.94	0.347	-604941.4	212694.4
Factor-Biased	-235788.6	206137.4	-1.14	0.253	-639810.5	168233.2
Labour	-298753.3	210156.8	-1.42	0.155	-710653.1	113146.5
Capital	5061.443	15644.86	0.32	0.746	-25601.93	35724.81
Energy	14272.94	5130.112	2.78	0.005	4218.104	24327.77
Materials	43630.29	16580.8	2.63	0.009	11132.52	76128.05

Daily hartal	Coef.	Std. Err.	z	P>|z|	[95% Conf	. Interval]
Overall effects	3319875	1542742	2.15	0.031	296157	6343593
Factor-Neutral	3426979	1588658	2.16	0.031	313266.3	6540691
Direct effects	3517298	1643230	2.14	0.032	296627.3	6737969
Outputs	-90319.45	87918.65	-1.03	0.304	-262636.8	81997.95
Factor-Biased	-107104	81613.72	-1.31	0.189	-267064	52855.94
Labour	-136409.1	88172.76	-1.55	0.122	-309224.6	36406.31
Capital	5280.315	3357.111	1.57	0.116	-1299.502	11860.13
Energy	6150.937	2140.38	2.87	0.004	1955.869	10346
Materials	17873.86	9587.506	1.86	0.062	-917.3044	36665.03