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Preventing Fires through Contracts with Global Retailers

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Abstract

The contract designed by Sato（2012） in relation to the garment factory fires on the outskirts of Dhaka can not only encourage factories to voluntarily implement safety measures (i.e., the contract can be fulfilled), but when the loss of profit due to cancellation of the relationship with the retailer is sufficiently large, it also clearly encourages the factory to voluntarily sign the contract (i.e., the contract can be consensual).

Keywords: Garment factory fires, Safety measures, Retailer, Optimal contract

1． Introduction

1-1 Garment factory fires on the outskirts of Dhaka

A fire at the garment factory of Tazreen Fashion Ltd located in Ashulia on the outskirts of Dhaka broke out on 24 November 2012 resulting in 112 deaths, which was the worst incident among a spate of Bangladesh garment factory fires.

Another garment factory fire broke out in Ashulia only 2 years ago, in which at least 26 died. According to the Daily Star (2010b,2010c), the fire broke out on the seventh floor of the 11-story garment factory of Ha-Meem Group on December 14, 2010 and four of the seven escape routes to lower floors for the 300 or so workers located on the top floor were blocked. Most of the victims died after falling from the building, which undeniably exacerbated the panic.

The Daily Star (2010a,c) reported that garment factory fires on a similar scale to this this tragedy have occurred in Dhaka and its suburbs (Narayanganj,Narsingdi,Chittagong,Ashulia） resulting in loss of at least 267 lives during the 20 years since 1990. In addition, this major tragedy at Tazreen occurred without even simple measures being implemented to secure escape routes.

The terrible tragedy at Tazreen prompted the reaction of a global retailer. That is, in a statement released two days after the fire, Wal-Mart noted the following:

> ・・・The Tazreen factory was no longer authorized to produce merchandise for Walmart. A supplier subcontracted work to this factory without authorization and in direct violation of our policies. Today, we have terminated the relationship with that supplier. ・・・
>
> （Wal-Mart(Website), emphasis added by the author）

1-2 Literature review

Paul-Majumder and Begum（2000）show a germination of interest in the prevention of factory fires occurring in the Readymade Garment Industry, which has been driving economic growth in Bangladesh in conjunction with globalization:

・・・ most garment factories do not have adequate fire prevention measures. The survey of 1997 shows that in addition to other fire code violations, most of the garment factories do not have fire exits or fire alarms. According to the Bangladesh Fire Brigade,up to November 1997, 58 fire accidents took place in the garment industry; 118 workers were killed, of which 90 percent were female workers.

（p.15, emphasis added by the author）

This interest is acknowledged in 5 （i、ii、vi、xi、xii）of the 13 "recommendations" by Akhter et al. (2010, p.70) that were noted from the viewpoint of female workers:

(i) Sufficient widen fire exit doors and enough ventilation with proper maintenance for air circulation should be designed for industry building
(ii) Regular fire drills should be held, minimum twice in a year
(iii) More toilet facilities for female workers
(iv) Pure water supply for drinking and washing for female workers
(v) Fulltime medical care and first aid treatment with female doctor and highly trained nurses for female workers
(vi) Safety management training for all kinds of worker
(vii) Maternity leave & weekly holiday with pay for female workers
(viii) Fixation of wages should equal and logical for male and female workers based on living standard
(ix) Management should issues appointment latter for all kinds of workers as certainty of their job
(x) Management should permit to arrange trade union by low
(xi) Proper exit sign and safety sign should be applied in appropriate areas of the industry
(xii) All the buildings of garment industries should have proper announcement system as to how to get out of the building
(xiii) Management has to provide basic legal requirements to ensure a healthy industry.

Sato (2012) shows that the probability of a fire can be reduced through private contracts between the

Bangladesh Garment Manufacturers and Exporters Association（BGMEA） and its member factories. The contracts cited in Sato (2012) can be fulfilled as long as the cost of the aforementioned recommendations i, ii, vi, xi, and xii is sufficiently small. The objective of this report is to design an optimal contract that can be fulfilled while being consensual. In the following section we set the framework, in section 3 we design the optimal contract, and lastly in section 4 we consider the relationship with corruption.

2. Framework

In the 2010 factory fire, the families of employees who died received (in addition to the 100,000 Tk from the Ha-Meem Group) 100,000Tk to 200,000Tk from BGMEA of which the factory is a member. In the following we consider the contract between BGMEA and one of its member factories.

Since BGMEA must compensate the families of employees who die in fires, there is a desire to take preventative measures at the factory (for example, Akhter et al.'s (2010) recommendations i, ii, vi, xi, and xii). However, it is said that BGMEA is unable to directly investigate whether a factory has actually implemented preventative measures (This is attributed to the lack of investigative resources at BGMEA and corruptibility of inspectors.). For the factory, preventative measures have a cost $c \geq 0$. For simplicity, in this paper we assume that the following as:

$$\theta = 1/(c+1). \quad (1)$$

When it is common knowledge that BGMEA cannot directly monitor a factory's conduct, the factory could neglect to implement preventative measures (or have no interest in the measures themselves).

For Simplicity, the scale of fires can be divided into two types: small h(>0) and disaster level such as

when there are deaths H(>h), and the BGMEA can observe that both are possible after the fact. When BGMEA observes h, it can tell whether the factory has taken preventative measures, but in the case of H, it is not possible to establish whether the cause was the absence of preventative measures unless there is a whistle-blower. For simplicity, we assume that the probability of a whistle-blowing p is exogenously given.

BGMEA offers (s,f) in the contract with the factory. Here, s is defined as the compensation that BGMEA commits to pay. That is, regardless of the scale of the fire, BGEMA compensates both personal and material damage caused by a fire. On the other hand, f is the fine that BGMEA imposes on a factory when an H-scale fire was caused by the absence of preventative measures.

3. Optimal contract

If a factory takes preventative measures under this contract, there is a probability 1-θ(c) that there will be no fire, and probability θ(c) that the scale of the fire will be h. If there is a fire, the factory will only receive compensation from BGMEA for s damage. The private cost to the factory in that case is c-θ(c)s. On the other hand, the social cost is c+θ(c)h. If the compensation to cause the private cost to be consistent with the social cost is represented as s*,then s*=-h.

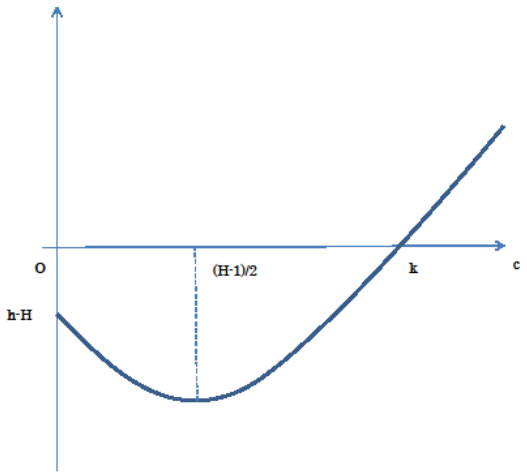
On the other hand, if the factory neglects to take preventative measures, we can derive from equation (1) that θ＝1 when c＝0, so there definitely a fire on a scale H. At this time, there is a probability 1-p that the factory will only be compensated with s, but there is a probability p that the factory's neglect to take preventative measures will be detected and the factory must pay a fine of f to BGMEA. The private cost in this case is pf-s. On the other hand, the social cost is H, and considering that s*=-h, the fine required to make the private cost consistent with the social cost would be f*=(H-h)/p.

Therefore, the optimal contract is (s*,f*)=(-h,(H-h)/p).

Next, we consider whether or not it is possible to prevent the moral hazard under this contract. When preventative measures are implemented, the private cost to the factory is c-θ(c)s*=c+h/(c+1), and when preventative measures are not implemented the private cost is pf*-s*=H, so the difference in the expected cost can be expressed as

$$\Delta C = c+h/(1+c)-H \qquad (2)$$

When there is $c < k, k = \frac{H-1+\sqrt{(H-1)^2+4(H-h)}}{2}$ as in the following Figure, $\Delta C < 0$, so there is incentive for the factory to take preventative measures. Therefore, the following proposition would be held. That is,



Proposition 1： When the safety of workers can be improved for a sufficiently small cost the optimal

contract can be fulfilled at (s*,f*)=(-h,(H-h)/p).

If the factory refuses to sign the optimal contract and does not implement any safety measures, formula (1) indicates there will be a definite scale H fire. In that case, the relationship with the retailer will be cancelled and profit will be lost. Denoting this lost profit as g, if g is greater than c+h/(c+1) the factory will lose the option to sign the contract and it would be most rational to sign the optimal contract and bear c. Therefore, the following proposition would be held.

Proposition 2 : When the lost profit due to the cancellation of the relationship with the retailer is sufficiently large, there could be agreement to the optimal contract.

4. Concluding remark

Bangladesh is ranked 144 out of 174 countries (i.e., the bottom 17%) in the Corruption Perception Index 2012 conducted by Transparency International, so there is scope for improvement from a global perspective. The contracted cited by Sato (2012) and in this paper is ultimately a private sector contract so it is not incompatible with the problem of corruption that is of concern when the safety management inspection of the factory is conducted by a public servant.

In addition, under the framework of this paper, as long as the cost of safety management is an independent variable to reduce the probability of a fire, for arbitrarily $c \in [0,k]$, the probability of a fire itself can be reduced.

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