Combating Smuggling: What Games We Are Playing: An Indonesian Case Study

Hidajat Hendarsjah

Faculty of Economics and Business, Universities Sebelas Maret
Corresponding author: h.hendarsjah@yahoo.com

ARTICLE INFO	ABSTRACT
	Intuitively, a person's behavioral tendency to corrupt seems to follow several incentives that bound with the outcomes. But changes in outcomes' payoffs do not always directly affect to person behavior. In games with mixed equilibrium presences, probability of actions taken by other parties (in this paper, "to inspect" and "do not inspect") will alter a person tendency whether "to comply" or "to cheat", as shown in garment smuggling case in Indonesia. Game theoretic concepts were employed in this paper to perform framework for analysis in describing the actions of interdependent agents. When the game has mixed equilibrium, probability of one player to take one strategic action does not depend on the opponent's payoffs (i.e. maximum penalty). What does change is the probability of the opponent's strategic actions.

INTRODUCTION

I will start this discussion by putting one simple case that was raised by Chairman of Indonesian Textile Association (API) as reported by KOMPAS 1/3/2008. In the press release, he stated that domestic consumption of garment was 1.22 million tons in 2007, which was met by local supply of 270,000 tons and imported (authorized government data) garment of 88,000 tons. What does it mean? It means that there was 862,000 tons of garment consumption from unknown origins.

Further, API presumed that big gap between domestic consumption and low supply from local suppliers as well as "authorized" imported goods was filled from illegal sources. They claimed that such big amount of supply comes from illegal imported goods. The Chairman admitted that there were tightened inspections at several Indonesian main ports, such as Tanjung Priok, Jakarta, and Batam ports. Nevertheless, there were many entry points without tight custom inspection in Indonesian ports. As per API data, there were 130 "authorized" ports in Indonesia, and the Chairman claimed that there were many more of the "unauthorized" ones. These also include many private-administered ports, as had been set up in Serang, Banten.

If we look at the big domestic consumption of garment in Indonesia, it is not too hard to foresee that there are also big opportunities for local manufacturers to fill up the high demand. But the presence of illegal imported goods may discourage local manufacturers to boost up their production capacities. "Unfair trade competition should be eliminated," said the Chairman.

The question is, how could this happen? What is the incentive to smuggle garment to Indonesia? Economics is all about incentive! This phrase was a quote from a Nobel laureate in economics, James Tobin, when asked to summarize economics in just one word (Aumann, 2006). However, what kind of incentives in this context?

Refer to API Chairman, he found in one case when the authority caught a smuggler red handedly for his imported goods amounted IDR 1 billion, the court just gave him IDR 100 million penalty. But the illegally imported goods were not sure to be destroyed! It should be noted that illegally imported garment did not pay customs tax 15%, VAT 10%, and income tax 2.5%. So the incentive to smuggle seems too interesting (incurred taxes plus additional 10% fine if being caught, and no confiscation upon the goods) as compared to the legally import procedures which have just slightly lower obligations to pay several incurred taxes!

Summing up these concerns, is there any such way to extend a framework of thinking to examine smuggling phenomenon? *Firstly*, we have to consider that this kind of action exists when the right decision for one party depends upon action taken by another. This situation is known as strategic situation, and one focal individual must take into account the actions taken or likely to be taken by others – but these other individuals will themselves be concerned about the actions that the focal individual will take. In addition the incentives to any actions taken are indispensable in this context. *Second*, with a focus on the interdependent actions among parties (the authorities and the importers) in smuggling phenomenon, we need a tool to construct the most appropriate framework for analysis.

I propose Game Theory to become our analytical framework as its concepts would perfectly apply whenever the actions of several agents are interdependent. The concepts of game theory may provide a language to formulate, structure, analyze, and understand strategic scenarios. In this paper I will exploit a simple payoff matrix to construct analytical framework to examine the corrupt behavior as in smuggling practices.

CUSTOMS INSPECTION GAME

In the case of Indonesian garment smuggling, there are two possible strategic stances for authorities to interact with smugglers. First is "inspect" stance. This entails fully inspection for any imported goods by Indonesian customs. Second is "do not inspect" stance. This scheme comes out as there is a concern for the authorities that they will experience significant shortfall on their budget to finance fully inspection program. On the other side, given such incentives, importers also have two basic stances: "to comply" or "to cheat" (then they become smugglers).

Referring to the information as stated by the API Chairman, we can construct possible **payoffs** (arbitrarily numbers attached to an outcome) for each strategic stance. These payoffs resemble **incentives** of the game. The standard outcome, defining the reference payoff 27.5% to authorities and -27.5% to importers, is that the authorities choose "do not inspect" while expecting the importers to choose "comply".

Without inspection, importers prefer "to cheat" since that gives them payoff about 27.5% out of their imported goods (that is, roughly, 15% + 10% + 2.5% of unpaid taxes), with resulting negative payoff -27.5% to the authorities. This situation may lead the authorities to decide "inspect", and imposing the importers to face regular taxes plus 10% fine.

If the importers comply, inspection leaves their payoff -27.5% unchanged, while the authorities incur a cost resulting in a negative payoff, say, -2%. If the importers cheat, however, inspection will result in an additional penalty (10% fine for the importers) and still create a certain amount of hassle for the authorities (say, payoff -15%).

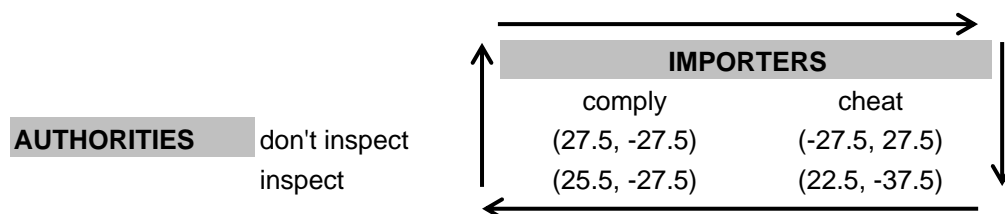|	IMPORTERS	
	comply	cheat
AUTHORITIES don't inspect	(27.5, -27.5)	(-27.5, 27.5)
inspect	(25.5, -27.5)	(22.5, -37.5)

Figure 1 Indonesian Customs Inspection Game

In all cases, the authorities would strongly prefer if the importers complied, but this is beyond the authorities' control. However, the authorities prefer to inspect if the importers cheat (since 22.5% is much better than -27.5%) as indicated by the downward arrow on the right in figure 1. But if the authorities always preferred "do not inspect", then this would be a dominating strategy for importers and be part of an equilibrium where the importers cheat!

The circular arrow structure at Figure 1 shows that this game has no equilibrium in a specific non-random course of action for players. Following Stengel and Turocy (2001), if any of the players settle on a deterministic choice, the best response of the other player would be unique, to which the original choice would not be a best response (i.e. the authorities prefer "to inspect" when the importers choose "to cheat", against which the importers in turn prefer "to comply").

What should the players do in this game? If the authorities choose a maximin strategy (Stengel and Turocy, 2001), then the possible option will be "to inspect", and for

the importers are "to comply". But this is not a stable solution for the two, since the authorities could switch their strategy and improve their payoff!

Then alternatively they could randomize their actions in a given probability that determines the players' decision (called as mixed strategy in Game Theory). A mixed strategy for the authorities are "to inspect" only with certain probability. Even if an inspection is not certain, a sufficiently high probability of being caught should deter from cheating, at least to some extent.

The low probability for inspection, say 2 percent, then the importers receive payoff 0 for complying, and payoff 0.8 x 27.5% + 0.2 x (-37.5%) = 14.5% for smuggling. Hence, importers will still have big incentive for smuggling. If the probability of inspection is higher, say 0.9 then the expected payoff for cheating is 0.1 x 27.5% + 0.9 x (-37.5%) = -31.0%, so that there is a big incentive for importers to comply. From this standpoint we may predict that there must exist one point so that the importers strategy is indifferent, either to comply or to smuggle, given the probability inspection of the authorities.

The importers could possibly randomize their strategies if both strategies give them the same payoff, that is, if they are indifferent. A simple calculation reveals that the importers are indifferent if the authorities inspect with probability 0.8642, since then the expected payoff for smuggling is 0.1538 x 27.5% + 0.8642 x (-37.5%) = -27.5%, which is then the same as the payoff for complying! Hence the importers can mix their strategies without losing payoff.

Using the same logical reasoning, the original mixed strategy of the authorities is a best response is if the authorities are indifferent. This requires the importers to choose comply with probability 0.9615. The expected payoffs to the authorities are then for "do not inspect" 0.9615 x 27.5 + 0.0385 x (-27.5%) = 25.4%, and for "inspect" 0.9615 x (25.5%) + 0.0385 x (22.5%) = 25.4%, so that the authorities course of action is indifferent, and this is a best response to the mixed strategy of the importers.

COMBATING SMUGGLING: HARSH PUNISHMENT OR MORE INSPECTION?

It is always tempting for the authorities to choose easier ways to fight smuggling by applying harsh punishment when they caught the smugglers red handedly. If, for example, 100% penalty when caught is applied instead of 37.5%, then does it lower the incentive to smuggle? Unfortunately it does not. What does change is the probability of inspection, which is reduced until the importers are indifferent. The circular flow in Figure 2 still indicates that the authorities do not have a dominant strategy to combat the smugglers.

			IMPORTERS	
			comply	cheat
AUTHORITIES	don't inspect		(27.5, -27.5)	(-27.5, 27.5)
	inspect		(25.5, -27.5)	(22.5, -100)

Figure 2 Application of Harsh Punishment

Once the authorities apply maximum penalty (i.e. 100%), then Table 1 shows that importers will be indifferent if the probability to inspect is reduced to 0.4314 (that is lower than 0.8462). It is indicated that maximum punishment still can not deter smuggling.

Table 1 Reduction of The Inspection Probability before The Smugglers Indifferent

Prob. To Inspect	Payoffs to the Importers	
	Comply	Cheat
1.0000	-27.5%	-100.0%
0.9000	-27.5%	-87.3%
0.8462	-27.5%	-82.7%
0.6000	-27.5%	-49.0%
0.4314	-27.5%	-27.5%
0.4000	-27.5%	-23.5%
0.3000	-27.5%	-10.8%
0.2000	-27.5%	2.0%
0.1000	-27.5%	14.8%
0.0000	-27.5%	27.5%

Given the above mentioned API's 2007 data that Indonesian domestic consumption of apparel is 1.22 tons, supply from local manufacturers is 270,000 tons, and reported imported apparel 88,000 tons, thus it was estimated that there are indicated illegally imported apparel amounted 862,000 tons, then what is the best action for the authorities to combat smuggling? Setting up maximum penalties or to perform more inspection? Table 2 shows that with the probability to cheat of 0.9074, then the best action for the authorities is clear: do the inspection.

Table 2 The Need to Inspect for The Authorities

Prob. To cheat	Payoffs to the Auth.	
	Don't inspect	Inspect
1.0000	-27.5%	22.5%
0.9074	-22.4%	22.8%
0.7000	-11.0%	23.4%
0.6000	-5.5%	23.7%
0.5000	0.0%	24.0%
0.4000	5.5%	24.3%
0.3000	11.0%	24.6%
0.2000	16.5%	24.9%
0.1000	22.0%	25.2%
0.0000	27.5%	25.5%

CONCLUSION

Game theoretic concepts that exploit payoff matrix (that resembles incentive for two interacting parties) are indeed very effective tool to construct framework of analysis in describing the course of actions of interdependent agents in the Indonesian customs inspection game. When the game has mixed equilibrium, probability of one player to take one strategic action does not depend on the opponent's payoffs (i.e. setting up maximum penalty). What does change is the probability of the opponent's strategic actions.

REFERENCES

Avenhaus, R. & M.J. Canty. 2005. *Compliance Quantified*. Cambridge University Press. Cambridge

Aumann, R. J. 2006. War and Peace. *Discussion Paper* #426, Center for the Study of Rationality, The Hebrew University of Jerusalem.

Aydinonat, N. E. 2005. An interview with Thomas C. Schelling: Interpretation of game theory and the checkerboard model. *Economics Bulletin* 2 (2), 1–7.

KOMPAS. (1/3/2008). *Garmen Lokal Kian Tergerus*. Rubrik Bisnis & Keuangan, hal 19.

Stengel, B.V. & T.L., Turocy. 2001. *Game Theory*. CDAM Research Report London School of Economics – CDAM – 2001 – 09.