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Incentives on the Road: Multitask Principal-Agent Problem and Traffic Accidents in the Trucking Industry

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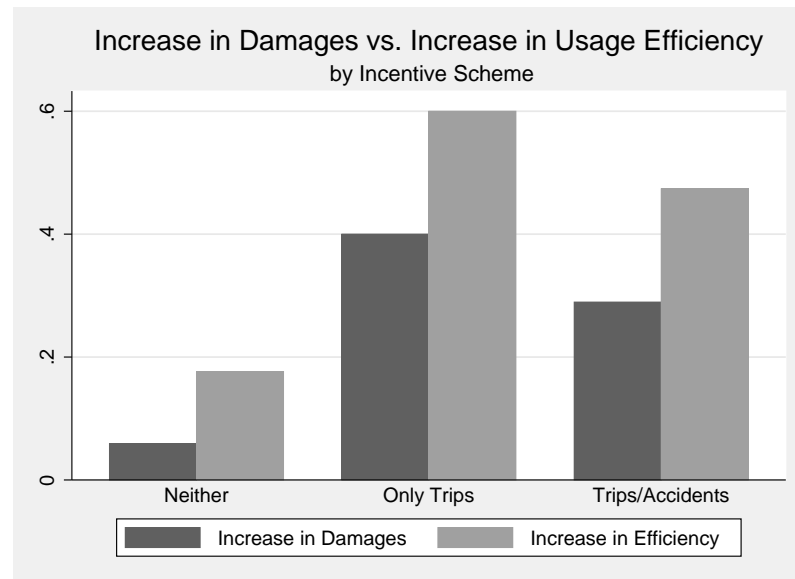
Paper Title	Incentives on the Road: Multitask Principal-Agent Problem and Traffic Accidents in the Trucking Industry
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Keywords	Incentives, Multitasks, Traffic accidents, Personnel Economics, Thailand.

Background The trucking services industry plays an essential role of connecting East Asian production networks, i.e., producers of raw materials, intermediate inputs, final goods, and retailers within and across industrial clusters. The quality of services of the trucking industry affects significantly efficient flow of goods and embodied technologies of goods in agriculture, manufacturing and other service sectors. Rapid industrial development has been increasing cargo traffic within and across East Asian countries. In tandem with the rapid industrial development and motorization, traffic accidents have been increasing in developing countries including ASEAN member states. Road traffic kills approximately 1.24 million people on the world's roads (WHO 2013), which are as many people as malaria does. Although the situation of road safety in developing economies is getting worse, there is a huge disparity in road traffic death rate between developing and developed countries, and among developing countries. For example, the rate for Thailand is almost double of the Indonesia, while the rate for Japan is much lower than these ASEAN member states (38.1 for Thailand vs. 17.7 for Indonesia vs. 3.8 for Japan). Estimated GDP loss due to road traffic death for developing economies is also higher than that for developed economies. This enormous social transportation cost indicates huge potential savings from keeping road safety for developing economies. Furthermore, the logistics cost was about 15.2% of the GDP in Thailand.

Method, data, and results This project explores the questions how incentives matter in multi-task model. This paper tackles this questions to utilize the context and data from the Trucking services industry in Thailand. Thus, we specify the questions using the institutional setting of the Trucking Industry as follows: (1) Does high-powered incentive for speeding-up affect safety-driving?; (2) What does determine choice of incentive schemes? To achieve research objectives, the authors conducted qualitative case studies and empirical analysis on the firm-level production efficiency and road safety (injuries and damages) of the Trucking service industry by running the unique and original survey to the trucking services companies located in the Greater Bangkok Area in Thailand. This project derives hypotheses from field interviews, tests the hypotheses by using the unique and original dataset, and shows direct evidences of bottlenecks and obstacles to improve efficiency and occupational safety in logistics services industry. The interview-based qualitative study allows us to derive following testable hypotheses for empirical analysis. We run firms visits, interviews, and follow-up survey and we randomly selected 200 companies in the Greater Bangkok. We finally investigate 68 companies to test the hypothesis using the context of observed large variations within narrowly defined industries.

The key outcomes of the research are firm's self-reported changes in accidents, operation efficiency and profitability during the last 3 years. The key explanatory dummy variables are choices and adoptions of **performance-based incentive payment** scheme for speeding-up and safety as follows: (1) Neither; (2) Only for speeding-up (i.e., #trips); (3) Speeding-up (i.e., #trips) + Safety (accidents). Then, we examine the determinants of incentive schemes. The results shows that incentives matter. First, we find that *no incentive payments, less damages and less productive*. Second, we show that *incentives for only speeding-up, more damages of cargos, but more productive*. Third, we also find that *incentives for safety with speeding can mitigate the trade-off, but no significant link between profitability and choice of incentive scheme*. These are summarized in Figure 1. Finally, we asks where incentives come from and we find that large-scale demand makes trucking companies not to choose incentive contract with drivers. Let us interpret our findings. According to Holmström and Milgrom (1991), we show that high powered incentives such as bonus for speed (trips) may induce drivers to focus too much on the incentivized task to the detriment of other tasks, which could include safe driving.

Figure 1: Less speeding-up, less damages, less efficiency



Source: Author's calculations.

Policy implication This paper derives some lessons toward detecting bottlenecks and obstacles to foster productive networks in East Asia from a viewpoint of the relationship between logistics firms' capabilities and road safety. This project is also aiming to provide lessons and policy implications for road safety and global health from a viewpoint of microeconomics: managerial inputs; employment conditions and incentive scheme for the truck drivers; contractual relationship between the trucking service companies, consignors, and consignees. It is very important to understand whether trucking firms are exclusively efficiency-seeking, or whether they are more profitable by seeking both efficiency and social responsibility.

This study takes into consideration the providers-consignors relationship that may affect their decision on adopting new technologies to the domestic service providers and transferring existing technologies, as well as choosing target markets and input sources within and across borders. To answer these policy-oriented questions and broader audiences, this study can provide a set of new and concrete evidences on the impacts of management practices in the Trucking industry. The empirical results of this paper suggest that we must face up to the fact that truck drivers have a **multi-task agency problem** on the road between speeding and safety. Thus, balancing incentives scheme can mitigate the serious trade-off between *efficiency vs. risks* in the industry. The main take away and implication of this paper is as follows: A misalignment of incentives within firms is an important cause of traffic accidents, but how to achieve organizational changes (wage contracts) and technological innovation (monitoring technology) smoothly in developing economies.

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