

## **ECONOMICS OF EMISSION TRADING IN THE CONTEXT OF KYOTO PROTOCOL FOR GREENHOUSE GAS REDUCTION.**

KISHORE K DHAVALA; MAHADEV BHAT  
*FLORIDA INTERNATIONAL UNIVERSITY.*

This paper analyzes the failures of the Kyoto Protocol and its consequences on ongoing and future international climate change agreements. The ineffectiveness of the Kyoto Protocol was probably due to a lack of agreement between potential buyers and sellers regarding permit prices, and of course, the lack of enforcing authority. Therefore, in this paper we explored how these factors are critical in motivating member countries to reach, and abide by, an emission control agreement. During phase I, of the Kyoto Protocol agreement, the countries of the FSU (former Soviet Union) acquired enormous number of permits which allowed them to monopolize the emission sellers market. The U.S., despite being one of the largest emitters, did not ratify the protocol during phase-I due to political and domestic interests. However, recent developments in the U.S. environmental policy are signaling towards the participation of the U.S. in emissions trading program. Considering the current scenario, if the U.S. participates in the emissions trading, it will become the largest buyer. If both the FSU and the U.S. participate in the program it will lead to a situation where both parties will attempt to exert market power. The US might emerge as a monopsony (single buyer) while FSU as a monopoly (single seller).

Under the above situation, it is plausible that both buyer as well as the seller may have a disagreement over the emission prices. Where, US as a monopsonist would try to procure a price lower than the competitive price, FSU as a monopoly would attempt to fetch a price higher than the competitive price. We analyzed the above buyer and seller prices in relation to a competitive market price that might occur when both cooperate. . We developed a dynamic differential game which takes into consideration, both buyers and sellers (Annex I countries listed in Kyoto Protocol). We analyzed the circumstances under which the two parties may fail to reach a permit trading agreement by characterizing and comparing their non-cooperative and cooperative price and emission paths. We investigated the market outcomes especially the net abatement cost savings for the buyer and net permit revenue for the seller if and when there is a mutually agreeable trade.

This paper also address the question to what extent the emission abatement technologies, which determine countries' abatement costs, will influence the gap between the monopoly and monopsony prices and the level of difficulty that arises for reaching a cooperative agreement. We use dynamic optimization technique to analyze the optimal price paths of the two players, assuming that each tries to optimize the respective payoff function. This model will also allow us to test the effect of declining emission cap overtime on the market power. Further, based on existing studies, we developed estimates of the marginal abatement costs for each country and numerically solved for the non-cooperative (individual optimal prices) and cooperative prices (market price) over time.