

The Hong Kong University of Science and Technology
Department of Information Systems,
Business Statistics and Operations Management

Seminar Announcement

*An Analysis of Coordination Mechanisms for the
U.S. Cash Supply Chain*
by

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Date: Friday, 18 December 2009

Time: 11:00 – 12:30 pm

Venue: Room 4379, ISOM Conference Room (Lift 17/18)

~~~~~ All interested are welcome ~~~~~

**Abstract:**

The overuse of its currency processing facilities by depository institutions (DIs) has motivated the Federal Reserve (Fed) to impose its new cash recirculation policy. This overuse is characterized by the practice of cross-shipping, where a DI both deposits and withdraws cash of the same denomination in the same business week in the same geographical area. Under the new policy, which came into effect from July 2007, the Fed has imposed a recirculation fee on cross-shipped cash. The Fed intends to use this fee to induce DIs to effectively recirculate cash so that the societal cost of providing cash to the public is lowered.

To examine the efficacy of this mechanism, we first characterize the social optimum and then analyze the response of DIs under a recirculation fee levied on cross-shipped cash. We show that neither a linear recirculation fee, which is the Fed's current practice, nor a more sophisticated non-linear fee is sufficient to guarantee a socially optimal response from DIs. We then derive a fundamentally different mechanism that induces DIs to self-select the social optimum. Our mechanism incorporates a fairness adjustment that avoids penalizing DIs that recirculate their fair share of cash and rewards DIs that recirculate more than this amount. We demonstrate that the mechanism is easy to implement and tolerates a reasonable amount of imprecision in the problem parameters. We also discuss a concept of welfare-preserving redistribution wherein the Fed allows a group of DIs to reallocate (amongst themselves) their deposits and demand if such a possibility does not increase societal cost. Finally, we analyze the impact of incorporating the custodial inventory program, another component of the Fed's new policy.

**Biography:**

Mili Mehrotra is currently a PhD student in the Department of Operations Management at The University of Texas at Dallas. She holds BS and MS degrees in Mathematics. Her research interests are in supply chain management, discrete models in operations management; in particular, service operations, production planning and logistics. Her papers have been accepted in leading academic journals such as *Management Science* and *Production and Operations Management*. Title of her dissertation is "*Emerging Coordination and Optimization Issues in the U.S. Cash Supply Chain*".