1. Segment Disclosure, Internal Resource Allocation, and Investment Efficiency

Does the management approach to segment reports distort internal resource allocation and the welfare of investors? To address this question, I focus on two aspects of multi-segment firms: i) the tension between the CEO and divisional managers over cash compensation and ii) another tension between the investor and the CEO over the efficient allocation of capitals. In order to address these two aspects, I propose a model where there is a two-tier agency problem between outside investors and a CEO and between the CEO and divisional managers. By extending the two-tier agency framework of Scharfstein and Stein (2000), my model shows the tradeoff of the aggregation of segment reports between the reduction in the efficiency of internal capital allocation and the saving of cash compensation to divisional managers. The model suggests that the overall gains between the two opposing forces are nontrivial and explains the possible drawbacks to the universal adoption of the disaggregation of segment reports such as SFAS 131 / IFRS 8. To sum up, the key message of the paper is that the disclosure policies on segment reports need to be understood in the broader context of internal capital allocation and the theory of the firm.

2. Intra and Inter-firm Accounting System: Quadruple Entry Bookkeeping Perspective

With Pierre Liang and Jing Li, I investigate the intra and inter-firm information structure using the framework of quadruple-entry bookkeeping (Ijirj 1965, etc). By extending the single-firm double-entry bookkeeping system into multiple-firm quadruple bookkeeping network framework, we can better understand how transactions are related within each firm and among multiple firms simultaneously. We show constructively how inferences about the underlying inter-firm transactions can be improved using the generalized inverse of an incidence matrix, and we provide a graphical representation of “quadruple incidence matrix”. We also show how a quadruple incidence matrix is converted into an adjacency matrix so that we can calculate not only the centrality of a firm in a network, but also the centrality of accounts of a firm. The main purpose is to better understand the backbone of double-entry bookkeeping using the language of linear algebra.

3. Ambiguity Aversion and a Theory of the Firm

Do firms keep or spin off internal divisions if investors are averse to ambiguity? With Jack Stecher and Jing Li, I show that firms may have incentives to keep multiple divisions inside as a means to minimize the adverse effect of ambiguity aversion. The basic intuition is the following. Ambiguity-averse investors take the worst-case scenario. If two divisions are separate, ambiguity-averse investors take the worst case of each division. However, if two divisions are held within a company, investors take the worst-case scenario of the combined divisions. Because of the convex nonadditive probability
feature, there is a possible benefit of holding multiple divisions together to reduce ambiguity about the future payoffs and increase the market value of the firm. Investors can also reduce ambiguity by holding a portfolio of multiple firms, but firms decide to keep multiple divisions inside first. This removes investors' chances to hold a portfolio. It is shown that firms have incentives to keep multiple divisions inside even if we assume that firms are more efficiently run without internal diversification. In this case, investors are worse off since i) internal diversification decreases firms' productivity and ii) investors could have diversified by themselves. This result arises because firms only take care of increasing the valuation of the company and do not consider investors' welfare. This framework provides an insight behind the role of ambiguity as an explanation for the existence of firms with multiple divisions.