# Informed Seller Problem—Signaling, Information Design, and Mechanism Design

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**Abstract**

This thesis studies an informed seller problem in which the seller tries to signal her private information through different channels—information disclosure, selling mechanism and return policy.

Chapter 1 analyzes the signalling effect of information disclosure and price posting. Any separating equilibria must have the two types of seller setting different disclosure rules as well as different prices. Furthermore, the outcome that survives the intuitive criterion always exists and is unique. This equilibrium outcome is separating, for which a closed-form solution is provided. The signaling concern forces the high-type seller to disclose an inefficient amount of information and charge a higher price, resulting in fewer sales and lower profit. A regulation on minimal quality could potentially damage social welfare.

In chapter 2, the seller is allowed to design a grand mechanism in which she herself participates in addition to information disclosure. The RSW (Rothschild-Stiglitz-Wilson) mechanism is fully characterized, in which each type of seller separates at the lowest cost. In this mechanism, the low-type seller sells to the buyer with certainty and leaves zero surplus to the buyer. The high-type seller discloses to the buyer whether his value is above a cutoff, sets a payment difference equal to the conditional expected value, and provides a nonnegative bonus. Furthermore, the RSW mechanism can always be supported as a PBE and its outcome is the unique PBE outcome under certain conditions. Finally, the RSW mechanism always survives the Intuitive criterion, and is the unique one under certain conditions.

Chapter 3 studies an second-price auction with return policies. It starts with binary type. In the separating equilibria, the high-type seller's return policy needs to be generous enough to deter the low-type seller from mimicking. Notably, a better return policy may not correspond to a better type. In the pooling equilibria, the return policy cannot be too generous. All separating equilibria have the same outcome and all survive Eso and Schummer's [24] credible deviation criterion while all pooling equilibria fail. Separation is costless and efficient. Similar results apply when sellers have multiple types.

# CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Yanlin Chen, declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy in Economics, in the Economics Discipline Group at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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# Format of Thesis

This is a thesis by compilation.

It includes the following papers:

1. Bayesian Persuasion and Mechanism Design by an Informed Seller (sole author)

This paper is written all by myself.

2. On the Informed Seller Problem: Signaling by Bayesian Persuasion and Pricing Strategies (with Jun Zhang) (submitted for publication)

This paper is joint with Jun Zhang. All authors in the joint works have equal contribution.

3. Costless Signaling in Auctions with Return Policies (with Ruqu Wang and Jun Zhang)

This paper is joint with Ruqu Wang and Jun Zhang. All authors in the joint works have equal contribution.

**Ruqu Wang Signature:** Production Note:

**Jun Zhang Signature:** Signatures removed prior to publication.

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