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Transaction costs and a redundant security: divergence of individual and social relevance ¹

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Abstract

This paper shows that, in markets with transaction costs, even if a redundant security does not even save individual investors' total costs for their security trading, the prices of the other securities may well be different were it to not be available for trade, resulting in a different equilibrium consumption allocation. In this sense, a redundant security may give rise to the divergence of individual and social relevance in markets with transaction costs. We then show that this divergence may also be a robust phenomenon with respect to perturbations in utility functions, initial endowments, and transaction costs. © 2000 Elsevier Science S.A. All rights reserved.

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¹ Part of the contents of this paper was contained in 'Transaction costs and a redundant security: Divergence of individual and aggregate cost saving' and 'Robustness of the coordinating role of a redundant security'. An example of the same nature as that of Section 4 was first given in the appendix to Chapter 3 of my Ph.D. thesis submitted to Harvard University.

1. Introduction

1.1. Overview of the results

In this paper, we investigate the risk sharing role of a redundant security in markets with transaction costs. We use a fairly simple model of security markets with transaction costs. We assume: an exchange economy under uncertainty, with a single consumption good and two periods; securities in zero net supply; transaction costs incurred in the first period and proportional to transaction volumes, with no fixed costs; and symmetric information.

The first risk sharing role of a security is the spanning role: a security provides consumers with the risk-hedging opportunities that they could not enjoy by using any portfolio of the other securities. A security without this role is called redundant.

A second role emerges in the presence of transaction costs. It is referred to as the cost saving role: even when the same risk-hedging opportunity is provided by some portfolio of the other securities, such a portfolio may be more costly for consumers than the redundant security. Note that this discrepancy in prices need not result in arbitrage opportunities in the presence of transaction costs.

The first purpose of this paper is to show by means of an example that even if a redundant security does not have the cost saving role for individual consumers, the prices of the other securities may well be different were it to be unavailable for trade, resulting in a different equilibrium consumption allocation. In short, the redundant security is individually irrelevant but socially relevant. The possibility of this pecuniary externality by a redundant security on the others should not surprise us once we understood the role of transaction costs. Nevertheless, it is a significant effect, one that should not be forgotten, and it is worthwhile to present a work-out example in a simple model. An immediate, technical implication of this result is that there is no straightforward extension of the no-arbitrage equilibrium presented in Magill and Shafer (1991), which is an analytically simple tool to study frictionless incomplete security markets, to markets with frictions, because whether a budget set can arise at equilibrium depends now on which securities span it in the presence of transaction costs. The pecuniary externality should thus not be ignored in the abstract price functional approach to derivative asset pricing with transaction costs taken by Bensaid et al. (1992) and Jouini and Kallal (1995a); Jouini and Kallal (1995b); Jouini and Kallal (1995c); we shall elaborate on this point in the next subsection.

The second purpose of this paper is to show that this *divergence of individual and social relevance* (DISR) is a robust phenomenon. More specifically, starting from a security market equilibrium at which a redundant security gives rise to the divergence, even if the consumers' utility functions and initial endowments and the proportional transaction costs of the securities are perturbed, there is a new

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