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Notes

Net trade and market efficiency in Grossman and Stiglitz (1980) ☆

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Abstract

In this paper, we correct part (b) of Theorem 6 of Grossman and Stiglitz (GS, 1980). We demonstrate that when the private signal tends to be perfect, the market converges to strong-form efficiency, and thus informed and uninformed traders have almost homogeneous beliefs about the stock payoff, but there is still significant net trade, rather than no trade as erroneously shown by GS. We further show that when the stock price becomes more informative, and thus traders' beliefs about the stock payoff become closer, the net trade may increase.

JEL classification: G10; G12; G14

Keywords: Net trade; Traders' beliefs; Market efficiency; The Grossman–Stiglitz model

1. Introduction

Grossman and Stiglitz (GS, 1980) develop a competitive equilibrium asset pricing model with asymmetric information between informed traders who acquire a private signal about the stock

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payoff at a cost and uninformed traders who extract a noisy version of the private signal freely from the stock price. Theorem 5 of GS shows that when the private signal is perfect, there is no equilibrium, leading to the famous result on the impossibility of informationally efficient markets. In part (b) of Theorem 6, GS further show that when the private signal tends to be perfect, the stock price tends to be fully revealing, but the net trade, which is equal to informed traders' net demand or uninformed traders' net supply, converges to zero. GS then conclude that

> *"Thus, the result that competitive equilibrium is incompatible with informationally efficient markets should be interpreted as meaning that speculative markets where prices reveal a lot of information will be very thin because it will be composed of individuals with very similar beliefs."*

GS further conclude that when the private signal is perfect, the market breaks down naturally due to lack of trade.

However, we find that part (b) of Theorem 6 of GS is incorrect, and thus the associated explanations are also incorrect. Our corrected Theorem 6 shows that when the private signal tends to be perfect, there is still significant net trade in the market, which converges to the innovation of the noisy supply, i.e., the noisy supply minus its expectation. Our corrected Theorem 6 implies that when the market converges to strong-form efficiency and thus traders have almost homogeneous beliefs about the stock payoff, there is still significant net trade. That is, a competitive equilibrium is compatible with an informationally efficient market in the limit. In addition, when the private signal is perfect, the market breaks down due to the competitive assumption rather than "thinness" or "lack of trade." In particular, our results hold for any finite information costs, which affect only the rate of convergence in our various limiting results.

When the price tends to be fully revealing, all traders have almost homogeneous beliefs about the stock payoff. Because traders have the same endowment and the same risk preference, one may think that traders' demands for the stock should converge and thus the net trade in the market should vanish. This thinking, however, is not necessarily correct.

A trader's optimal demand for the stock depends on the trade-off between his conditional expected profit per share and his conditional risk per share. Because the price tends to be fully revealing, the conditional expected profits per share of the informed trader and the uninformed trader converge to zero. Because informed traders observe the private signal directly, the expected profit per share of the informed trader converges to zero in a lower order than that of the uninformed trader. In addition, the conditional risks per share of both the informed and the uninformed trader converge to zero in the same order. As a result, in equilibrium, the informed trader's optimal demand converges to infinity, but the uninformed trader's optimal demand converges to a finite quantity. Consequently, although the fraction of informed traders goes to zero, significant net trade exists in the market.

It is interesting to note that when the price tends to fully reveal the private signal, informed traders are still willing to pay for it. The intuition of this result is as follows. The informed trader observes the private signal directly but the uninformed trader has to learn the private signal from the stock price. When the price tends to be fully revealing, the uninformed trader's information, which is inferred from the price, converges to the true private signal, but it is still infinitesimally inferior to the private signal itself. In other words, the difference between the uninformed trader's information and the private signal converges to zero, but it is not zero. As a result, it remains worthwhile for a small number of traders to buy information because they are able to cover the cost by trading infinitely aggressively to exploit the infinitesimal mispricing that remains.