



# Asymmetric information in bilateral trade and in markets: An inversion result <sup>☆</sup>

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## Abstract

I consider bilateral trade between a seller and a buyer with private valuations. The seller makes a take-it-or-leave-it price offer. If the seller observes the buyer's valuation (symmetric information), bilateral trade is trivially efficient. If the seller cannot observe the valuation (asymmetric information), bilateral trade is inefficient. This bilateral trading game is embedded into a large matching market. In the steady-state equilibrium of the market game, the relation between the informational regime and efficiency is inverted: With small frictions efficiency obtains if information is asymmetric. If information is symmetric, however, the trading outcome can be very inefficient—even if frictions vanish.

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## 1. Introduction

Asymmetric information prevents efficient bilateral trade. This paper revisits this insight if bilateral trade is embedded in a large market. I compare the efficiency of the trading outcome with asymmetric information and with symmetric information for different levels of market integration. I derive an inversion result: when bilateral trade is well integrated into a large market, it can be *symmetric* information that prevents efficiency.

Understanding the relation between efficiency and the information available to traders is important for market design and has implications for work on consumer privacy. Consumer privacy aims at withholding information from sellers.<sup>1</sup> Conventional economic intuition derived solely from the detrimental effects of asymmetric information for bilateral trade might give the misleading impression that there should be as little privacy as possible from an overall welfare perspective. The current paper demonstrates to the contrary that rents generated by price discrimination can lead to severe welfare-reducing distortions.

I study a model of search in which bilateral trade is embedded in a dynamic market. There is a continuum of buyers and sellers. Sellers place zero valuation on an indivisible good and buyers have positive valuations. The traders are matched into pairs at the beginning of each period. Within each pair, they bargain bilaterally. Each trader is chosen with some probability to make a take-it-or-leave-it price offer. The pairs are connected by allowing an unsuccessful trader to be matched with another partner in a new pair in the next period. There is an exogenous probability  $\delta$  that a trader cannot enter the next period and exits (dies). The market is kept in steady state by an exogenous flow of newly arriving traders. One can interpret the exit rate as a measure of market integration or friction. The model nests bilateral trade between isolated agents as a special case when the exit rate is one.

The analysis becomes particularly transparent when only sellers make price offers. I study this case as a benchmark and compare two information environments. First, with symmetric information, a seller observes the valuation of the buyer before making an offer and can perfectly price discriminate. Secondly, with asymmetric information, the seller does not observe the buyer's valuation. I characterize the welfare properties of equilibrium in the benchmark model for different levels of the exit rate in each information environment. Fig. 1 illustrates the inversion result graphically: When the exit rate is large, welfare is lower with asymmetric information. This observation is not surprising. When the exit rate is small, however, welfare is larger with asymmetric information. This result is new.

To illustrate the comparative static analysis of welfare for different levels of frictions, I consider extreme exit rates. When the exit rate is one, continuation payoffs are zero. With symmetric information, this implies that sellers trade whenever the buyer's valuation exceeds their private cost of selling; hence, the outcome is first-best efficient. With asymmetric information, however, the outcome is necessarily inefficient. Sellers offer the monopolistic price, which is rejected by low valuation buyers. At the other extreme, when the exit rate vanishes to zero, the essential intuition for the welfare comparison stems from the difference in the sellers' continuation profits. With symmetric information, sellers engage in perfect (first-degree) price discrimination and extract the entire surplus from buyers. This is shown to imply that sellers' continuation profits stay positive even in the limit. Therefore, sellers are not willing to trade their good with buyers

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<sup>1</sup> For a discussion of the economics of consumer privacy see [27].

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