

The Bright Side of Dark Markets: Experiments

Edward Halim¹; Yohanes E. Riyanto²;
Nilanjan Roy³; Yan Wang⁴

^{1,2,4}Nanyang Technological University

³City University of Hong Kong

ABSTRACT

We design an experiment to study the effects of dark trading on incentives to acquire costly information, price efficiency, market liquidity, and investors' earnings in a financial market. When the information precision is high, adding a dark pool alongside a lit exchange encourages information acquisition, crowds out liquidity from the lit market, and results in a non-linear relationship between price efficiency and dark pool participation. At modest levels, dark pools enhance information aggregation. Investors with stronger signals use the lit exchange relatively more, and uninformed traders are better off when they trade more in the dark pool.

FULL TEXT

Kindly scan the QR code below to access the full text:



CONTACT

Yan Wang
Division of Economics, Nanyang Technological University
yan006@e.ntu.edu.sg

INTRODUCTION

In the last few decades, there has been a proliferation of equity trading systems, among which dark pools have rapidly grown in popularity.

In a **dark pool**, investors can buy and sell stocks **without publicly displaying their orders**. As opposed to traditional stock exchanges, these dark venues **lack pre-trade transparency**. Traders in dark pools submit buy and (or) sell orders, and trades are executed using prices derived from the exchanges.

In January 2023, dark venues accounted for **13.75% of US equity trading volume** (Rosenblatt Securities: Let There Be Light - US Edition).

RESEARCH QUESTIONS

Dark pools have raised regulatory concerns in that they may harm price discovery in financial markets. Before the Securities Traders Association's 82nd Annual Market Structure Conference in Sep. 2015, then-SEC-Commissioner Kara M. Stein mentioned that "as more and more trading is routed to dark venues that have restricted access and limited reporting, I am concerned that overall market price discovery may be distorted rather than enhanced."

- Given that markets are now fragmented, and a substantial portion of the liquidity is anticipated to be hidden, does the **incentive to acquire costly information** about stock fundamentals increase compared to the benchmark of a centralized trading institution with full pre-trade transparency?
- How does the **relative usage of the dark pool** vis-à-vis the lit exchange depend on the relative **strength of private information held by an investor**?
- Are **informational efficiency** of prices and **market quality** necessarily degraded when dark trading occurs?

EXPERIMENT DESIGN

Table I. Treatments

Treatment	Trading Institution	Information Precision	No. of Sessions	Total Subjects
<i>Lit Only - Low</i>	Lit Only	Low	6	72
<i>Dark - Low</i>	Dark	Low	6	72
<i>Lit Only - High</i>	Lit Only	High	6	72
<i>Dark - High</i>	Dark	High	6	72

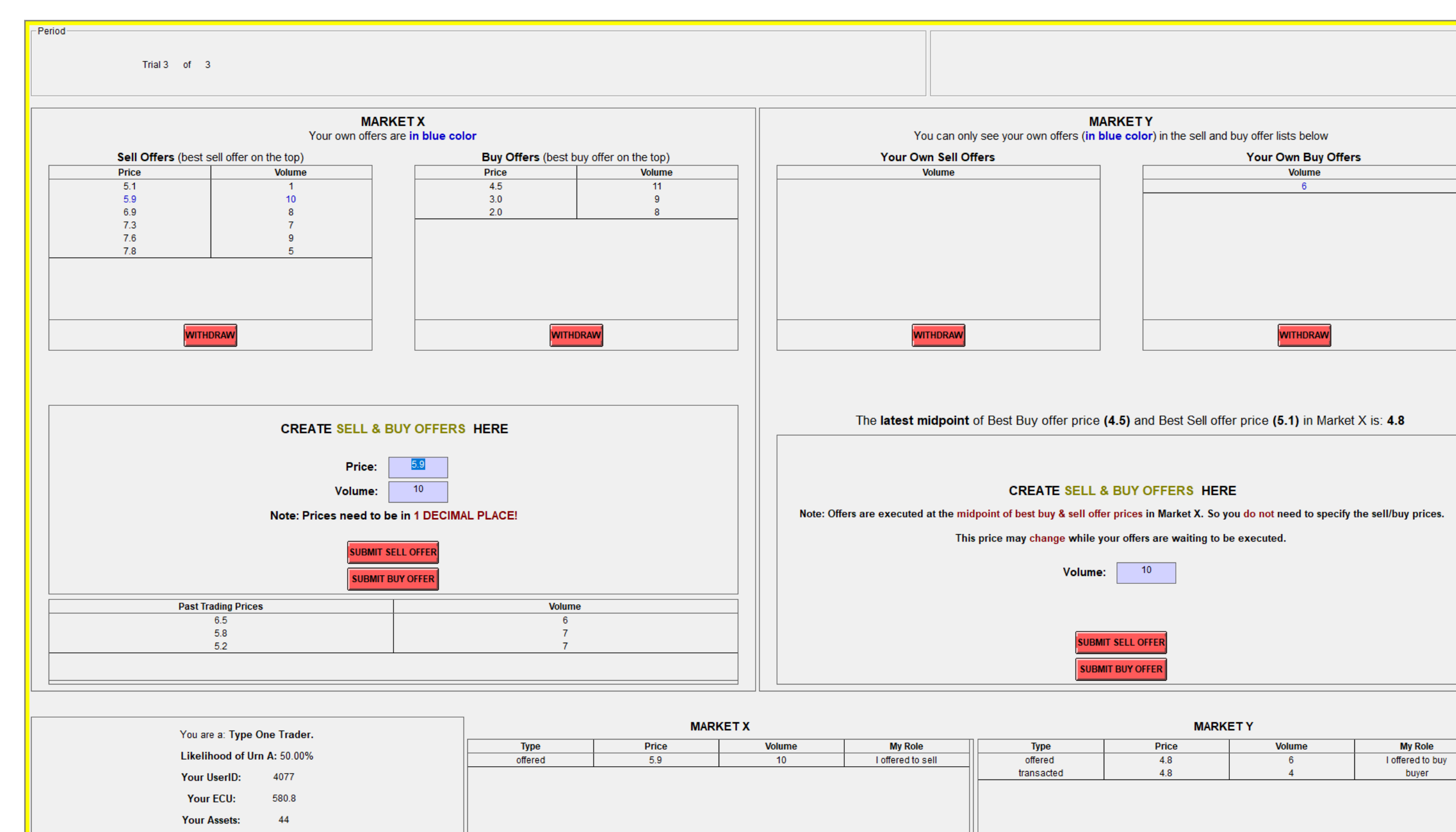
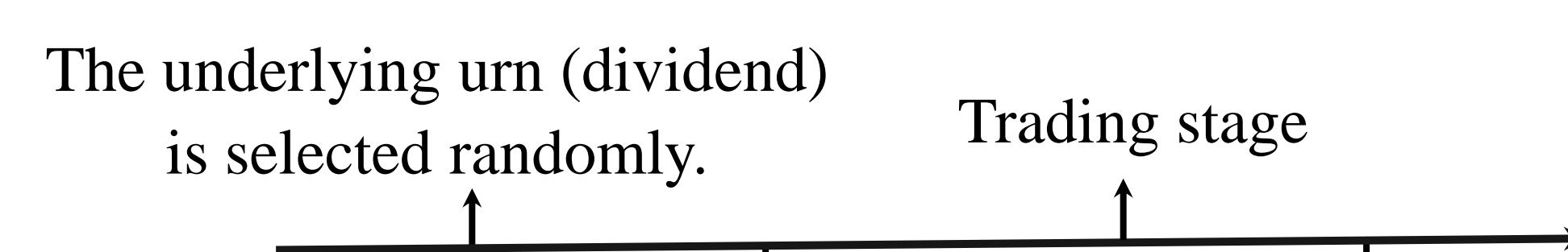


Figure 1. Trading Interface in the Lab (*Dark*)

Timeline of One Period



Traders will then choose how many signals to acquire. Signals acquired will then be revealed to the participants themselves.

The underlying urn (dividend) is revealed and payoff for the period is computed.

RESULTS

RESULT 1: The addition of a dark pool alongside a lit exchange increases costly information acquisition (**information acquisition effect**).

Table II. Period-Average Information Acquisition Summary Statistics

	<i>Lit Only - Low</i>	<i>Dark - Low</i>	<i>Lit Only - High</i>	<i>Dark - High</i>
S_{mkt}	39.34 (8.66)	43.62 (9.37)	30.82 (8.35)	35.26 (6.31)
N_{mkt}	6.51 (1.22)	7.01 (1.00)	6.19 (1.57)	6.75 (1.04)
θ_{mkt}	46.67% (11.09%)	48.06% (11.06%)	46.81% (13.54%)	48.26% (10.96%)
No. of observations	120	120	120	120

RESULT 2: Traders with stronger signals have a relatively lower dark pool usage when the information precision is high (**sorting effect**).

RESULT 3: When a dark pool is added alongside a lit exchange, compared to the lit-only market, the total transaction volume remains unchanged while there is a decline in the volume of transactions at the lit exchange. This observation holds irrespective of the information precision of signals (**crowding out effect**).

RESULT 4: When information precision of signals is high, compared to the lit only market, the addition of a dark pool improves (worsens) information aggregation in the lit market when dark pool participation is modest (very high). **There is a non-linear relationship between dark market participation and the ability of prices at the lit market to aggregate available information.**

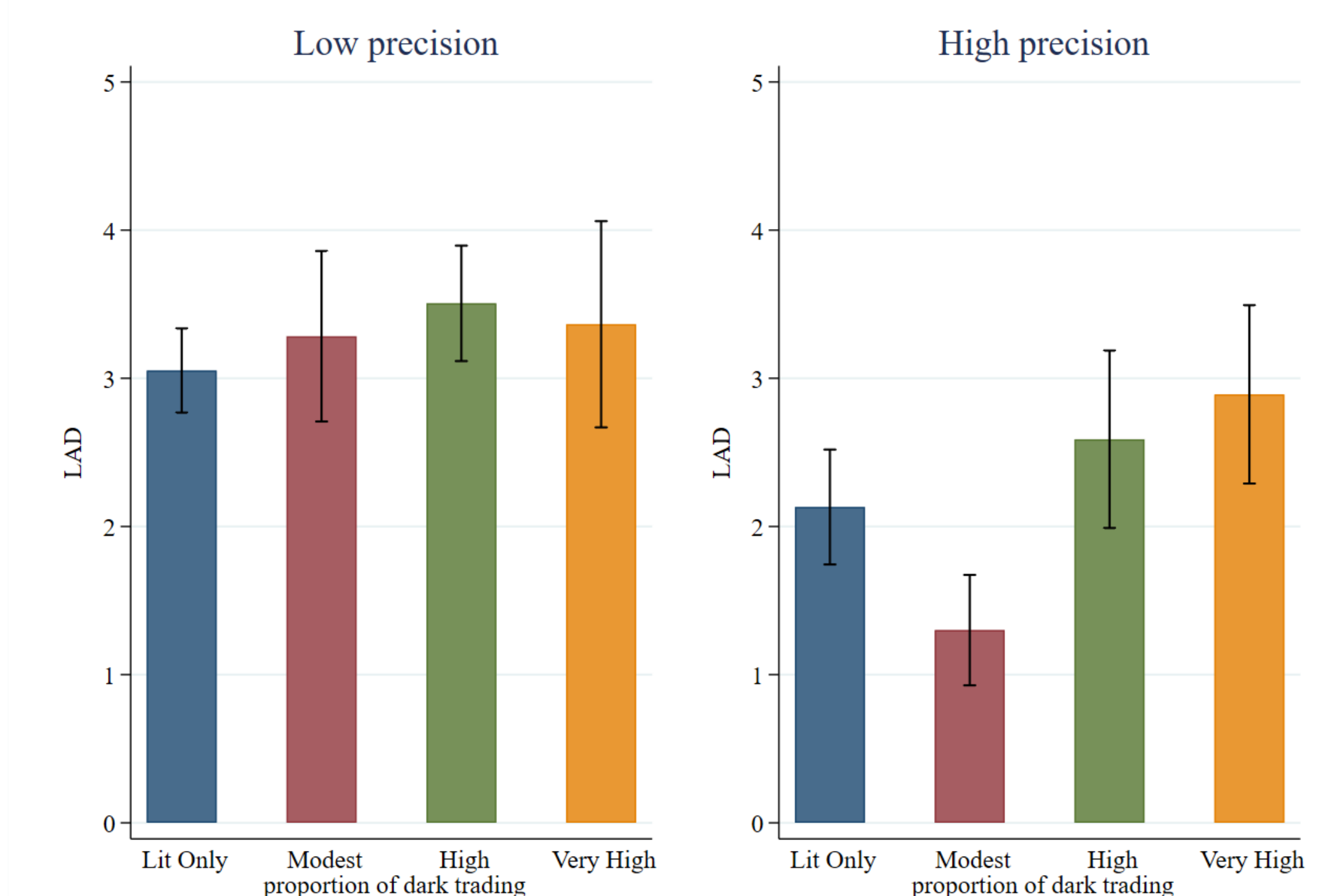


Figure 2. Linear Absolute Deviation (LAD) in the Lit Market

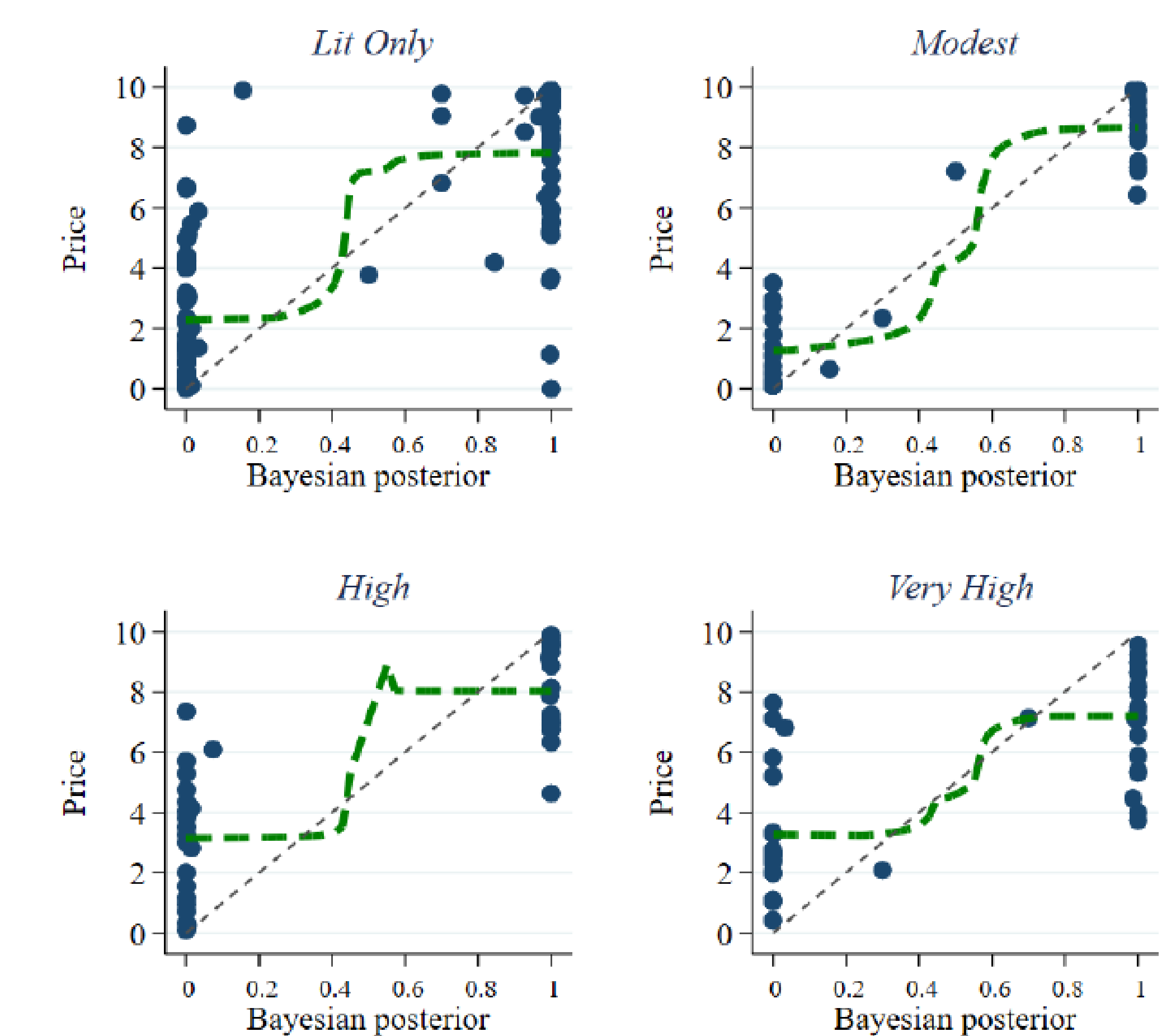
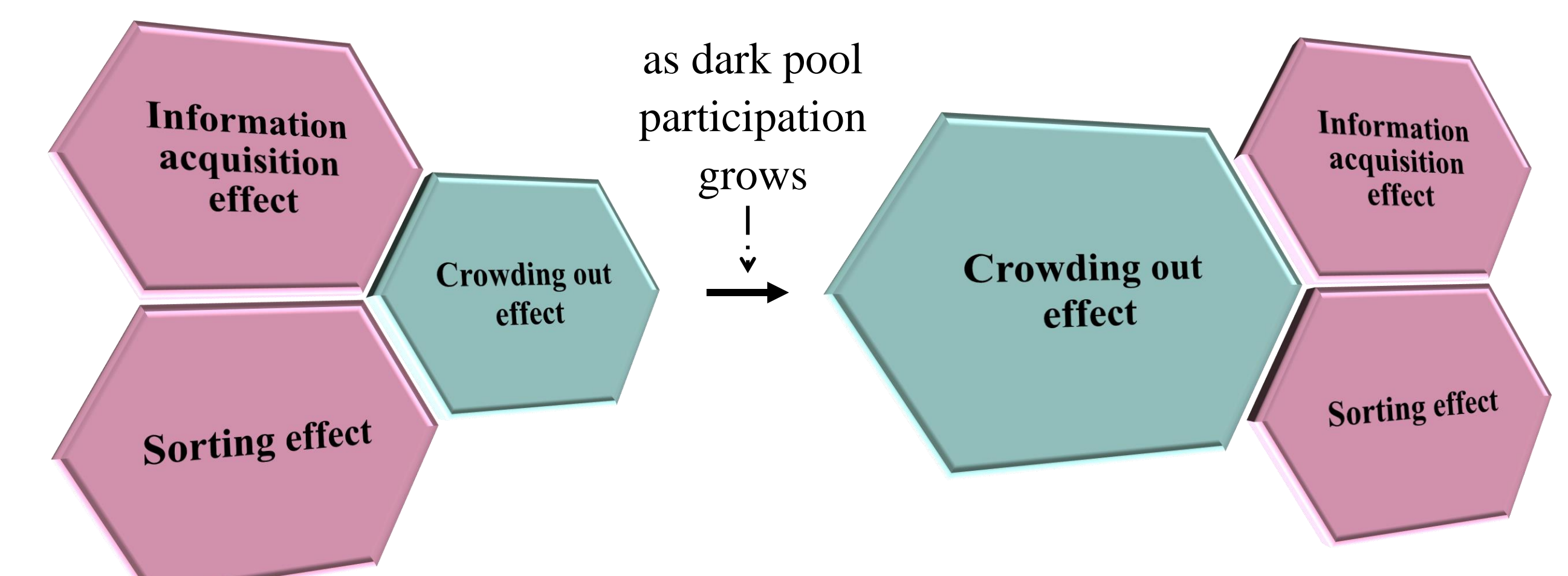


Figure 3. Precision of Market Prices in the Lit Market in *Lit Only-High* and *Dark-High* Treatments.

DISCUSSION



Non-linear relationship between dark market participation and price efficiency