

# The 2012 Capital Market Research Scholarship for Graduate Students

Research Papers by Faculty of Economics, Thammasat University

“Technical Trading Strategy in Spot and Future Markets: Arbitrage Signaling”

By

Mr. Khemarat Songyoo, MA (Economics)

Assoc. Prof. Dr. Tatre Jantarakolica as a research advisor

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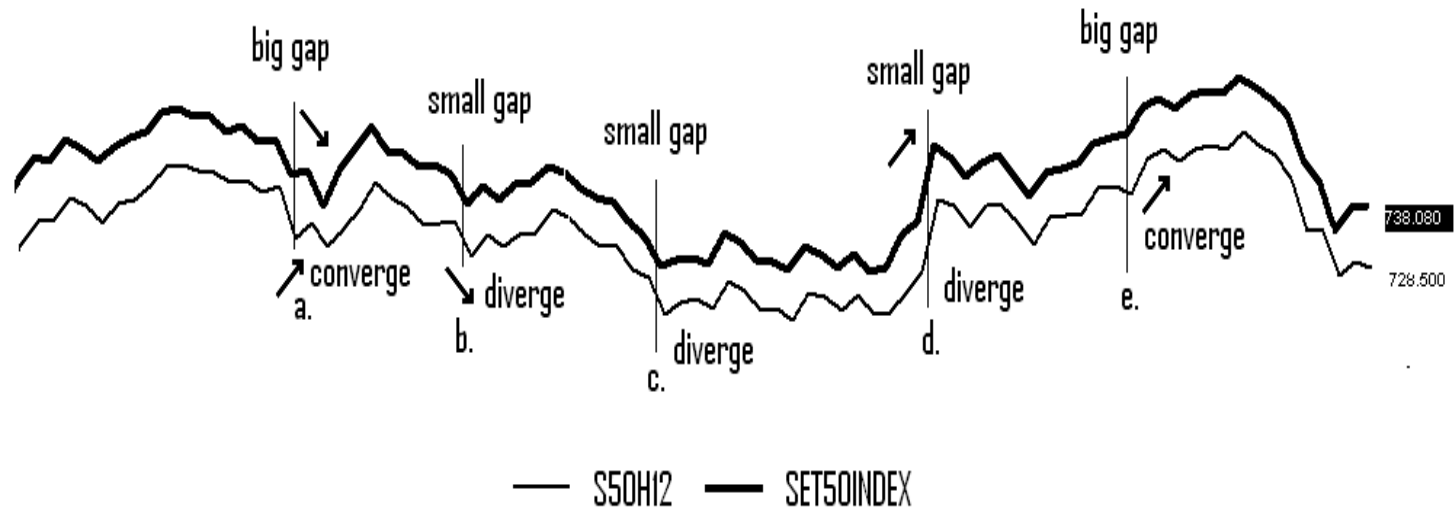
# RESEARCH OBJECTIVES

- To exhibit short-run and long-run relationship between spot and future prices
- To determine the casual relation between prices and the existence of arbitrage opportunities between two markets.
- To construct a buy/sell signal to any arbitrage opportunities with information from Threshold model and trading volume.
- To provide investors an alternative quantitative tool for trading

# PAIR TRADING

- Choose a pair of price series that move together historically
- When those prices move away, take a position with a presumption that they are coming back toward each other soon
- Sell the winner and buy the loser
- Profit from short-long position

# PAIR UP INDEX AND FUTURES



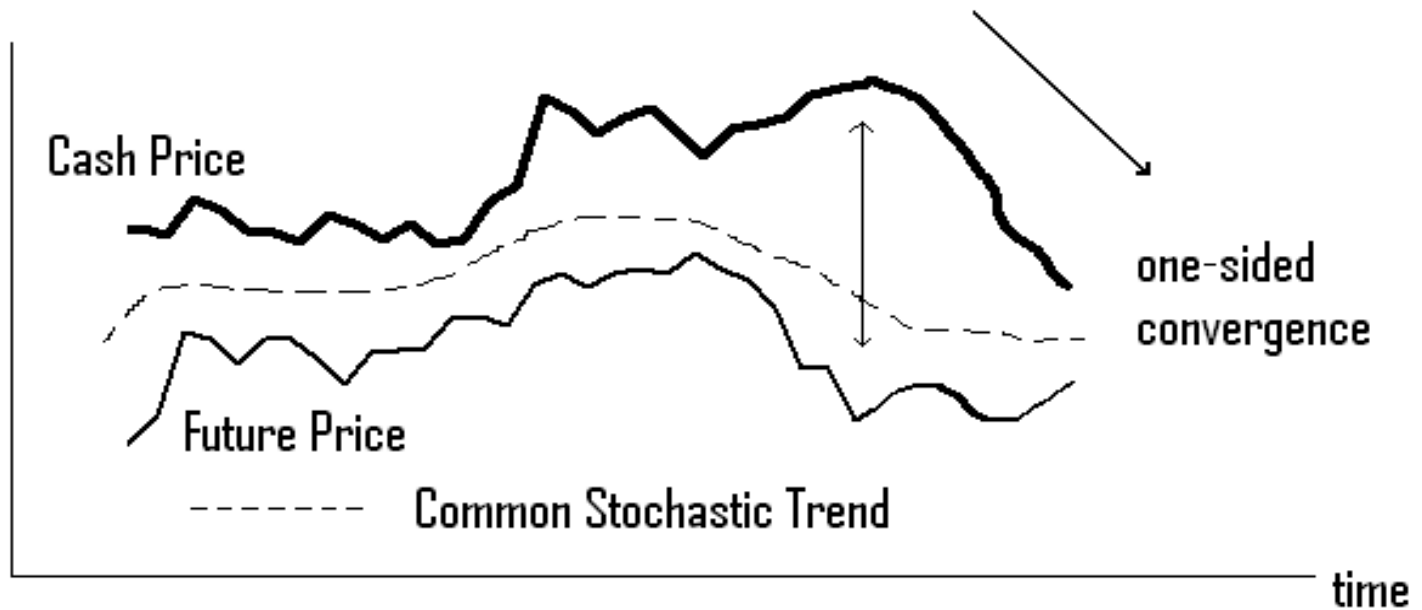
DAILY DATA FROM 30/03/2011 - 10/08/11 : EFINANCE-THAI

# PROBLEMS WITH TRADITIONAL STRATEGY

- Is it necessary that, after a period of time, the two prices will move toward each other?
- How large should the price gap be when a position is to be taken?
- Is the convergence behavior one-sided or two-sided?

# CONVERGENCE BEHAVIOR

## Actual Movement Hypothesis



# BRIEF SCOPE OF THIS STUDY

- Adopt traditional pair trading strategy to the data of SET's spot and future prices.
- Use trading volume and moving average tool to enhance the power of traditional strategy.
- Analyze the dynamic of the prices and correspondingly market efficiency.

# FRAMEWORKS

- Pair Trading Strategy



- Co-movement



- Series are cointegrated



- Share long-run equilibrium



- Mean-reverting

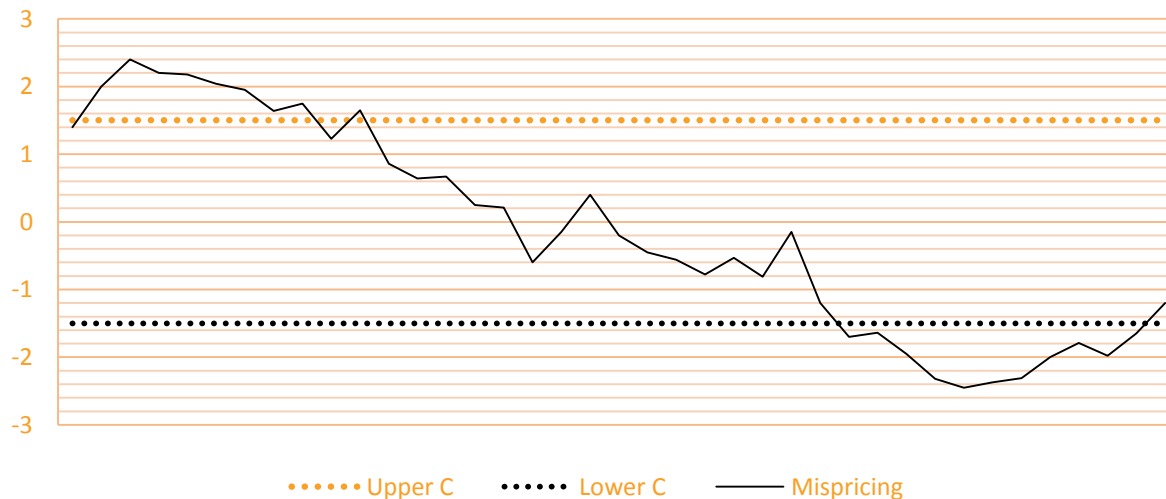


# IMPORTANT ISSUES

- How can a short run mispricing occur since both series are mean reverting
- Answer: Arbitraders are incentivized by mispricing gap but the gap is not profitable enough to take a position
- What prevent arbitrage force from adjusting the equilibrium?
- Answer: Transaction Costs

# EXISTENCE OF TRANSACTION COSTS

- The existence of transaction cost creates a mispricing gap where no arbitragers are profitable namely the “no arbitrage band.”



# EXISTENCE OF TRANSACTION COSTS

- The no-arbitrage band divides the mispricing sizes into three different regimes.
- Only when the size enter either lower or upper regimes, arbitrage force will take place.
- Consequently, the speed of adjustment should be low inside the band and considerably higher outside the band

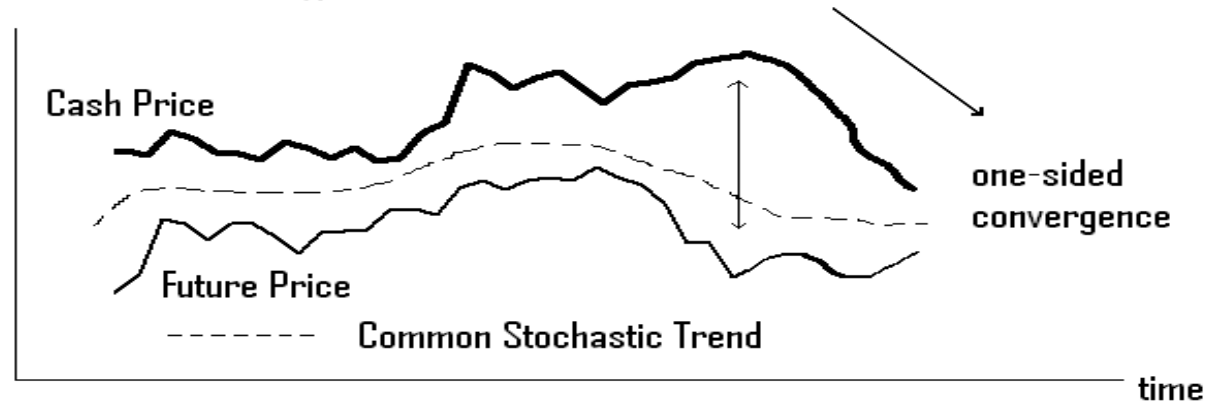
# EXISTENCE OF TRANSACTION COSTS

- The arbitrage incentive are provided only outside the band where mispricing can generate profit over the cost.
- Any position should be taken as the speed of adjustment is relatively high. (outside the no-arbitrage band)
- The second problem to traditional strategy is solved.

# CONVERGENCE BEHAVIORS

- Does the adjustment process take place in both series?
- Answer: Eventually
- Sometimes the convergence behavior is one-sided. Only a price is moving toward another when mispricing occurs.

Actual Movement Hypothesis



# EXPLANATIONS

- The mispricing gap is basically generated **by disagreement among traders** of the markets often caused by asymmetric informational flows.
- **Traders with correct information** would drive the price along the **correct stochastic trend**.
- **Traders with wrong information** would drive the price **away from the true trend**.
- As the information is distributed symmetrically over time, the **driven-away price will soon move toward the true trend**.
- In this case, if the **convergence is one-sided**, the **short-long position** of traditional pair trading strategy could **increase the overall transaction costs**.
- **Additional signal is needed** to identify the correct stochastic trend and prevent wrong positioning.

# TRADE VOLUME SIGNALING

- When a **price changes significantly**, change in trading **volume should be remarkable**.
- Follows **the Mixture of Distribution Hypothesis** which states that volume traded and price changes are driven by the same underlying latent variable, specifically news-arrival or information flow.
- **The arrival of news** resulting in price change is accompanied by **above-average trading activity** in the market

# TRADE VOLUME SIGNALING

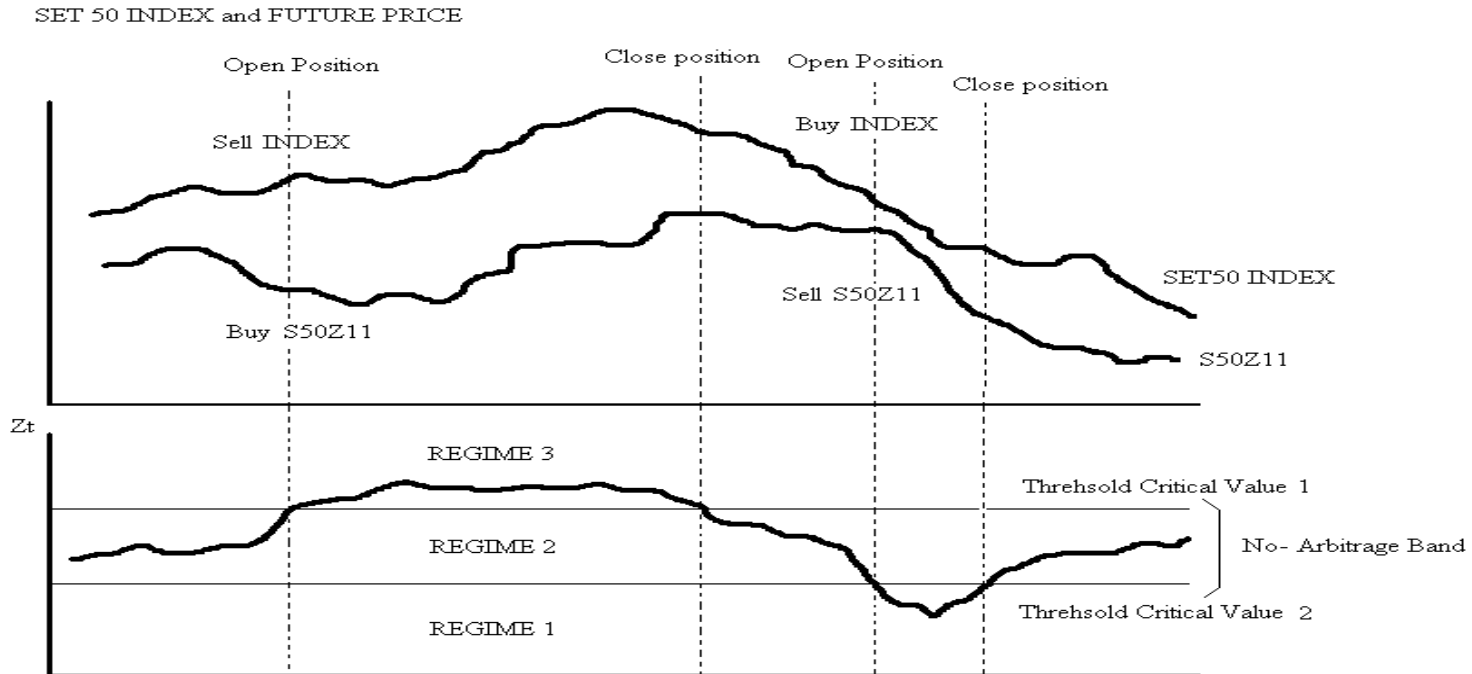
- So it is hypothesized that
  - **Traders with the correct information move first** and create an amount of transaction in a market.(Leader)
  - Later on when investors inside another market **receive the same new information**, they will **adjust their position** to keep a proper range with the long run equilibrium along with assisting arbitrage force.



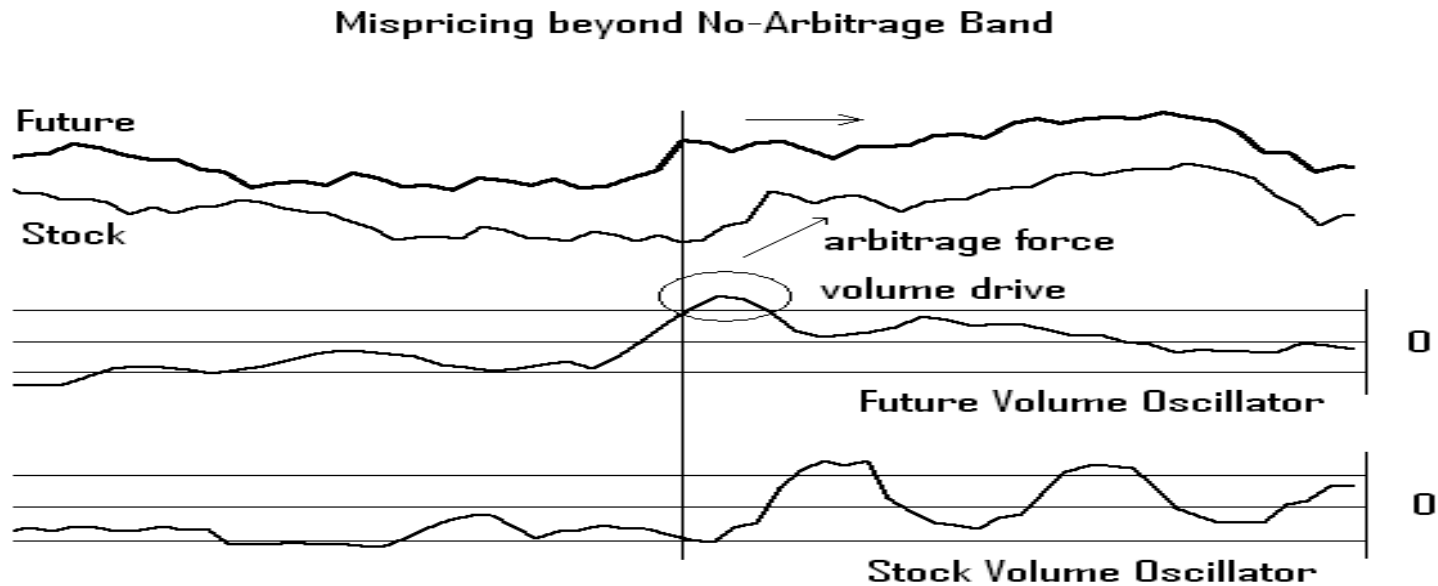
# RESEARCH METHODOLOGY

- Estimation
  - Long-run Price Discovery ( Engle and Granger Cointegration)
  - Short-run Dynamic (Vector Error Correction Mechanism)
  - Asymmetric Adjustment Process (Threshold VECM)
- Portfolio Evaluation
  - Rule set-up
  - Signal from no-arbitrage band
  - Signal from trading volume (Moving Average)
  - Return calculation

# TRADING RULES: SIGNAL FROM TVECM



# TRADING RULES: SIGNAL FROM VOLUME



# RESULTS: PORTFOLIO EVALUATION

- There are totally 37 transaction over 3-month period of experiment.
- The costs of transaction are calculated with proprietary desk cost and retail investor cost

# RESULTS: PORTFOLIO EVALUATION

<b>No Volume Signal</b>	<b>Return of Proprietary</b>	<b>Return of Retail</b>	<b># of contracts B/S</b>
In-Sample	70,600 (100.86%)	27,400 (39.14%)	54
Out-Sample	23,800 (34%)	-3,400 (-4.86%)	34
Traditional	4,800 (6.86%)	-4,500 (-6.43%)	48
<b>With Volume Signal</b>	<b>Return of Proprietary</b>	<b>Return of Retail</b>	<b># of contracts B/S</b>
In-Sample	115,290 (164.7%)	102,340 (146.2%)	37
Out-Sample	103,670 (148.1%)	86,070 (123%)	22
Traditional	116,000 (165.7%)	92,000 (131.43%)	30



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