

Policy Risks in China's Financial System

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HKUST Summer Workshop on Macroeconomics
June 14, 2017

China's Distinct Economic Structure

- ▶ Central planning is still largely mixed with free markets
 - ▶ Dual tracks (market & planning tracks) are present in many sectors
 - ▶ The state sector, while much improved, is still less efficient than the private sector, and is large and will likely remain large
- ▶ The government still plays a central role in many aspects
 - ▶ Sets agenda for policy reforms
 - ▶ Has strong influence on allocation of key resources—fiscal spending, credit, land, ...
 - ▶ Provides soft budget constraints to state firms and implicit guarantees to various sectors
- ▶ The fluctuations in the financial system all revolve around government policy, intended or unintended
 - ▶ ongoing housing market boom
 - ▶ expansion of shadow banking system
 - ▶ exchange rate crash in 2015
 - ▶ stock market turmoil in 2015
 - ▶ breakdown of circuit breakers in 2016

Government's Paternalistic Philosophy

- ▶ Large population of **inexperienced retail investors**
 - ▶ retail investors hold 50% of tradable shares and contribute to 90% of trading volume
- ▶ Large price **volatility** in China's stock markets and heavy turnover
 - ▶ highest turnover rate among major stock markets
- ▶ Asset prices often **deviate from fundamentals**
 - ▶ large price differentials between A-B and A-H stock pairs, e.g., Mei, Scheinkman and Xiong (2009)
 - ▶ dramatic warrant bubble in 2005-2008, e.g., Xiong and Yu (2011)
- ▶ **CSRC's mission**: protect retail investors and stabilize markets

Frequent Government Interventions

- ▶ History of **policies and regulations**

- ▶ bank required reserve ratio (36 changes 2003-2011)
- ▶ suspension of IPO issuance (8 times 1994-2014)
- ▶ stamp tax on stock trading (7 changes 1997-2014)
- ▶ mortgage rate and first payment requirement
- ▶ installation of circuit breakers (2016)

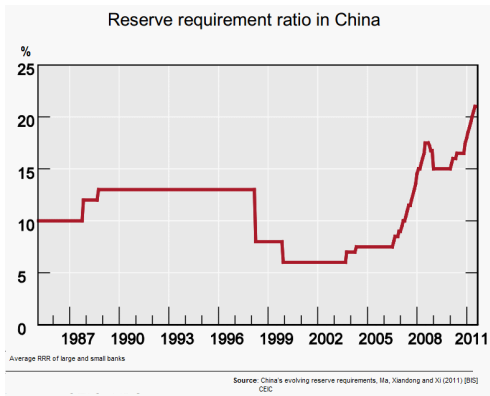
- ▶ **Direct trading** in stock markets

- ▶ “national team” directed to bail out stock market in summer 2015

- ▶ **Uncertainty** surrounding timing and scale of intervention

Required Reserve Ratio in China

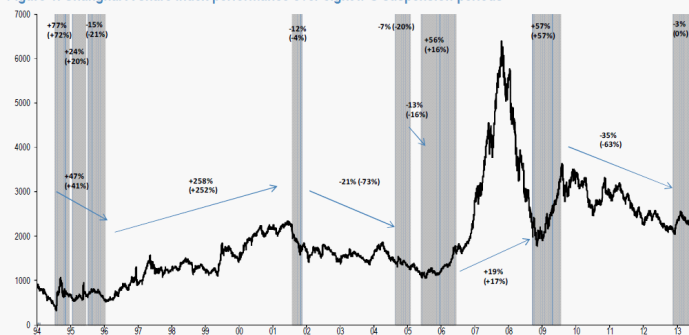
- ▶ Active monetary policy: up 32 times, down 4 times from 2003-2011
- ▶ Powerful and direct impact on credit supply, money multiplier



IPO Issuance in A-Share Markets

- ▶ The government (CSRC) directly **controls IPO issuance**
 - ▶ had suspended IPO issuance 8 times
 - ▶ quantity and allocation of quota

Figure 1: Shanghai A share index performance over eight IPO suspension periods

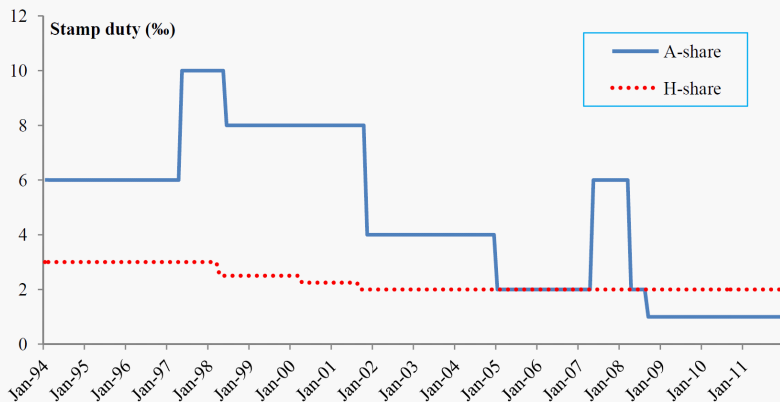


Source: Bloomberg, Datastream. Remark: Grey areas are the IPO suspension periods. Figures in blanket are performance relative to MXEM.

Stamp Tax in Stock Trading

Figure 1 Evolution of Stamp Duties in China and Hong Kong

The figure shows the evolution of trading stamp duty (sum over buyers and sellers) in A-share and H-share markets. Y-axis shows the absolute level of stamp duty in ‰.



Policy Risks in Financial Development

- ▶ Intensive and uncertain intervention by Chinese government entails unavoidable policy risks
 - ▶ complex financial instruments and interconnected financial markets
 - ▶ largely new to policy makers
- ▶ Speculation by market participants about government policy may reinforce, and even trigger, policy errors
- ▶ As a result, intensive government intervention
 - ▶ makes noise in policy making a pricing factor
 - ▶ government noise attracts market speculation and may get amplified
- ▶ Implications for real allocative efficiency since intervention affects cost of capital

Roadmap

- ▶ An empirical study "The Whack-A-Mole Game: Tobin Tax and Trading Frenzy" with Jinghan Cai, Wenxi Jiang, and Jibao He
- ▶ A theoretical model "China's Model of Managing the Financial System" with Markus Brunnermeier and Michael Sockin

THE WHACK-A-MOLE GAME: TOBIN TAX AND TRADING FRENZY

JINGHAN CAI, UNIVERSITY SCRANTON

JIBAO HE, SHENZHEN STOCK EXCHANGE

WENXI JIANG, CHINESE UNIVERSITY OF HONG KONG

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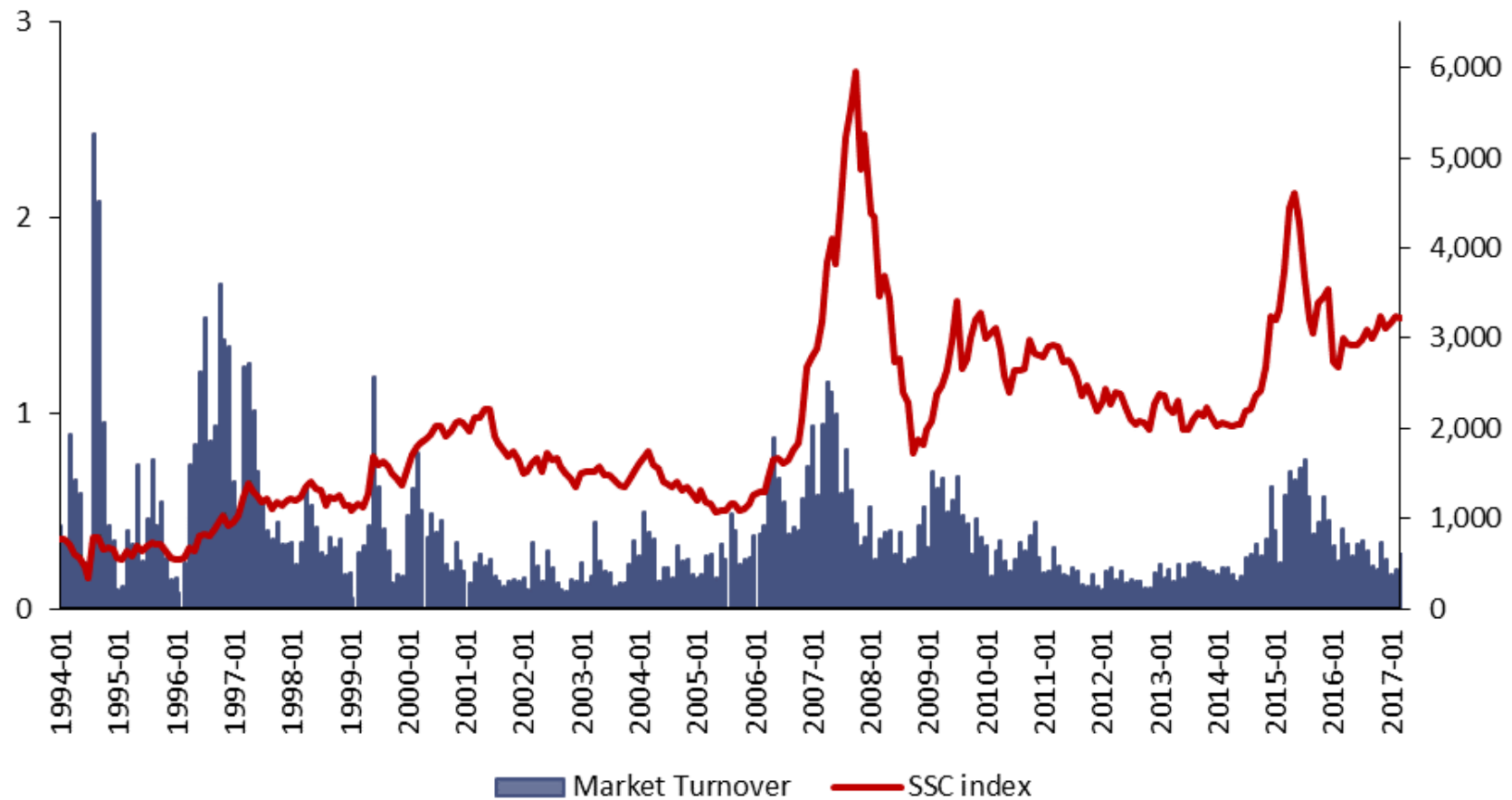
Whack-A-Mole Games in Financial Regulations

- Alan Blinder described the Fed policy in 2008 as a game of “Whack a Mole”
- Similar Whack-A-Mole games with market participants sidestepping financial regulations through unregulated markets/channels are commonly seen
 - effectiveness of the Dodd-Frank Act to discipline financial institutions
 - new payday rules to protect consumers
 - international efforts to crack down on tax evasion and money laundering
 - shadow banking activities across the world
- Blinder (2014) argues that over-regulations might be socially optimal
- How systematically does this problem exist in practice?
- Can financial regulations of one market lead to economically significant effects on other markets?

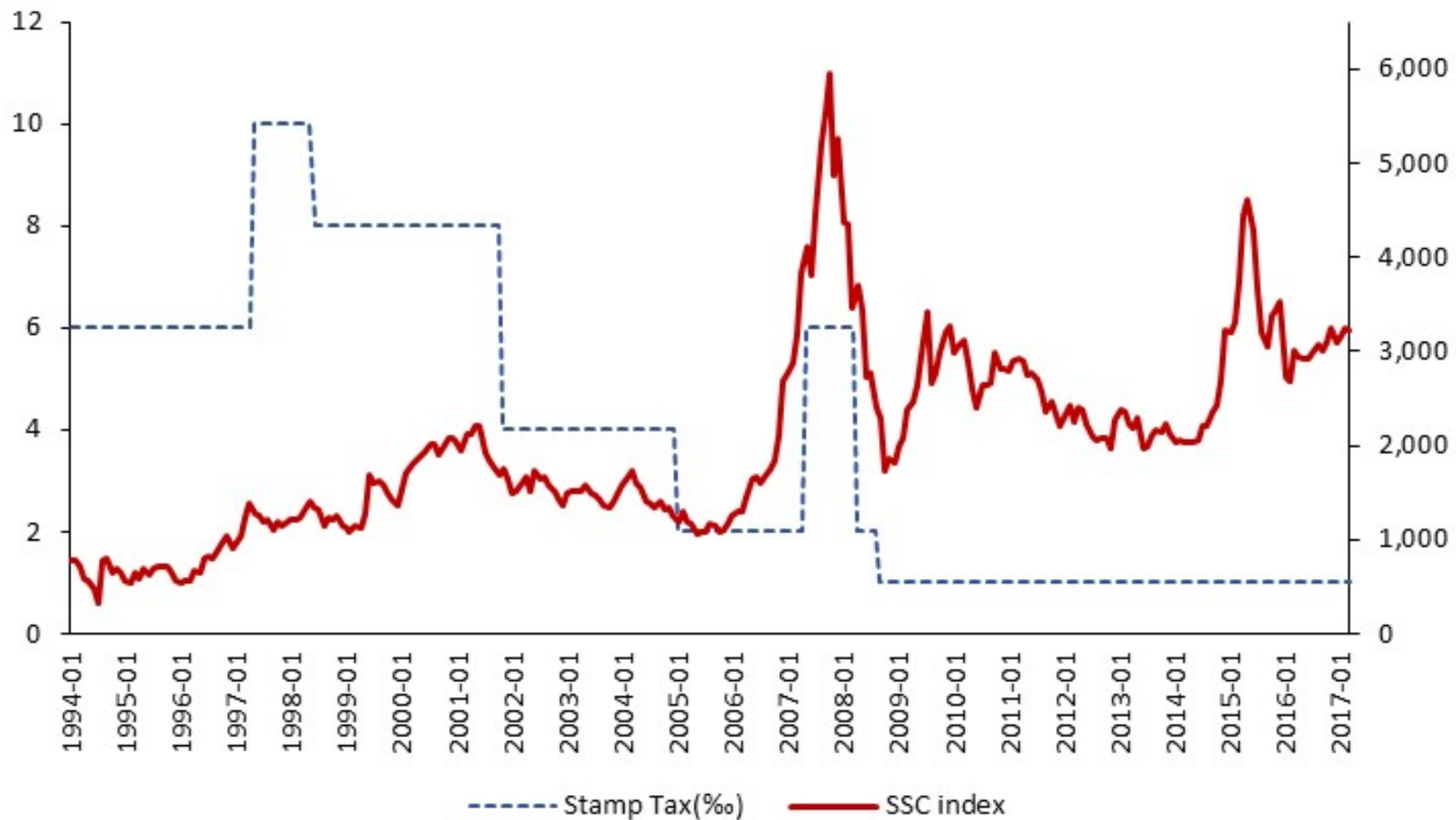
Tobin Tax in China's Stock Market

- We systematically examine a Whack-A-Mole game via the effects of Tobin tax for stock trading on warrant trading
 - The Chinese government frequently intervenes in financial markets, e.g., Brunnermeier, Sockin and Xiong (2016)
 - Tobin tax is an important policy tool in China's stock market, e.g., Deng, Liu and Wei (2014)

Market Index and Monthly Turnover



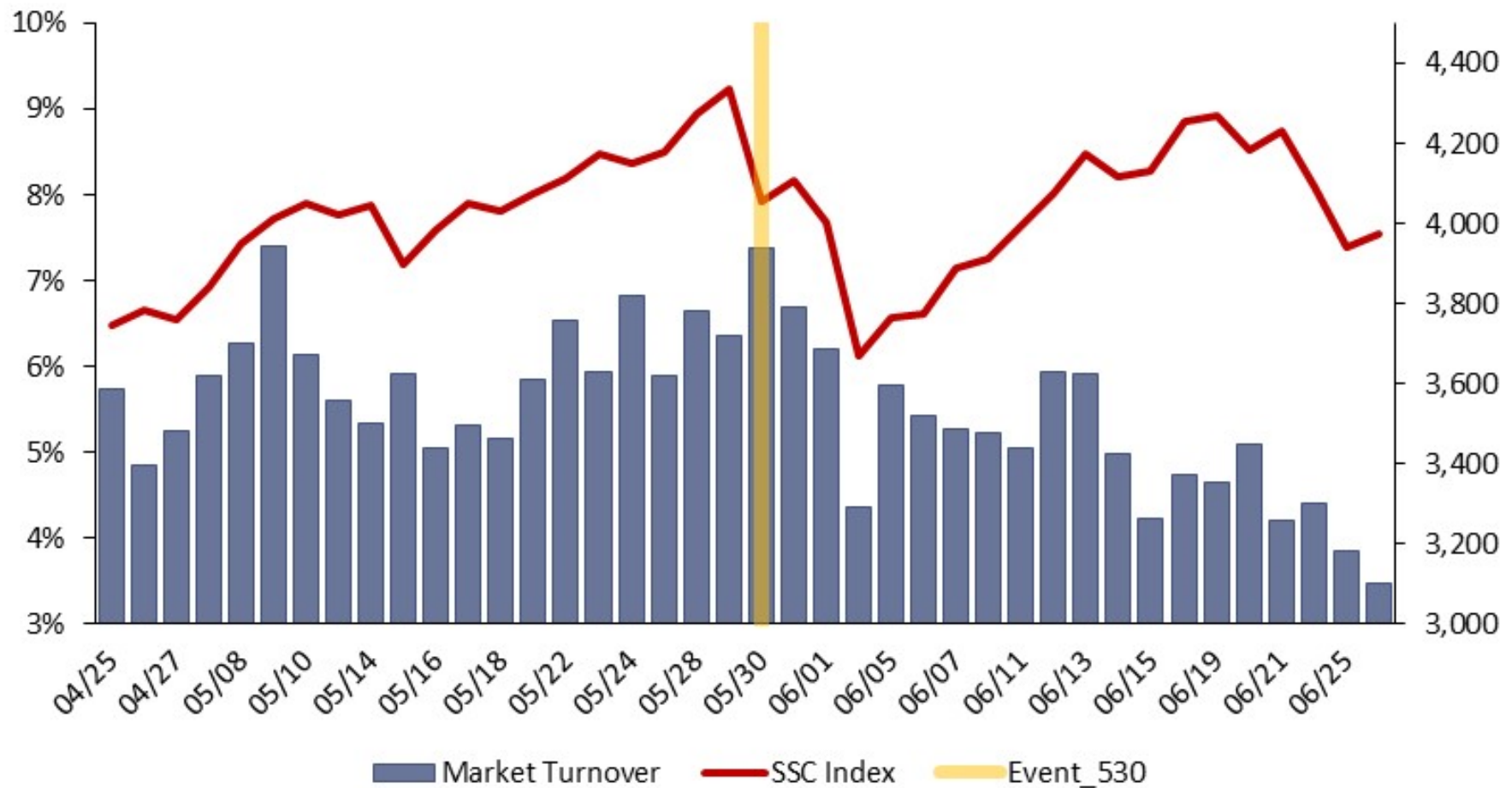
Market Index and Stamp Tax



Stamp Tax Increase on May 30, 2007

- What were its effects on stock market & warrant market?
 - An event study, event window 20 trading days before & after
- China experimented exchanged traded stock warrants in 2005-2008, e.g., Xiong and Yu (2011)
 - 12 put warrants and 37 call warrants
 - No stamp tax for warrants
 - T+0 rule, different from T+1 in stock trading
 - Wider daily price limits
- 5 put warrants & 9 call warrants traded on May 30, 2007

Reactions from Stock Market



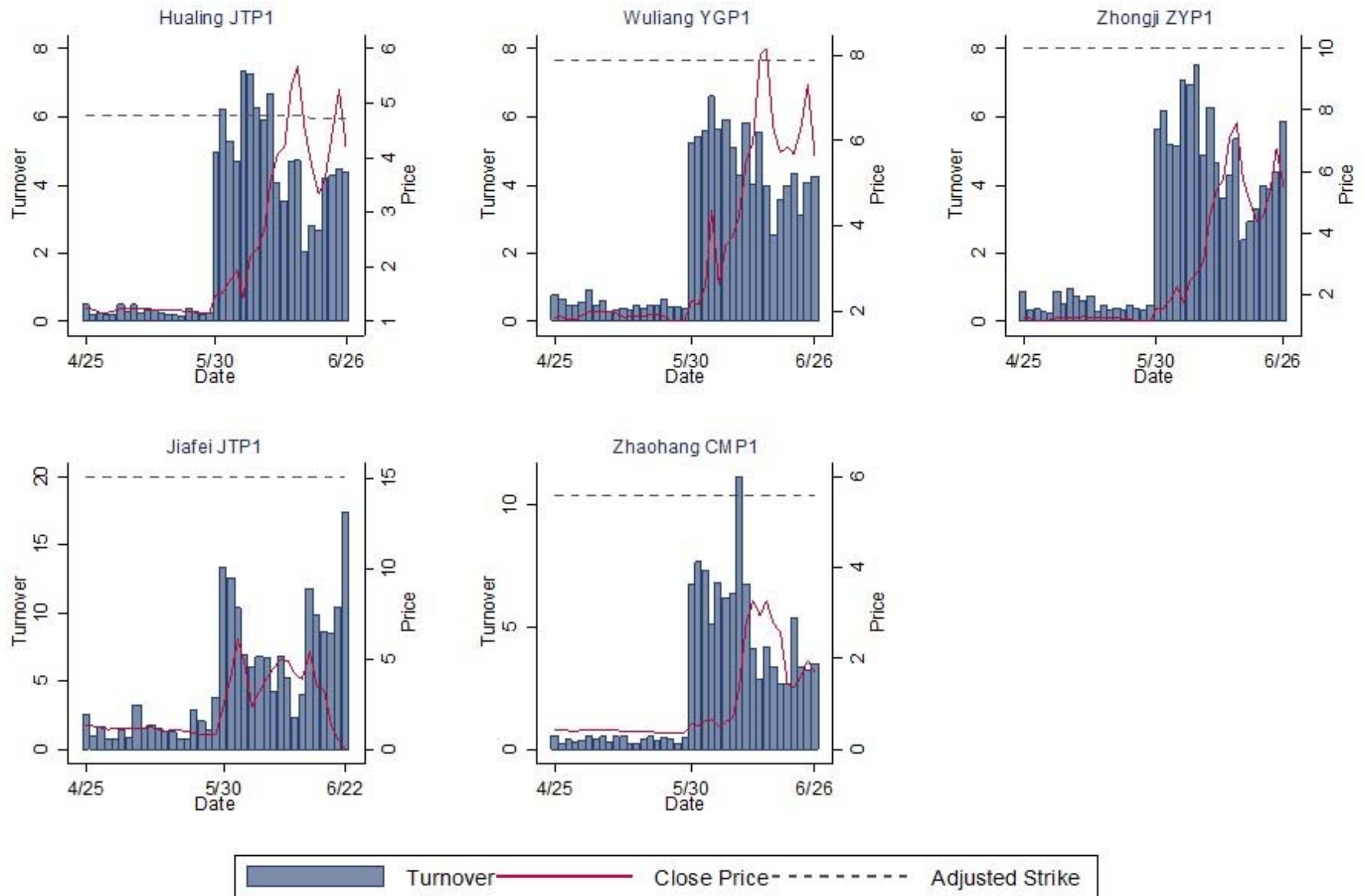
Reactions from Stock Market

<i>Panel A: summary statistics</i>								
	Mean	SD	P1	P25	P50	P75	P99	N
Before 5/30								
<i>Return</i>	1.36%	5.93%	-6.49%	-1.38%	0.98%	3.57%	10.00%	25712
<i>Turnover</i>	7.46%	4.19%	0.61%	4.73%	6.82%	9.44%	20.80%	25712
<i>Ln_Volume</i>	18.74	1.06	16.2	18.1	18.75	19.38	21.27	25712
<i>Volatility</i>	5.78%	2.67%	0.00%	3.93%	5.32%	7.22%	13.60%	25712
After 5/30								
<i>Return</i>	-0.98%	6.25%	-10.00%	-5.00%	-0.54%	3.02%	10.00%	26606
<i>Turnover</i>	6.55%	3.91%	0.20%	4.05%	6.05%	8.35%	19.40%	26606
<i>Ln_Volume</i>	18.53	1.179	14.61	17.87	18.54	19.24	21.22	26606
<i>Volatility</i>	7.78%	3.60%	0.00%	5.08%	7.42%	10.20%	16.90%	26606

Reactions from Stock Market

<i>Panel B: regression results</i>				
Dep. Variable:	(1) <i>Return</i>	(2) <i>Turnover</i>	(3) <i>Ln_Volume</i>	(4) <i>Volatility</i>
<i>Post_530</i>	-0.0233 (-2.37)	-0.0091 (-3.03)	-0.208 (-3.18)	0.0200 (4.13)
Observations	52,318	52,318	52,318	52,318
Adjusted R2	0.035	0.012	0.009	0.09

Reactions from Put Warrants



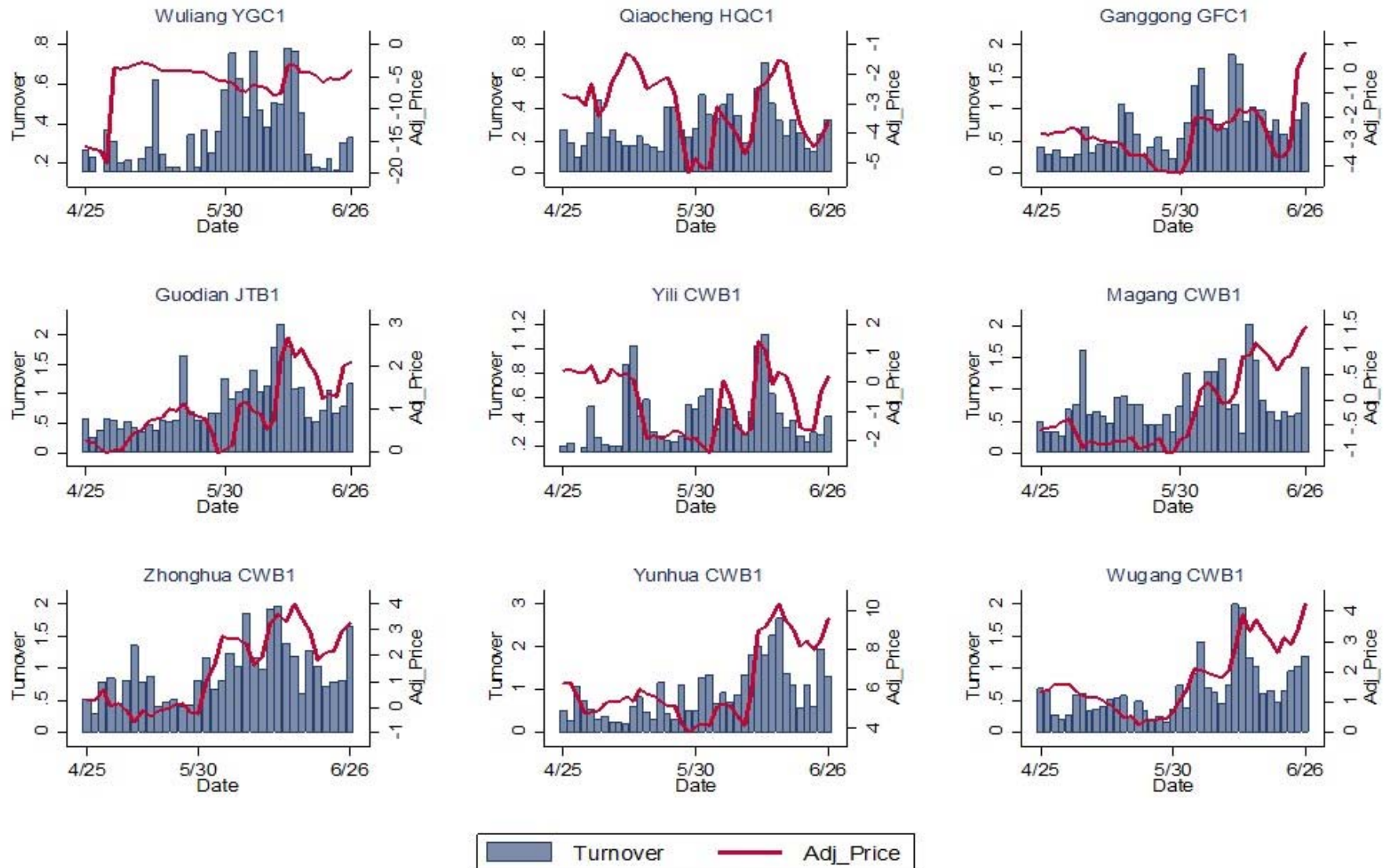
Reactions from Put Warrants

<i>Panel A: summary statistics</i>								
	Mean	SD	P1	P25	P50	P75	P99	N
Before 5/30								
<i>Price</i>	1.16	0.48	0.37	0.98	1.22	1.27	1.99	98
<i>BS_Value</i>	0.00	0.01	0.00	0.00	0.00	0.01	0.08	98
<i>Adj_Price</i>	1.16	0.48	0.37	0.98	1.21	1.27	1.97	98
<i>Turnover</i>	67.10%	64.80%	15.70%	33.50%	45.80%	74.50%	385.40%	98
<i>LN_Volume</i>	19.38	0.46	18.33	19.09	19.33	19.78	20.27	98
<i>Volatility</i>	5.50%	3.16%	1.64%	3.13%	4.54%	7.18%	16.00%	98
After 5/30								
<i>Price</i>	3.57	1.94	0.11	1.96	3.49	5.13	8.15	96
<i>BS_Value</i>	0.01	0.01	0.00	0.00	0.00	0.00	0.07	96
<i>Adj_Price</i>	3.56	1.94	0.11	1.92	3.49	5.11	8.15	96
<i>Turnover</i>	559.20%	255.10%	204.90%	403.50%	515.50%	669.70%	1741.00%	96
<i>LN_Volume</i>	22.84	0.775	20.91	22.44	22.81	23.23	24.55	96
<i>Volatility</i>	41.80%	24.80%	11.00%	23.60%	33.30%	54.10%	150.50%	96

Reactions from Put Warrants

<i>Panel B: regression results</i>				
	(1)	(2)	(3)	(4)
Dep. Variable:	<i>Adj_Price</i>	<i>Turnover</i>	<i>Ln_Volume</i>	<i>Volatility</i>
<i>Post_530</i>	2.405 (9.02)	4.344 (14.36)	3.303 (30.74)	0.328 (10.06)
Maturity FE	Yes	Yes	Yes	Yes
Observations	194	194	194	194
Adjusted R2	0.657	0.702	0.918	0.612

Reactions from Call Warrants



Reactions from Call Warrants

<i>Panel A: summary statistics</i>								
	Mean	SD	P1	P25	P50	P75	P99	N
Before 5/30								
<i>Price</i>	14.56	8.20	4.64	6.29	13.38	23.83	32.00	169
<i>BS_Value</i>	14.64	9.54	3.87	6.64	9.77	25.90	36.13	169
<i>Adj_Price</i>	-0.08	2.63	-5.34	-1.59	-0.31	0.77	6.54	169
<i>Turnover</i>	45.10%	26.90%	13.70%	25.70%	39.30%	56.90%	162.10%	169
<i>LN_Volume</i>	20.98	0.80	19.04	20.45	21.01	21.55	22.57	169
<i>Volatility</i>	6.47%	3.06%	2.32%	4.27%	5.63%	8.11%	15.50%	169
After 5/30								
<i>Price</i>	16.76	9.82	4.69	7.49	13.71	25.59	36.70	175
<i>BS_Value</i>	16.23	12.09	3.09	7.30	10.81	27.20	40.04	175
<i>Adj_Price</i>	0.53	3.74	-7.59	-1.61	0.74	2.45	9.77	175
<i>Turnover</i>	85.40%	50.90%	15.40%	48.00%	72.80%	113.30%	226.60%	175
<i>LN_Volume</i>	21.68	0.751	20.05	21.16	21.7	22.24	23.29	175
<i>Volatility</i>	10.30%	4.54%	2.62%	6.89%	9.65%	13.40%	23.70%	175

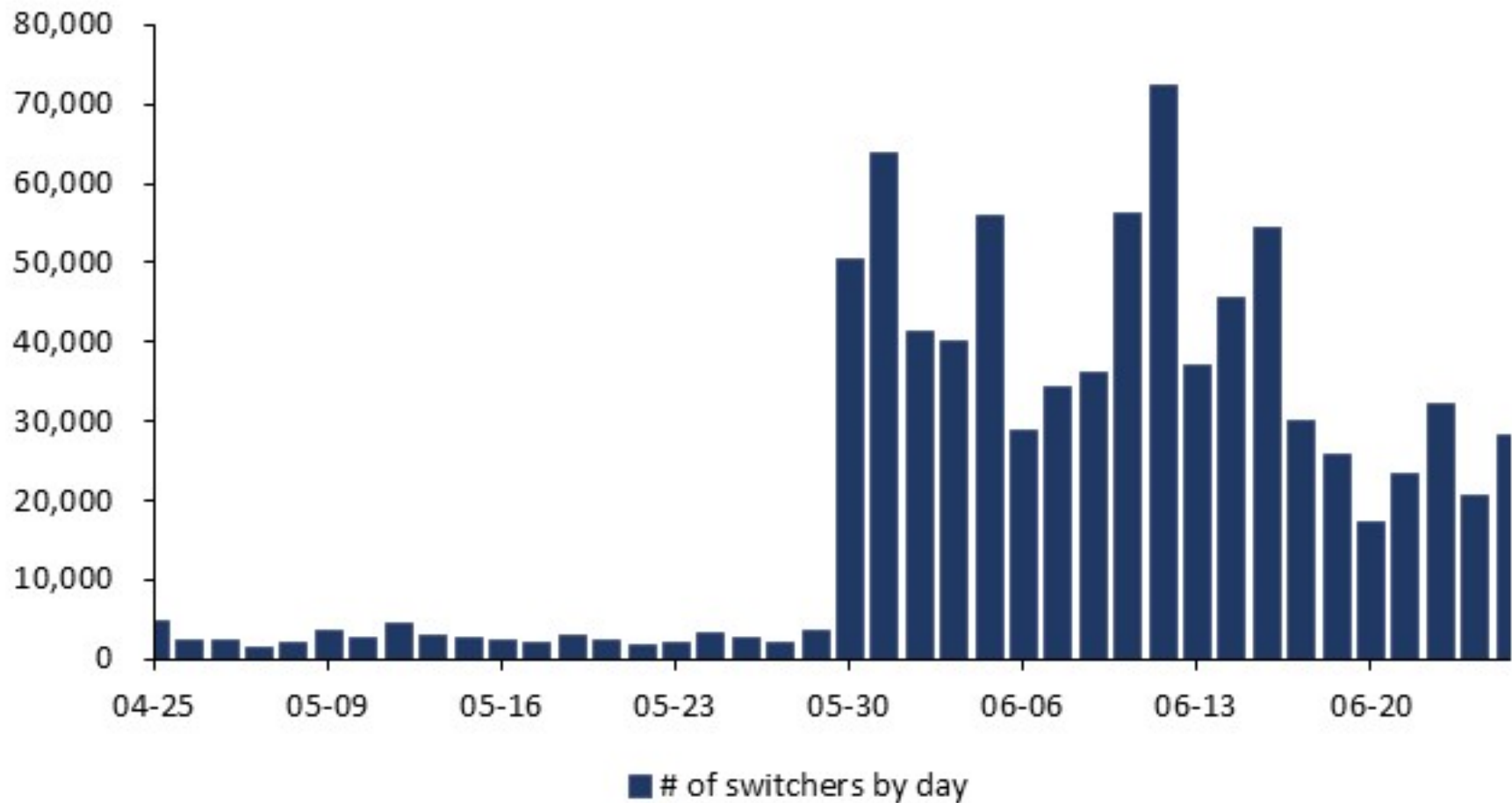
Reactions from Call Warrants

<i>Panel B: regression results</i>								
Dep. Variable:	(1) <i>Adj_Price</i>	(2) <i>Turnover</i>	(3) <i>Ln_Volume</i>	(4) <i>Volatility</i>	(5) <i>Adj_Price</i>	(6) <i>Turnover</i>	(7) <i>Ln_Volume</i>	(8) <i>Volatility</i>
<i>Post_530</i>	0.420 (1.65)	0.285 (4.50)	0.634 (7.21)	0.0306 (3.95)	-3.055 (-5.81)	-0.322 (-3.01)	0.235 (1.08)	0.00462 (0.30)
<i>Post_530*Pre_Turnover</i>					7.523 (9.06)	1.325 (5.39)	0.876 (2.12)	0.0570 (2.16)
Maturity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	344	344	344	344	344	344	344	344
Adjusted R2	0.888	0.374	0.647	0.200	0.352	0.377	0.142	0.152

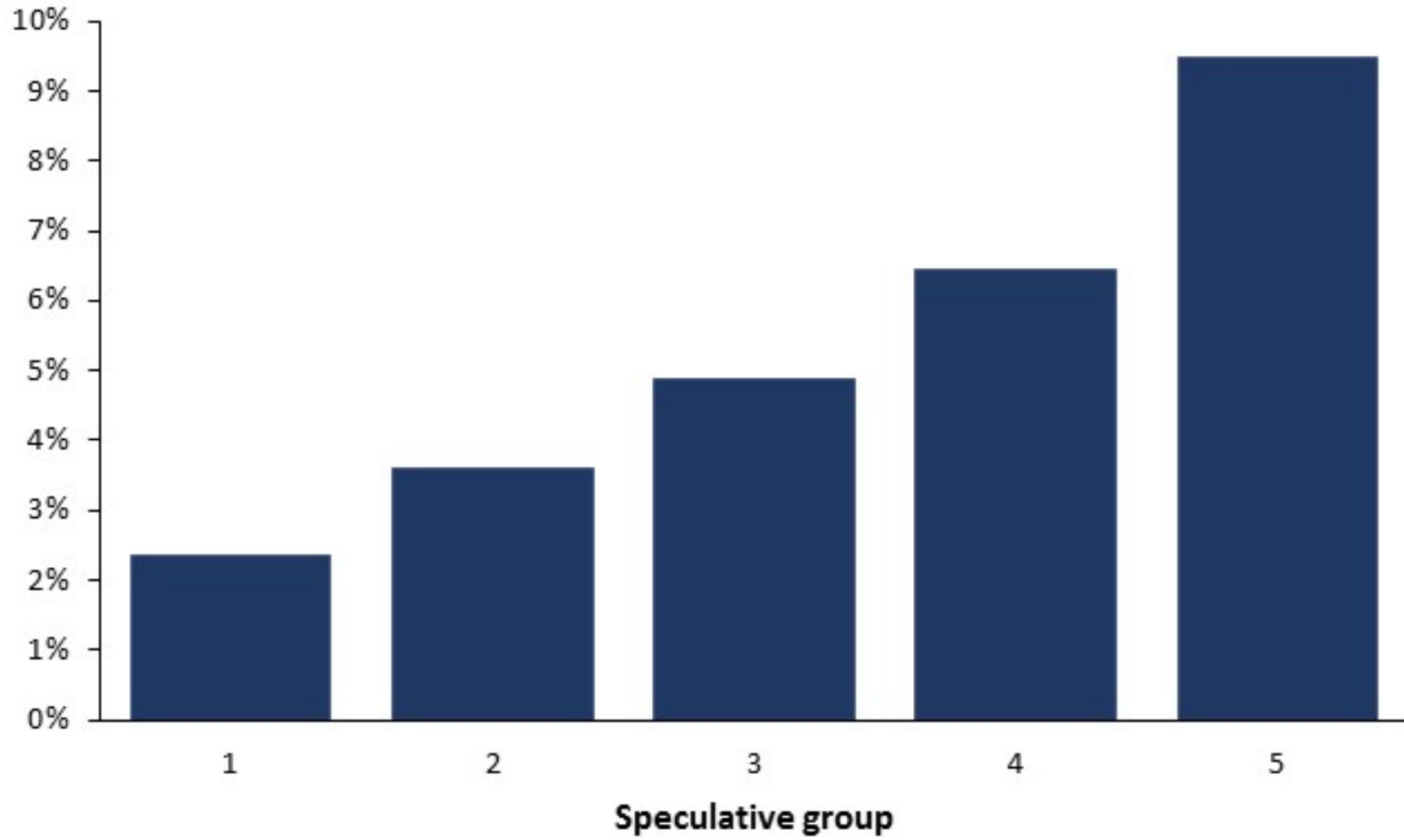
Reactions from Investors

- Account-level trading records of all stocks and the four put warrants listed on the Shenzhen Stock Exchange
- Switcher is defined as stock investors who start trading warrants for the first time on a given day
- We sort all individual investors into five speculativeness groups based on their total number of trades before the event.

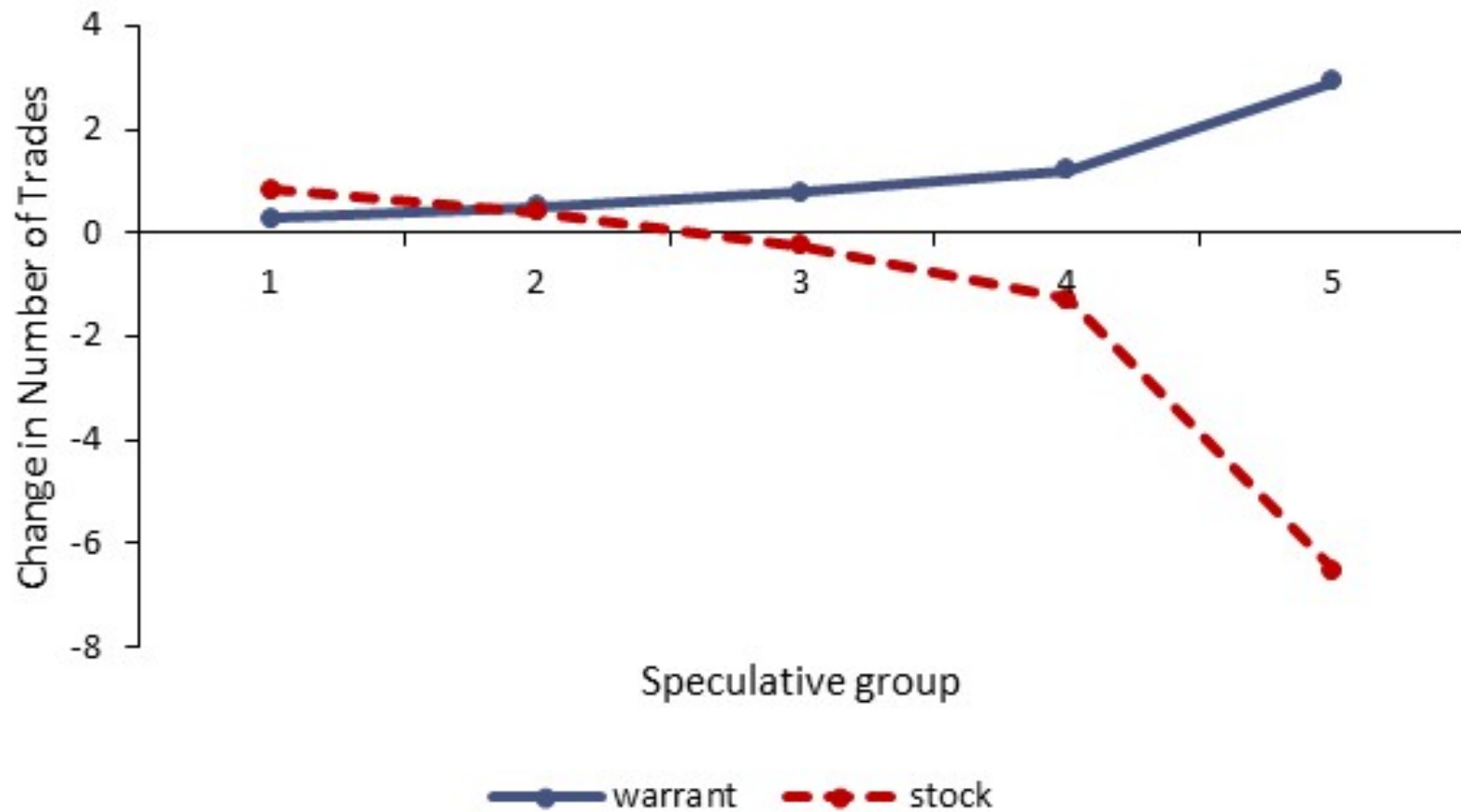
Number of Switchers



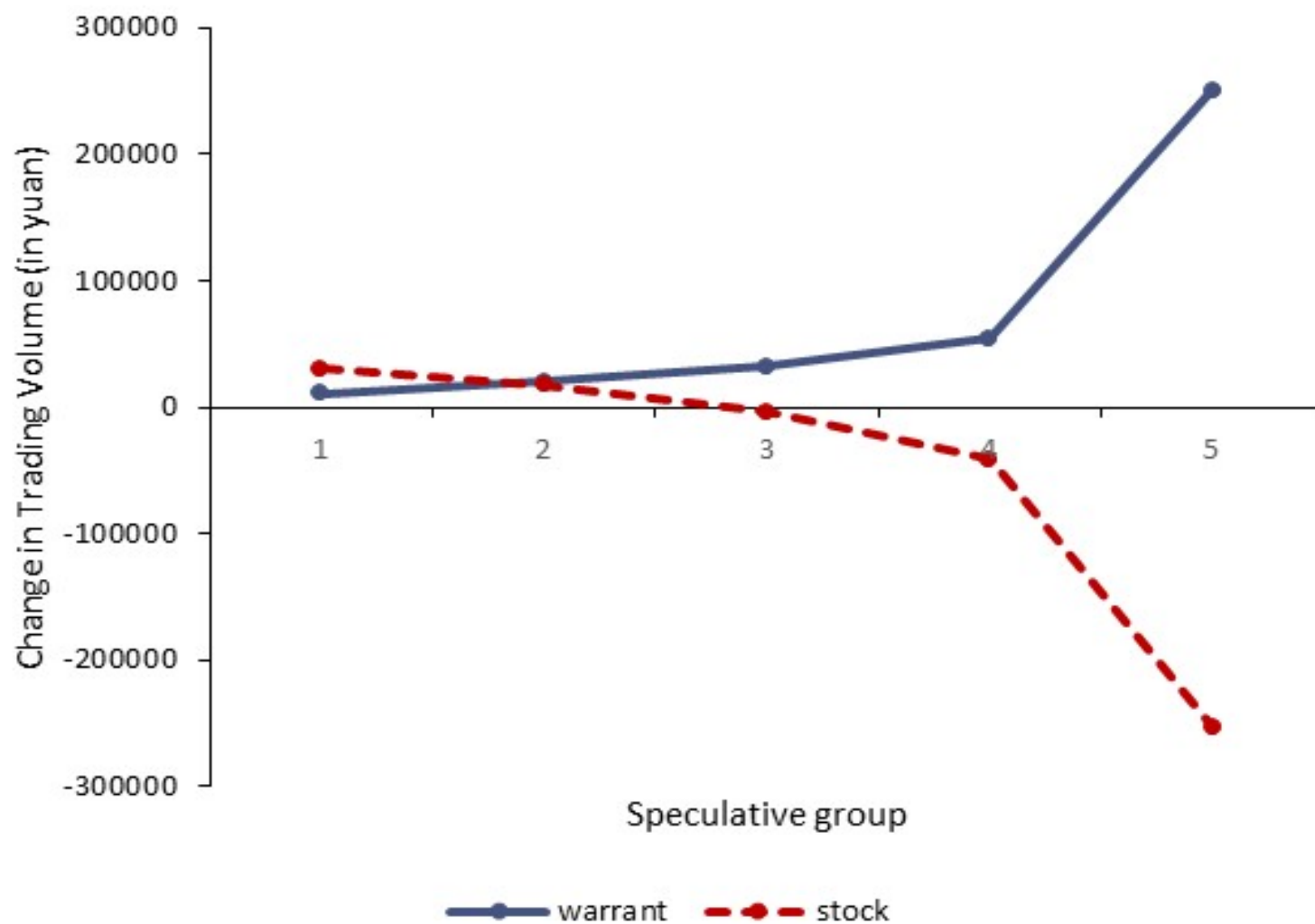
Fraction of Switchers



Substitution of Stock Trading by Warrant Trading



Substitution of Stock Trading by Warrant Trading



Substitution of Stock Trading by Warrant Trading

<i>Panel B: Number of trades</i>				
Dep. Variable:	(1)	(2)	(3)	(4)
	<i>Ntrades_Warrant</i>		<i>Ntrades_Stock</i>	
<i>Post_530</i>	1.084 (300.65)	-0.625 (-87.59)	-1.221 (-214.09)	3.489 (329.98)
<i>Speculativeness*Post_530</i>		0.591 (168.27)		-1.628 (-306.27)
Observations	26,145,090	26,145,090	26,145,090	26,145,090
Adjusted R-squared	0.003	0.009	0.002	0.169

Substitution of Stock Trading by Warrant Trading

<i>Panel C: Value of trades in yuan</i>				
	(1)	(2)	(3)	(4)
Dep. Variable:	<i>Vtrades_Warrant</i>		<i>Vtrades_Stock</i>	
<i>Post_530</i>	69,630 (36.13)	-77,380 (-19.95)	-44,691 (-55.65)	134,481 (82.10)
<i>Speculativeness*Post_530</i>		50,812 (25.65)		-61,928 (-74.85)
Observations	26,145,090	26,145,090	26,145,090	26,145,090
Adjusted R-squared	0.000	0.000	0.000	0.014

Summary

- The increase of stamp tax for stock trading in China on May 30, 2007 offers a vivid account of a Whack-A-Mole game
 - substantially increased price level, daily turnover rate, and daily price volatility in the warrant market
 - effects on the deep out of the money put warrants: prices rose by 2.4 *Yuan*, daily turnover rate by 434%, trading volume in *Yuan* by 330%, and daily price volatility by 32.8%.
- A key challenge to financial regulations—the need to account for market participants sidestepping a financial policy through other unregulated markets and the subsequent spillover effects.

China's Model of Managing the Financial System

Markus Brunnermeier, Princeton University

Michael Sockin, University of Texas, Austin

Wei Xiong, Princeton University

Conceptual Questions

- ▶ How does government intervention impact market dynamics?
- ▶ How do market participants react to this intervention?
 - ▶ do they trade along with or against the government?
- ▶ What is the right objective of government intervention?
 - ▶ reduce price volatility or improve informational efficiency?

A Baseline Setting with Perfect Information

Discrete-time with infinitely many periods: $t = 0, 1, 2, \dots$

- ▶ A risky asset, which pays a stream of **dividends** over time:

$$D_t = \theta_t + \sigma_D \varepsilon_t^D, \quad \varepsilon_t^D \sim \mathcal{N}(0, 1)$$

- ▶ θ_t is an exogenous **asset fundamental**:

$$\theta_{t+1} = \rho_\theta \theta_t + \sigma_\theta \varepsilon_{t+1}^\theta, \quad \varepsilon_{t+1}^\theta \sim \mathcal{N}(0, 1)$$

- ▶ For now, θ_{t+1} is **publicly observable**

A Baseline Setting with Perfect Information

Noise traders submit random market orders:

$$N_t = \rho_N N_{t-1} + \sigma_N \varepsilon_t^N, \quad \varepsilon_t^N \sim \mathcal{N}(0, 1)$$

- ▶ Price insensitive orders, meant to capture trading by inexperienced retail investors under market stress

Rational short-term investors each maximize myopic trading profit:

$$U_t^i = \max_{X_t^i} E \left[-\exp \left(-\gamma W_{t+1}^i \right) \mid \theta_{t+1}, N_t \right]$$

with $W_{t+1}^i = R^f \bar{W} + X_t^i R_{t+1}$ and $R_{t+1} = D_{t+1} + P_{t+1} - R^f P_t$.

- ▶ Equilibrium without any government intervention:

$$\int_0^1 X_t^i dt = N_t$$

Market Breakdown and Government Intervention

Conjecture a linear equilibrium: $P_t = \frac{1}{R^f - \rho_\theta} \theta_{t+1} + p_N N_t$

- ▶ The **market breaks down** when $\sigma_N > \sigma_N^*$ (a threshold)
 - ▶ Short-term investors ineffective in trading against noise trader risk, similar to DSSW (1990)
- ▶ Introduce a government that trades the asset and takes a position

$$X_t^G = \underbrace{\vartheta^N N_t}_{\text{intended intervention}} + \underbrace{\sqrt{\text{Var} [\vartheta^N N_t \mid \mathcal{F}_{t-1}]} G_t}_{\text{unintended noise}}, \quad G_t \sim \mathcal{N}(0, \sigma_G^2)$$

- ▶ the government chooses intervention intensity ϑ^N
 - ▶ the amount of unintended noise increases with ϑ^N
- ▶ Market clearing $\int_0^1 X_t^i dt + X_t^G = N_t$
 - ▶ $\vartheta^N > 0$ **mitigates** region of market failure and may prevent failure if sufficiently large

Setting with Informational Frictions

- ▶ Suppose now θ_{t+1} is unobservable

Government intervention

- ▶ The government has no private information and intervenes

$$X_t^G = \vartheta_{\hat{N}} \hat{N}_t^M + \sqrt{\text{Var} [\vartheta_{\hat{N}} \hat{N}_t^M \mid \mathcal{F}_{t-1}^M]} G_t$$

- ▶ The government's objective:

$$\min_{\vartheta_{\hat{N}}} \gamma_{\sigma} \text{Var} [\Delta P_t (\vartheta_{\hat{N}}) \mid \mathcal{F}_t] + \gamma_{\theta} \text{Var} \left[P_t (\vartheta_{\hat{N}}) - \frac{1}{R^f - \rho_{\theta}} \theta_{t+1} \mid \mathcal{F}_t \right]$$

Rational short-term investors

- ▶ Investor i chooses to acquire **only one** private signal from

$$s_t^i = \theta_{t+1} + \tau^{-1/2} \varepsilon_t^{s,i} \quad \text{or} \quad g_t^i = G_{t+1} + \tau^{-1/2} \varepsilon_t^{g,i}$$

Equilibria with Government Intervention

- ▶ A **fundamental-centric** equilibrium
all investors acquire signals about θ_{t+1}
 - ▶ investor trading makes price more informative about θ_{t+1}
 - ▶ investors may trade against government, depending on signals
- ▶ A **government-centric** equilibrium
all investors acquire signals about G_{t+1}
 - ▶ occurs when the government intervention is sufficiently intensive
 - ▶ price may be less informative about θ_{t+1}
 - ▶ investors all trade along the government, making price volatility lower and allowing government to trade less
- ▶ A mixed equilibrium
some investors acquire signals about θ_{t+1} some about G_{t+1}

Key Insights

- ▶ Government intervention helps to stabilize financial markets
 - ▶ unregulated markets can be highly volatile and might break down when noise trader risk is sufficiently large
- ▶ Adverse effects:
 - ▶ active government intervention renders noise in government policy **a pricing factor**
 - ▶ intervention can cause investors to **speculate on government noise** rather than fundamentals, which amplifies effects of policy errors
- ▶ Tension between objectives of reducing **price volatility** and improving **informational efficiency**
 - ▶ while price volatility is lower with intervention, informational efficiency can be worse

Risks in China's Financial System

- ▶ Commonly concerned risks
 - ▶ Noise trader risk created by inexperienced retail investors
 - ▶ Rising leverage across the nation
 - ▶ Overheating housing markets
 - ▶ Surging capital outflow
- ▶ A more important risk: policy errors **magnified** by financial market speculation
 - ▶ the stock market turmoil in summer 2015
 - ▶ the breakdown of the circuit breaker in January 2016
 - ▶ the exchange rate crash in August 2015
- ▶ Government intervention can stabilize, but
 - ▶ new risk factor
 - ▶ shifts information acquisition
- ▶ Time-inconsistency problem

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- ▶ to be launched in June 2017
- ▶ an independent, non-partisan and nonprofit platform
- ▶ initiated by a group of experienced and accomplished economists
- ▶ a bridge on economic issues between China and the rest of the world