Analysis: Two Markets

Contents

Variable description

The file 'Data.RData' consists of nine data tables:

marketsummary

The table 'marketsummary' summarizes data for each market, i.e. two observations per period and cohort.

Variable	Description
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Period	Period index, ranging from '1' to '12'.
Period0	Period index, ranging from '0' to '5', indicating the distance to the phase's first period, starting with 0 to facilitate the interpretation of the intercept.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.

Variable	Description
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'‘, 'RR.NN'‘, or 'RR.RR'.
history	Treatment index specifying the regulation in previous Phases, which is either '1' for markets in Phase 1, 'N' (resp. 'R') for markets in Phase 2 which succeeded NOREG (REG) markets, 'N.N', 'N.R', 'R.N', or 'R.R' for markets in Phase 3.
Location	City index, which is either 'Graz' or 'Vienna'.
BBV	Buyback Value.
BBVCent	Buyback Value centralized by the unconditional expected value of 57.5.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.
REGBoth	Regulatory index which is either '1' when both markets in a period apply regulation or '0' otherwise.
REGSH	Regulatory index which is eiterh '1' when a market in Phase 2 applies regulation or '0' otherwise.
BestBid180	Active bid in the order book when market ended which offered the highest bid price.
BestAsk180	Active ask in the order book when market ended which offered assets for the lowest ask price.
BAspread180	Difference between best bid and best ask price when market ended.
midpointBA180	Arithmetic average of the best bid and best ask price when market ended.
BestBid150	Mean best bids in the order book in the last 30 seconds weighted with the seconds providing the highest bid price.
BestAsk150	Mean best asks in the order book in the last 30 seconds weighted with the seconds providing the lowest ask price.
BAspread150	Mean difference between best bid and best ask price in the last 30 seconds each second.
midpointBA150	Mean midpoint between best bid and best ask price in the last 30 seconds each second.
midpointBAavg150	Midpoint between mean best bid and mean best ask price in the last 30 seconds each second.
BA_BBV	Difference between the mean midpoints between best bid and best ask prices of the whole timespan of one market, and the the buyback value.
BA_BBV150	Difference between the mean midpoints between best bid and best ask prices in the last 30 seconds, and the the buyback value.
BA_BBV180	Difference between the mean midpoints between best bid and best ask prices when market closes, and the the buyback value.

Variable	Description
lnBA_BBV	Logarithmic ratio of the mean midpoints between best bid and best ask prices of the whole timespan of one market, and the the buyback value.
lnBA_BBV150	Logarithmic ratio between the mean midpoints between best bid and best ask prices in the last 30 seconds, and the the buyback value.
lnBA_BBV180	Logarithmic ratio between the mean midpoints between best bid and best ask prices when market closes, and the the buyback value.
meanBestBid	Mean best bids in the order book in the whole timespan of a market weighted with the seconds providing the highest bid price.
meanBestAsk	Mean best asks in the order book in the whole timespan of a market weighted with the seconds providing the lowerst ask price.
meanBAspread	Mean difference between best bid and best ask price each second.
meanmidpointBA	Mean midpoint between best bid and best ask price in the whole timespan of a market.
meanBAspreadwins	Mean difference between best bid and best ask price each second after a symmetric 90% winsorization of prices.
meanBAspreadwins2	Mean difference between best bid and best ask price each second after a symmetric 90% winsorization.
meanreturnsec	Mean price change between observations each second.
meanreturn	Mean price change between transactions.
meanreturnwins	Mean price change between transactions after a symmetric 90% winsorization of prices.
meanreturnwins2	Mean price change between transactions after a symmetric 90% winsorization.
obsreturn	Number of observations of returns, i.e., of two consecutive transactions.
sdreturnsec	Standard deviation of price changes observed each second within a market.
volatility	Standard deviation of transaction price returns within a market.
volatilitywins	Standard deviation of transaction price returns within a market after a symmetric 90% winsorization of prices.
volatilitywins2	Standard deviation of transaction price returns within a market after a symmetric 90% winsorization.
meanPrice	Mean transaction price within a market.
sdPrice	Standard deviation of transaction prices within a market.
Volume	Number of assets transacted in a single market.
lagVolume	Number of assets transacted in the previous market.
VolumeUni	Number of assets transacted involving uninformed traders in a single market.
VolumeInf	Number of assets transacted involving informed traders in a single market.

Variable	Description
Volume_Informed_Informed	Number of assets offered and accepted by informed traders in a single market.
Volume_Uninformed_Informed	Number of assets offered by uninformed and accepted by informed traders in a single market.
Volume_Informed_Uninformed	Number of assets offered by informed and accepted by uninformed traders in a single market.
Volume_Uninformed_Uninformed	Number of assets offered and accepted by uninformed traders in a single market.
LimitVolume	Number of assets offered in limit orders in a single market.
lagLimitVolume	Number of assets offered in limit orders in the previous market.
LimitVolumeInf	Number of assets offered in limit orders by informed traders in a single market.
LimitVolumeUni	Number of assets offered in limit orders by uninformed traders in a single market.
NumTransactions	Number of transactions in a single market.
Countoffers	Number of limit orders placed in a single market.
CountSelloffers	Number of asks placed in a single market.
CountBuyoffers	Number of bids placed in a single market.
CancelledVolume	Number of offered assets withdrawn before market closing.
remainingVol	Number of offered assets in the order book at market closing.
SellLimitVolume	Number of assets offered in ask limit orders in a single market.
BuyLimitVolume	Number of assets offered in bid limit orders in a single market.
ProfitPotential	Sum absolute difference between the transaction price and the buyback value for each transaction times the transacted volume.
GD	Geometric Deviation - Geometric volume-weighted average relative mispricing within a market.
GAD	Geometric Absolute Deviation - Absolute geometric volume-weighted average relative mispricing within a market.
GADhyp	Hypothetical GAD when prices are set to be the unconditional expected value, 57.5.
rGAD	1 minus the ratio between GAD and the hypothetical GAD.
RD	Relative Deviation - Arithmetic volume-weighted average relative mispricing within a market.
RAD	Relative Absolute Deviation - Absolute arithmetic volume-weighted average relative mispricing within a market.
GD120	Geometric volume-weighted average relative mispricing in the last minute of a market.
GAD120	Absolute geometric volume-weighted average relative mispricing in the last minute of a market.
RD120	Arithmetic volume-weighted average relative mispricing in the last minute of a market.

Variable	Description
RAD120	Absolute arithmetic volume-weighted average relative mispricing in the last minute of a market.
Price	Last transaction price in a market.
Price120	Mean transaction price in the last minute of a market.
marketshare	Ratio of transacted volume over the transacted volume of both simultaneously operating markets.
lagmarketshare	marketshare in the previous period.
marketshareLimit	Ratio of limit order volume over the limit order volume of both simultaneously operating markets.
lagmarketshareLimit	marketshare of limits in the previous period.
AssetTurnover	Ratio of transacted volume over the remaining volume at market closing.
TransactionSize	Ratio of transacted volume over the number of transactions in a single market.
LimitOrderTurnover	Ratio of limit order volume over the remaining volume at market closing.
LimitOrderSize	Ratio of limit order volume over the number of transactions in a single market.
odds	Ratio of transacted volume over the transacted volume in the other, simultaneously operating market.
lagodds	odds in the previous period.
oddsLimit	Ratio of limit order volume over the limit order volume in the other, simultaneously operating market.
lagoddsLimit	limit order odds in the previous period.
oddsUninf	Ratio of transacted volume involving uninformed traders over the transacted volume involving uninformed traders in the other, simultaneously operating market.
oddsInf	Ratio of transacted volume involving informed traders over the transacted volume involving informed traders in the other, simultaneously operating market.
oddsInfmax	Ratio of transacted volume involving informed traders over the transacted volume involving informed traders in the other, simultaneously operating market such that markets with all market share are associated with the highest observed ratio.
oddsInfmax2	Ratio of transacted volume involving uninformed traders over the transacted volume involving uninformed traders in the other, simultaneously operating market such that markets with all market share are associated with the transacted volume over 1.
oddsInfmax3	Ratio of transacted volume involving uninformed traders over the transacted volume involving uninformed traders in the other, simultaneously operating market such that markets with all market share are associated with the highest observed ratio in the same phase.

Variable	Description
oddswins	odds after 90% winsorization.
oddsLimitwins	Limit order odds after 90% winsorization.
oddsInfwins	odds involving informed traders after 90% winsorization.
oddsUninfwins	odds involving uninformed traders after 90% winsorization.
oddsLimitUninf	Limit order odds involving uninformed traders.
oddsLimitInf	Limit order odds involving informed traders.
geomodds_start	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 1.
geomodds_middle	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 2.
geomodds_end	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 1.
absgeomodds_start	Absolute geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 1.
absgeomodds_middle	Absolute geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 2.
absgeomodds_end	Absolute geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 3.
geomoddsInf_start	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 1.
geomoddsInf_middle	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 2.
geomoddsInf_end	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 3.
geomoddsUni_start	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 1.
geomoddsUni_middle	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 1.
geomoddsUni_end	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 3.

Variable	Description
geomoddswins_start”	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 1 after 90% winsorization of odds.
geomoddswins_middle	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 2 after 90% winsorization of odds.
geomoddswins_end	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 3 after 90% winsorization of odds.
geomoddsInfwins_start	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 1 after 90% winsorization of odds.
geomoddsInfwins_middle	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 2 after 90% winsorization of odds.
geomoddsInfwins_end	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 3 after 90% winsorization of odds.
geomoddsUniwins_start	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 1 after 90% winsorization of odds.
geomoddsUniwins_middle	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 2 after 90% winsorization of odds.
geomoddsUniwins_end	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 3 after 90% winsorization of odds.
geomoddsLimitInf_start	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 1.
geomoddsLimitInf_middle	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 2.

Variable	Description
geomoddsLimitInf_end	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving informed traders in Phase 3.
geomoddsLimitUni_start	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 1.
geomoddsLimitUni_middle	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 2.
geomoddsLimitUni_end	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) involving uninformed traders in Phase 3.
geomoddsLimit_start	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 1.
geomoddsLimit_middle	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 2.
geomoddsLimit_end	Geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 3.
absgeomoddsLimit_start	Absolute geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 1.
absgeomoddsLimit_middle	Absolute geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 2.
absgeomoddsLimit_end	Absolute geometric ratio of limit order volume over the transacted volume in the other, simultaneously operating markets (geometric averages) in Phase 3.
unprofittime	Unexectued Profitable Orders per Time - Money on the table times the time on the market, i.e., profitable price difference between an offer and the fundamental value times the remaining volume times the timespan the order is on the market.
RUPT	Relative Unexecuted Profitable Orders per Time - relative money on the table, i.e., profitable price difference between an offer and the fundamental value times the remaining volume times the timespan the order is on the market divided by the fundamental value and divided by the sum of time times volume of all limit orders.
shortsells	Number of assets sold with negative asset endowment using the short limit capacity.
marginbuysTaler	Money spend to buy assets with negative money endowment using the credit limit.
marginbuysAsset	Purchases with negative money endowments divided by the transaction price.

Variable	Description
marginbuys	Purchases with negative money endowments divided by the buyback value.
shortsells_Informed	Number of assets sold with negative asset endowment using the short limit capacity involving informed traders.
shortsells_Uninformed	Number of assets sold with negative asset endowment using the short limit capacity involving uninformed traders.
marginbuys_Informed	Purchases with negative money endowments divided by the buyback value involving informed traders.
marginbuys_Uninformed	Purchases with negative money endowments divided by the buyback value involving uninformed traders.
marginbuysAsset_Informed	Purchases with negative money endowments divided by the transaction price involving informed traders.
marginbuysAsset_Uninformed	Purchases with negative money endowments divided by the transaction price involving uninformed traders.
NumActiveTrader	Number of traders who either placed a limit order or accepted a market order.
NumTransactingTraders	Number of traders who either accepted a market order or whose limit order has been accepted by others.
NumOfferingTraders	Number of traders who placed a limit order.
ParticipationRate_Uninf	Number of active uninformed traders divided by the total number of uninformed traders.
ParticipationRate_Inf	Number of active informed traders divided by the total number of informed traders.
HHInitialAssets	Herfindahl–Hirschman index for the initial asset endowment with an alpha of 2.
HHEndAssets	Herfindahl–Hirschman index for the asset endowment at market closing with an alpha of 2.
HHInitialEndowment	Herfindahl–Hirschman index for the initial endowment with an alpha of 2.
HHEndEndowment	Herfindahl–Hirschman index for the endowment at market closing with an alpha of 2.
HHEndEndowmentPun	Herfindahl–Hirschman index for the endowment at market closing after punishment payments with an alpha of 2.
HHVolume	Herfindahl–Hirschman index for the transacted volume with an alpha of 2.
HHPDbefore	Herfindahl–Hirschman index for the wealth change before redistributions with an alpha of 2.
HHPDPun	Herfindahl–Hirschman index for the wealth change after punishement payments with an alpha of 2.
HHI_InitialAssets	Herfindahl–Hirschman index for the initial asset endowment with an alpha of 2 for active traders.
HHI_EndAssets	Herfindahl–Hirschman index for the asset endowment at market closing with an alpha of 2 for active traders.
HHI_InitialEndowment	Herfindahl–Hirschman index for the initial endowment with an alpha of 2 for active traders.

Variable	Description
HHI_EndEndowment	Herfindahl–Hirschman index for the endowment at market closing with an alpha of 2 for active traders.
HHI_EndEndowmentPun	Herfindahl–Hirschman index for the endowment after punishment payment at market closing with an alpha of 2 for active traders.
HHI_Volume	Herfindahl–Hirschman index for the transacted volume with an alpha of 2 for active traders.
HHI_PDbefore	Herfindahl–Hirschman index for the wealth change before redistributions with an alpha of 2 for active traders.
HHI_PDPun	Herfindahl–Hirschman index for the wealth change after punisment payments with an alpha of 2 for active traders.
GiniPDbefore	Gini index for wealth change before redistributions.
GiniPDPun	Gini index for wealth change after punishment payment.
GiniProfit	Gini index for payoffs at market closing after punishemnt payment.
GiniAssets	Gini index for the initial asset endowment.
GiniEndowment	Gini index for the initial endowment.

subjectsummary

The table 'subjectsummary' summarizes data for each individual in each market, i.e. 14 observations for each market, period, and cohort.

Variable	Description
subjectID	ID variable, which uniquely identifies each participant from '1' to '382'.
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Subject	ID variable, which identifies participants within an experimental session from '1' to '14'.
client	ID variable, which identifies participants within an experimental session.
Period	Period index, ranging from '1' to '12'.
Period0	Period index, ranging from '0' to '5', indicating the distance to the phase's first period, starting with 0 to facilitate the interpretation of the intercept.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.

Variable	Description
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'‘, 'RR.NN'‘, or 'RR.RR'.
history	Treatment index specifying the regulation in previous Phases, which is either '1' for markets in Phase 1, 'N' (resp. 'R') for markets in Phase 2 which succeeded NOREG (REG) markets, 'N.N', 'N.R', 'R.N', or 'R.R' for markets in Phase 3.
Location	City index, which is either 'Graz' or 'Vienna'.
BBV	Buyback Value.
BBVCent	Buyback Value centralized by the unconditional expected value of 57.5.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.
REGBoth	Regulatory index which is either '1' when both markets in a period apply regulation or '0' otherwise.
REGSH	Regulatory index which is either '1' when a market in Phase 2 applies regulation or '0' otherwise.
Role	Trader type index which is either 'Informed trader' or 'Uninformed trader'.
InitialAssets	Number of assets this participant is endowed at the beginning of this period.
Assets	Number of assets this participants holds at market closing of this period.
InitialCash	Monetary units this participant is endowed at the beginning of this period.
Cash	Monetary units this participants holds at market closing of this period.
InitialEndowment	Initial asset endowment time the buyback value plus the initial monetary units.
EndVermoegen	Asset endowment times the buyback value plus the monetary units at market closing before redistributions and punishment.
EndEndowmentPun	Asset endowment times the buyback value plus the monetary units at market closing after redistributions and punishment.
InitialEndowmentUnits	Initial asset endowment value plus initial monetary units divided by the buyback value.
EndEndowmentUnits	Asset endowment plus the monetary units divided by the buyback value at market closing before redistributions and punishment.
EndEndowmentUnitsPun	Asset endowment plus the monetary units divided by the buyback value at market closing after redistributions and punishment.
Punished	Binary variable which is either '1' when this trader is informed and correctly identified, or '0' otherwise.

Variable	Description
PunishmentReceived	Sum of redistributions and punishement payments lost or received in this single market.
TradingProfit	Trading profits from market participation in experimental monetary units before redistribution and punishment.
TPRedist	Trading profits from market participation in experimental monetary units after redistribution.
TPPun	Trading profits from market participation in experimental monetary units after redistribution and punishment.
TPUnits	Trading profits from market participation in asset units (experimental monetary units divided by the buyback value) before redistribution and punishment.
TPUnitsRedist	Trading profits from market participation in asset units after redistribution.
TPUnitsPun	Trading profits from market participation in asset units after redistribution and punishment.
ProfitPeriod	Profit from market participation in Euro after redistribution and punishment.
PDbefore	Wealth change before redistribution and punishement.
PDRedist	Wealth change after redistribution.
PDPun	Wealth change after redistribution and punishment.
PDbeforeVol	Wealth change per transacted asset before redistribution and punishment.
PDRedistVol	Wealth change per transacted asset after redistribution.
PDPunVol	Wealth change per transacted asset after redistribution and punishment.
rankPDbefore	Ordered rank of wealth change before redistribution and punishment within a single market from '1' (lowest) to '14' (highest).
rankPDbeforeRole	Ordered rank of wealth change before redistribution and punishment within a single market by trader type from '1' (lowest) to '10' (highest, resp. '4' for informed traders).
rankavgPDbeforeRole	Ordered rank of average wealth change before redistribution and punishment throughout the experiment by role from '1' (lowest) to '14' (highest).
AvgPDbeforeRole	Arithmetic mean of wealth changes per transacted asset before redistribution and punishment in periods in the same trader type as in this period.
Volume	Number of assets transacted in a single market.
LimitVolume	Number of assets offered in limit orders in a single market.
CancelledVolume	Number of offered assets withdrawn before market closing.
VolumeMarketOrder	Number of accepted assets in market orders in a single market.
VolumeLimitOrder	Number of offered assets accepted by another trader in a single market.

Variable	Description
VolumeSold	Number of assets sold in a single market.
VolumePurchased	Number of assets purchased in a single market.
activeTrader	Binary variable which identifies whether this trader placed any limit order or accepted any market order.
transacted	Binary variable which identifies whether this trader accepted any market order.
offered	Binary variable which identifies whether this trader placed any limit order.
TPUnProfitTransaction	Trading losses from unprofitable transactions in a single market.
VolUnprofitTransaction	Number of assets transacted in unprofitable transactions in a single market.
NumUnprofitTransactions	Number of unprofitable transactions in a single market.
marketshare	Ratio of transacted volume of this trader over the transacted volume in both simultaneously operating markets.
odds	Ratio of transacted volume of this trader over the transacted volume in the other, simultaneously operating market.
oddsLimit	Ratio of limit order volume of this trader over the limit order volume in the other, simultaneously operating market.
shortsells	Number of assets sold with negative asset endowment using the short limit capacity.
marginbuysTaler	Money spend to buy assets with negative money endowment using the credit limit.
marginbuysAsset	Purchases with negative money endowments divided by the transaction price.
marginbuys	Purchases with negative money endowments divided by the buyback value.
ParticipationRate_Uninf	Number of active uninformed traders in this market divided by the total number of uninformed traders.
ParticipationRate_Inf	Number of active informed traders in this market divided by the total number of informed traders.
ObserverStrategy	Self-description of observers at the end of the experiment how they use information: PostQ1: 'Please describe how you think the available information (1. volume limit; 2. volume limit deleted; 3. trading volume limit; 4. trading volume market; 5. volume purchased; 6. volume sold; 7. volume purchased - sold; 8. average price; 9. average volume) can be used to identify informed traders!'.
WhichMarket	Self-description of traders at the end of the experiment how they estimate the probability of a detection of informed traders. PostQ2: 'Please describe, which criteria were decisive for you, when choosing which market to trade on!'.

Variable	Description
ProbabilityDetected	Self-description of traders at the end of the experiment how they estimate the probability of a detection of informed traders. PostQ3: 'How high do you estimate the probability that an observer correctly identifies a trader with information as such.'.
StrategyTrader	Self-description of traders at the end of the experiment of their trading strategy. PostQ4: 'What strategies did you use to avoid being recognized by observers as a trader with information?'.
OpinionPenalty	Self-description of participants at the end of the experiment about their opinion on the appropriateness of the penalty. PostQ5: 'If a trader with information is correctly selected by the observer, he loses his trading profit and must pay an additional penalty equal to the trading profit. Please indicate whether you consider this penalty to be appropriate, too low, or too high.'.
RiskGeneral	Self-description of participants' risk tolerance at the end of the experiment. PostQ6: 'How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?'.
RiskFinancial	Self-description of participants' financial risk tolerance at the end of the experiment. PostQ7 'People can behave differently in different situations. How would you rate your willingness to take risks in financial matters?'.
LossAversion	Self-description of participants loss tolerance at the end of the experiment. PostQ8 'In financial decisions, both gains and losses are possible. To what extent do possible losses compared to possible gains influence you?'.
Department	Self-description of participants' department of studies. PostQ9: 'Which faculty are you studying at?'.
MajorOther	If they specified other at department, they are asked to specify here their faculty.
Age	Self-description of participants' age. PostQ10a: 'Age in years'.
Female	Self-description of participants' gender which can be either 'Weiblich' for Female, 'Männlich' for Male, or 'Divers'.
GeneralComments	Room for further comments concerning the experiment.
gender	Self-description of participants' gender which can be either 'female', 'male', or 'xdivers'.

subjects

The table 'subjects' summarizes data for each individual in each period, i.e. 14 observations for each period and cohort.

Variable	Description
subjectID	ID variable, which uniquely identifies each participant from ‘1’ to ‘382’.
SessionID	ID variable, which uniquely identifies each session from ‘1’ to ‘24’.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Subject	ID variable, which identifies participants within an experimental session from ‘1’ to ‘14’.
Group	ID variable, which identifies participants’ group within an experiemntal session from ‘1’ to ‘2’.
client	ID variable, which identifies participants within an experimental session.
Period	Period index, ranging from ‘1’ to ‘12’.
Programme	Progress index, which is either ‘1’ for the pre-experimental questionnaire, ‘2’ for the training periods, and ‘3’ for the actual experimental data.
Treatment	Treatment index, which is either ‘NN.NR.RR’, ‘NN.RN.RR’, ‘RR.NR.NN’, ‘RR.NR.RR’, ‘RR.RN.NN’, or ‘RR.RN.RR’.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either ‘NR’, or ‘RN’.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either’NN.RR’‘, ’RR.NN’‘, or ’RR.RR’.
Location	City index, which is either ‘Graz’ or ‘Vienna’.
Role	Participant role index which is either ‘Informed trader’, ‘Uninformed trader’, ‘Observer’, or ‘Experimenter’.
IsInsider	Participant role index which is either ‘1’ for informed traders or ‘0’ otherwise.
IsExperimenter	Participant role index which is either ‘1’ for the experimenter or ‘0’ otherwise.
IsAuthority	Participant role index which is either ‘1’ for observers or ‘0’ otherwise.
InitialAssets[1]	Number of assets this participant is endowed at the beginning of this period.
Assets[1]	Number of assets this participants holds at market closing of this period.
InitialCash	Monetary units this participant is endowed at the beginning of this period.
Cash	Monetary units this participants holds at market closing of this period.
InitialEndowment	Initial asset endowment time the buyback value plus the initial monetary units.
EndVermoegen	Asset endowment times the buyback value plus the monetary units at market closing before redistributions and punishment.
EndEndowmentPun	Asset endowment times the buyback value plus the monetary units at market closing after redistributions and punishment.

Variable	Description
Punished[1]	Binary variable which is either '1' when this trader is informed and correctly identified in the top market, or '0' otherwise.
Punished[2]	Binary variable which is either '1' when this trader is informed and correctly identified in the bottom market, or '0' otherwise.
TradingProfit[1]	Trading profits from market participation in experimental monetary units before redistribution and punishment in the top market.
TradingProfit[2]	Trading profits from market participation in experimental monetary units before redistribution and punishment in the bottom market.
CompensationReceived[1]	Sum of redistributions and punishement payments lost or received in the top market.
CompensationReceived[2]	Sum of redistributions and punishement payments lost or received in the bottom market.
ProfitPeriod	Profit from market participation in Euro after redistribution and punishment.
PD	Wealth change after redistribution and punishment.
VolumeTransactions[1]	Number of assets transacted in the top market.
VolumeTransactions[2]	Number of assets transacted in the bottom market.
LimitVol[1]	Number of assets offered in limit orders in the top market.
LimitVol[2]	Number of assets offered in limit orders in the bottom market.
CancelledVol[1]	Number of offered assets withdrawn before market closing in the top market.
CancelledVol[2]	Number of offered assets withdrawn before market closing in the bottom market.
VolMarketTran[1]	Number of accepted assets in market orders in the top market.
VolMarketTran[2]	Number of accepted assets in market orders in the bottom market.
VolLimitTran[1]	Number of offered assets accepted by another trader in the top market.
VolLimitTran[2]	Number of offered assets accepted by another trader in the bottom market.
Transactions[1]	Number of transactions in the top market.
Transactions[2]	Number of transactions in the bottom market.
VolPurch[1]	Number of assets purchased in the top market.
VolPurch[2]	Number of assets purchased in the bottom market.
VolSold[1]	Number of assets sold in the top market.
VolSold[2]	Number of assets sold in the bottom market.
TotalProfit	Profit from participation in Euro at the end of an experimental session.

Variable	Description
ObserverStrategy	Self-description of observers at the end of the experiment how they use information: PostQ1: 'Please describe how you think the available information (1. volume limit; 2. volume limit deleted; 3. trading volume limit; 4. trading volume market; 5. volume purchased; 6. volume sold; 7. volume purchased - sold; 8. average price; 9. average volume) can be used to identify informed traders!'.
WhichMarket	Self-description of traders at the end of the experiment how they estimate the probability of a detection of informed traders. PostQ2: 'Please describe, which criteria were decisive for you, when choosing which market to trade on!'.
ProbabilityDetected	Self-description of traders at the end of the experiment how they estimate the probability of a detection of informed traders. PostQ3: 'How high do you estimate the probability that an observer correctly identifies a trader with information as such.'.
StrategyTrader	Self-description of traders at the end of the experiment of their trading strategy. PostQ4: 'What strategies did you use to avoid being recognized by observers as a trader with information?'.
OpinionPenalty	Self-description of participants at the end of the experiment about their opinion on the appropriateness of the penalty. PostQ5: 'If a trader with information is correctly selected by the observer, he loses his trading profit and must pay an additional penalty equal to the trading profit. Please indicate whether you consider this penalty to be appropriate, too low, or too high.'.
RiskGeneral	Self-description of participants' risk tolerance at the end of the experiment. PostQ6: 'How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?'.
RiskFinancial	Self-description of participants' financial risk tolerance at the end of the experiment. PostQ7 'People can behave differently in different situations. How would you rate your willingness to take risks in financial matters?'.
LossAversion	Self-description of participants loss tolerance at the end of the experiment. PostQ8 'In financial decisions, both gains and losses are possible. To what extent do possible losses compared to possible gains influence you?'.
Department	Self-description of participants' department of studies. PostQ9: 'Which faculty are you studying at?'.
MajorOther	If they specified other at department, they are asked to specify here their faculty.
Age	Self-description of participants' age. PostQ10a: 'Age in years'.

Variable	Description
Female	Self-description of participants' gender which can be either 'Weiblich' for Female, 'Männlich' for Male, or 'Divers'.
GeneralComments	Room for further comments concerning the experiment.
gender	Self-description of participants' gender which can be either 'female', 'male', or 'xdivers'.

phasesummary

The table 'phasesummary' summarizes data for each phase, market, and trader type and for the overall market, i.e. three observations for each trader type times two markets times three phases constitute 18 observations for each cohort.

Variable	Description
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Role	Trader type index which is either 'Informed trader', 'Uninformed trader', or 'market'.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'‘, 'RR.NN'‘, or 'RR.RR'.
history	Treatment index specifying the regulation in previous Phases, which is either '1' for markets in Phase 1, 'N' (resp. 'R') for markets in Phase 2 which succeeded NOREG (REG) markets, 'N.N', 'N.R', 'R.N', or 'R.R' for markets in Phase 3.
Location	City index, which is either 'Graz' or 'Vienna'.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.
REGBoth	Regulatory index which is either '1' when both markets in a phase apply regulation or '0' otherwise.
REGSH	Regulatory index which is eiterh '1' when markets in Phase 2 apply regulation or '0' otherwise.
Volume	Number of assets transacted in a phase.
LimitVolume	Number of assets offered in limit orders in a phase.

Variable	Description
NumActiveTrader	Number of traders who either placed a limit order or accepted a market order.
PR	Participation Rate - Number of active traders divided by the total number of traders.
CancelledVolume	Number of offered assets withdrawn before market closing.
TraderCount	Number of traders times periods in a phase.
obs	Number of market observations, i.e. number of markets with activity.
TraderVolume	Number of assets transacted per trader in a phase.
TraderLimitVolume	Number of assets offered in limit orders per trader in a phase.
shortsells	Number of assets sold with negative asset endowment using the short limit capacity.
marginbuysTaler	Money spend to buy assets with negative money endowment using the credit limit.
marginbuysAsset	Purchases with negative money endowments divided by the transaction price.
marginbuys	Purchases with negative money endowments divided by the buyback value.
odds	Ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (arithmetic averages).
odds_start	Ratio of transacted volume between simultaneously operating market of the same cohort in Phase 1.
odds_middle	Ratio of transacted volume between simultaneously operating market of the same cohort in Phase 2.
odds_end	Ratio of transacted volume between simultaneously operating market of the same cohort in Phase 3.
oddsLimit	Ratio of limit order volume over the limit order volume in the other, simultaneously operating markets.
oddsLimit_start	Ratio of limit order volume between simultaneously operating market of the same cohort in Phase 1.
oddsLimit_middle	Ratio of limit order volume between simultaneously operating market of the same cohort in Phase 2.
oddsLimit_end	Ratio of limit order volume between simultaneously operating market of the same cohort in Phase 3.
geomodds	Geometric ratio of transacted volume over the transacted volume in the other, simultaneously operating markets (geometric averages).
geomoddsLimit	Geometric ratio of limit order volume over the limit order volume in the other, simultaneously operating markets.
absgeomodds	Geometric absolute ratio of transacted volume over the transacted volume in the other, simultaneously operating markets.
absgeomoddsLimit	Geometric absolute ratio of limit order volume over the limit order volume in the other, simultaneously operating markets.

Variable	Description
geomodds_start	Geometric ratio of transacted volume between simultaneously operating market of the same cohort in Phase 1.
geomodds_middle	Geometric ratio of transacted volume between simultaneously operating market of the same cohort in Phase 2.
geomodds_end	Geometric ratio of transacted volume between simultaneously operating market of the same cohort in Phase 3.
geomoddsLimit_start	Geometric ratio of limit order volume between simultaneously operating market of the same cohort in Phase 1.
geomoddsLimit_middle	Geometric ratio of limit order volume between simultaneously operating market of the same cohort in Phase 2.
geomoddsLimit_end	Geometric ratio of limit order volume between simultaneously operating market of the same cohort in Phase 3.
marketshare	Ratio of transacted volume over the transacted volume of simultaneously operating markets.
marketshareLimit	Ratio of limit order volume over the limit order volume of simultaneously operating markets.
d1	Difference in odds between this phase and Phase 1.
d2	Difference in odds between this phase and Phase 2.
d3	Difference in odds between this phase and Phase 3.
d1r	Difference in odds between this phase and Phase 1 dividing odds by the number of periods in the resp. phase.
d2r	Difference in odds between this phase and Phase 2 dividing odds by the number of periods in the resp. phase.
d3r	Difference in odds between this phase and Phase 3 dividing odds by the number of periods in the resp. phase.
d1P	Difference in geometric odds between this phase and Phase 1.
d2P	Difference in geometric odds between this phase and Phase 2.
d3P	Difference in geometric odds between this phase and Phase 3.

observers

The table 'observers' summarizes data for each observer in each period, i.e. two observations for each period and cohort.

Variable	Description
subjectID	ID variable, which uniquely identifies each participant from '1' to '382'.
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.

Variable	Description
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Subject	ID variable, which identifies participants within an experimental session from '1' to '14'.
client	ID variable, which identifies participants within an experimental session.
Period	Period index, ranging from '1' to '12'.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'', 'RR.NN'', or 'RR.RR'.
Location	City index, which is either 'Graz' or 'Vienna'.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
Role	Participants' role index which is 'Observer'.
NumSelected	Number of traders suspected to be informed after market closing.
NumDetections	Number of traders correctly identified to be informed after market closing.
NumPunished	Number of traders correctly identified to be informed in the regulatory regime REG after market closing.
NumSelected	Number of traders incorrectly suspected to be informed after market closing.
ProfitPeriod	Profit from market observation in Euro.
ObserverStrategy	Self-description of observers at the end of the experiment how they use information: PostQ1: 'Please describe how you think the available information (1. volume limit; 2. volume limit deleted; 3. trading volume limit; 4. trading volume market; 5. volume purchased; 6. volume sold; 7. volume purchased - sold; 8. average price; 9. average volume) can be used to identify informed traders!'.
OpinionPenalty	Self-description of participants at the end of the experiment about their opinion on the appropriateness of the penalty. PostQ5: 'If a trader with information is correctly selected by the observer, he loses his trading profit and must pay an additional penalty equal to the trading profit. Please indicate whether you consider this penalty to be appropriate, too low, or too high.'.

Variable	Description
RiskGeneral	Self-description of participants' risk tolerance at the end of the experiment. PostQ6: 'How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?'.
RiskFinancial	Self-description of participants' financial risk tolerance at the end of the experiment. PostQ7 'People can behave differently in different situations. How would you rate your willingness to take risks in financial matters?'.
LossAversion	Self-description of participants loss tolerance at the end of the experiment. PostQ8 'In financial decisions, both gains and losses are possible. To what extent do possible losses compared to possible gains influence you?'.
Department	Self-description of participants' department of studies. PostQ9: 'Which faculty are you studying at?'.
MajorOther	If they specified other at department, they are asked to specify here their faculty.
Age	Self-description of participants' age. PostQ10a: 'Age in years'.
Female	Self-description of participants' gender which can be either 'Weiblich' for Female, 'Männlich' for Male, or 'Divers'.
GeneralComments	Room for further comments concerning the experiment.
gender	Self-description of participants' gender which can be either 'female', 'male', or 'xdivers'.

transactions

The table 'transactions' summarizes data for each acceptence of a limit order, i.e. one observation per market order.

Variable	Description
transactionID	ID variable, which uniquely identifies each market order from '1' to '23549'.
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Period	Period index, ranging from '1' to '12'.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.

Variable	Description
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'‘, 'RR.NN'‘, or 'RR.RR'.
Location	City index, which is either 'Graz' or 'Vienna'.
BBV	Buyback Value.
BBVCent	Buyback Value centralized by the unconditional expected value of 57.5.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.
REGBoth	Regulatory index which is either '1' when both markets in a period apply regulation or '0' otherwise.
REGSH	Regulatory index which is eiterh '1' when a market in Phase 2 applies regulation or '0' otherwise.
offerID	ID variable, which uniquely identifies each limit order from '1' to '19390'.
type	Limit order index specifying whether the liquidity provider offers to buy ('BuyingOffer') or to sell ('SellingOffer').
takerID	ID variable, which uniquely identifies the liquidity taker from '1' to '382'.
makerID	ID variable, which uniquely identifies the liquidity provider from '1' to '382'.
makerRole	Trader type index for the liquidity taker which is either 'Informed trader' or 'Uninformed trader'.
takerRole	Trader type index for the liquidity provider which is either 'Informed trader' or 'Uninformed trader'.
BuyerID	ID variable, which uniquely identifies the buying party from '1' to '382'.
SellerID	ID variable, which uniquely identifies the selling party from '1' to '382'.
orderID	ID variable, which uniquely identifies each withdrawal, limit, and market order from '1' to '19390'.
Price	Price of the transactions at which the asset is bought and sold.
Volume	Number of assets transacted via this market order.
remainingVolExAnte	Number of assets offered via the respective limit order before this market order.
remainingVolExPost	Number of assets offered via the respective limit order after the execution of this market order.
SellersProfit	Trading profit in Taler of the selling party by this market order.
MakersProfit	Trading profit in Taler of the liquidity provider by this market order.

Variable	Description
shortsells	Number of assets sold by the selling party with negative asset endowment using the short limit capacity.
marginbuysTaler	Money spend to buy assets by the buying party with negative money endowment using the credit limit.
marginbuysAsset	Purchases by the buying party with negative money endowments divided by the transaction price.
Pricewins	Price of the transactions at which the asset is bought and sold after a symmetric 90% winsorization of prices.
L.Pricewins	Last price before this market order after a symmetric 90% winsorization of prices.
L.Price	Last price before this market order.
return	Log price change between transactions, i.e., ln('Price') - ln('L.Price').
returnwins	Log price change between transactions after a symmetric 90% winsorization of prices.
returnwins2	Log price change between transactions after a symmetric 90% winsorization of returns.
Time	Time in seconds that has been passed since z-Tree has been started until the market order was executed.
transactionVol	Number of assets transacted via this market order.
OfferTime	Time in seconds that has been passed since z-Tree has been started until the limit order was placed.
AuctionStartTime	Time in seconds that has been passed since z-Tree has been started until the start of the auction.
AuctionEndTime	Time in seconds that has been passed since z-Tree has been started until the end of the auction.
offertime	Time in seconds that has been passed since the start of the auction until the limit order was placed.
transactiontime	Time in seconds that has been passed since the start of the auction until the market order was executed.

offers

The table 'offers' summarizes data for each placement of a limit order, i.e. one observation per limit order.

Variable	Description
offerID	ID variable, which uniquely identifies each limit order from '1' to '19390'.
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Period	Period index, ranging from '1' to '12'.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.

Variable	Description
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'', 'RR.NN'', or 'RR.RR'.
Location	City index, which is either 'Graz' or 'Vienna'.
BBV	Buyback Value.
BBVCent	Buyback Value centralized by the unconditional expected value of 57.5.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.
REGBoth	Regulatory index which is either '1' when both markets in a period apply regulation or '0' otherwise.
REGSH	Regulatory index which is eiterh '1' when a market in Phase 2 applies regulation or '0' otherwise.
type	Limit order index specifying whether the liquidity provider offers to buy ('BuyingOffer') or to sell ('SellingOffer').
makerID	ID variable, which uniquely identifies the liquidity provider from '1' to '382'.
makerRole	Trader type index for the liquidity taker which is either 'Informed trader' or 'Uninformed trader'.
status	Limit order index, which is either 'cancelled' if this limit order got cancelled somewhen throughout the auction, 'on market' if this limit order remaind in the order book at market closing, 'sold out' when all assets were accepted by another party, or 'fully invalidated' when they are no longer feasible at market closing.
Price	Price of the limit order at which the asset is offered to buy or sell.
Volume	Number of assets offered via this limit order.
LimitVolume	Number of assets offered via this limit order.
totTransacted	Number of assets transacted via this limit order.
CancelledVolume	Number of assets cancelled of this limit order.
remainingVol	Number of assets offered via this limit order at market closing.
BuyVol	Number of assets offered via this limit order which the liquidity provided offered to buy.
SellVol	Number of assets offered via this limit order which the liquidity provided offered to sell.
AuctionStartTime	Time in seconds that has been passed since z-Tree has been started until the start of the auction.

Variable	Description
AuctionEndTime	Time in seconds that has been passed since z-Tree has been started until the end of the auction.
offertime	Time in seconds that has been passed since the start of the auction until the limit order was placed.
offertimeEnd	Time in seconds that has been passed since the start of the auction until the end of the respective limit order, i.e., either at market closing, withdrawal, or when the limit order sold out.

orders

The table 'orders' summarizes data for each order, i.e. one observation per withdrawal, limit, and market order.

Variable	Description
orderID	ID variable, which uniquely identifies each withdrawal, limit, and market order from '1' to '19390'.
offerID	ID variable, which uniquely identifies each limit order from '1' to '19390'.
transactionID	ID variable, which uniquely identifies each market order from '1' to '23549'.
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Period	Period index, ranging from '1' to '12'.
Phase	Phase index, which is either 'Phase 1' for periods 1 to 3, 'Phase 2' for periods 4 to 9, or 'Phase 3'.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'', 'RR.NN'', or 'RR.RR'.
Location	City index, which is either 'Graz' or 'Vienna'.
BBV	Buyback Value.
BBVCent	Buyback Value centralized by the unconditional expected value of 57.5.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.

Variable	Description
REGBoth	Regulatory index which is either '1' when both markets in a period apply regulation or '0' otherwise.
REGSH	Regulatory index which is eiterh '1' when a market in Phase 2 applies regulation or '0' otherwise.
type	Limit order index specifying whether the liquidity provider offers to buy ('BuyingOffer') or to sell ('SellingOffer').
makerID	ID variable, which uniquely identifies the liquidity provider from '1' to '382'.
takerID	ID variable, which uniquely identifies the liquidity taker from '1' to '382'.
status	Limit order index, which is either 'cancelled' if this limit order got cancelled via this order, 'on market' if this limit order remaind in the order book after this order, 'sold out' when all assets were accepted by another party, or 'fully invalidated' when they are no longer feasible.
Price	Price of the limit order at which the asset is offered to buy or sell.
Volume	Number of assets offered via this limit order.
LimitVolume	Number of assets offered via the respective limit order.
transactionVol	Number of assets transacted via the respective market order.
totTransacted	Number of assets transacted via the respective limit order.
remainingVolExAnte	Number of assets offered via the respective limit order before this order.
remainingVolExPost	Number of assets offered via the respective limit order after the execution of this order.
AuctionStartTime	Time in seconds that has been passed since z-Tree has been started until the start of the auction.
AuctionEndTime	Time in seconds that has been passed since z-Tree has been started until the end of the auction.
ordertime	Time in seconds that has been passed since the start of the auction until the order was executed/placed/withdrawn.
orderStarttime	Time in seconds that has been passed since the start of the auction until the order was placed, i.e. since the limit order was placed or the last market order was executed.
offertime	Time in seconds that has been passed since the start of the auction until the limit order was placed.
offertimeEnd	Time in seconds that has been passed since the start of the auction until the end of the respective limit order, i.e., either at market closing, withdrawal, or when the limit order sold out.

seconds

The table 'seconds' summarizes data for each second within each market, i.e. 180 observations per period and cohort.

Variable	Description
SessionID	ID variable, which uniquely identifies each session from '1' to '24'.
Date	Date and Program Starting Time of the experimental session in format yymmdd_hhmm.
Period	Period index, ranging from '1' to '12'.
Period0	Period index, ranging from '0' to '5', indicating the distance to the phase's first period, starting with 0 to facilitate the interpretation of the intercept.
market	Market index, which is either 'Bottom' or 'Top' indicating the position on the screen.
time	Time in seconds that has been passed since the start of the auction.
Programme	Progress index, which is either '1' for the pre-experimental questionnaire, '2' for the training periods, and '3' for the actual experimental data.
Treatment	Treatment index, which is either 'NN.NR.RR', 'NN.RN.RR', 'RR.NR.NN', 'RR.NR.RR', 'RR.RN.NN', or 'RR.RN.RR'.
regOrder	Treatment index specifying the order of market regulation in Phase 2, which is either 'NR', or 'RN'.
embTreatment	Treatment index specifying the regulation in Phase 1 and 3, which is either'NN.RR'‘, 'RR.NN'‘, or 'RR.RR'.
history	Treatment index specifying the regulation in previous Phases, which is either '1' for markets in Phase 1, 'N' (resp. 'R') for markets in Phase 2 which succeeded NOREG (REG) markets, 'N.N', 'N.R', 'R.N', or 'R.R' for markets in Phase 3.
Location	City index, which is either 'Graz' or 'Vienna'.
MA	Moving average of transaction volume with past volume being weighted by $\left\{\frac{1}{2}^n \quad | \quad n \in \{1, 2, \ldots, 8, 9, 9\}\right\}$.
BBV	Buyback Value.
BBVCent	Buyback Value centralized by the unconditional expected value of 57.5.
IsREG	Regulatory index, which is either 'REG' for regulated markets or 'NOREG'.
othermarket	Regulatory index for the simultaneous opposite market, which is either 'REG' for regulated markets or 'NOREG'.
REGBoth	Regulatory index which is either '1' when both markets in a period apply regulation or '0' otherwise.
REGSH	Regulatory index which is eiterh '1' when a market in Phase 2 applies regulation or '0' otherwise.
BestBid	Active bid in the order book at this time which offered the highest bid price.
BestAsk	Active ask in the order book at this time which offered assets for the lowest ask price.
BAspread	Difference between best bid and best ask price each second.
midpointBA	Midpoint between best bid and best ask price each second.

Variable	Description
last	Last transaction price in a market before this second.
lnlastPrice	Log transformed last transaction price in a market.
L.lnlastPrice	Log transformed price in a market in the previous second.
return	Log-change in prices between last seconds.
BestBidwins	Active bid in the order book at this time which offered the highest bid price after a symmetric 90% winsorization of prices.
BestAskwins	Active ask in the order book at this time which offered assets for the lowest ask price after a symmetric 90% winsorization of prices.
BAspreadwins	Difference between best bid and best ask price each second after a symmetric 90% winsorization of prices.
BAspreadwins2	Difference between best bid and best ask price each second after a symmetric 90% winsorization of spreads.

Descriptive Statistics table - markets

```
##            Volume VolumeInf VolumeUni LimitVolume ProfitPotential unprofittime
## mean    135.05208  80.68750 124.32118    278.4115        1572.140     10440.50
## sd       79.26076  53.20467  73.77238    142.0059        1754.051     23674.65
## median  120.00000  69.00000 109.00000    254.5000         989.400      1506.20
## minimum   1.00000   0.00000   1.00000     29.0000           0.000         0.00
## maximum 461.00000 301.00000 442.00000   1096.0000       15541.200    199304.50
## n       576.00000 576.00000 576.00000    576.0000         576.000       576.00
##                    GD         GAD           RD         RAD NumActiveTrader
## mean     -0.03171189   0.2427755  -0.01511453   0.1895846       12.454861
## sd        0.21695060   0.2403139   0.21261225   0.1391278        1.308718
## median   -0.04080878   0.1826522  -0.03305893   0.1611328       13.000000
## minimum  -0.74024801   0.0000000  -0.55909304   0.0000000        5.000000
## maximum   0.77482037   3.0467064   0.85833333   0.8583333       14.000000
## n       576.00000000 576.0000000 576.00000000 576.0000000      576.000000
##         AssetTurnover TransactionSize LimitOrderTurnover LimitOrderSize
## mean       1.50776128        3.501688           2.507761       8.330151
## sd         1.93305599        1.357895           1.933056       2.838135
## median     0.99541284        3.408730           1.995413       8.064763
## minimum    0.01388889        1.000000           1.013889       2.636364
## maximum   23.50000000        8.166667          24.500000      24.043478
## n        576.00000000      576.000000         576.000000     576.000000
##         relCancelledVolume
## mean            0.11432273
## sd              0.09928780
## median          0.09427126
## minimum         0.00000000
## maximum         0.61320755
## n             576.00000000
```

The number of transactions per second is equal to 0.4542631, while 1.5005787 is the transacted volume per second over all sessions, periods, and markets.

Descriptive Statistics table - trader

```
##          TotProfit ObserverProfit TraderProfit Informed.trader Uninformed.trader
## mean      29.93481      23.958333     30.78860        33.65104          29.51287
## sd        10.59741       8.666292     10.58350        13.97769          11.64361
## median    30.00000      22.000000     30.00000        31.43593          29.96420
## minimum    5.00000       5.000000      5.00000         5.00000           5.00000
## maximum   74.38601      38.000000     74.38601       144.66067         242.72096
## n        384.00000      48.000000    336.00000      1152.00000        2880.00000
```

```
##          Informed.trader.REG Informed.trader.NOREG Uninformed.trader_REG
## mean                33.07357              34.45951               29.54338
## sd                  13.69666              14.32292               11.43882
## median              31.22900              31.93045               29.98377
## minimum              5.00000               5.00000                5.00000
## maximum            144.66067             136.62928              242.72096
## n                 1344.00000             960.00000             3360.00000
##          Uninformed.trader_NOREG
## mean                    29.47015
## sd                      11.92431
## median                  29.93955
## minimum                  5.00000
## maximum                242.72096
## n                     2400.00000
```

```
## Warning in log(x): NaNs produced
```

```
## Warning in log(x): NaNs produced
```

```
##               Volume LimitVolume TradingProfit ProfitPeriod       Active
## mean       19.293155   19.886533  2.449368e-16     30.69520    0.8896329
## geoMean     8.974152    7.374205  1.952865e+01     28.17543    1.0000000
## sd         25.190966   31.014880  3.909478e+02     12.49368    0.3133662
## median     11.000000   10.000000  0.000000e+00     30.00000    1.0000000
## minimum     0.000000    0.000000 -1.086260e+04      5.00000    0.0000000
## maximum   369.000000  510.000000  6.926800e+03    242.72096    1.0000000
## n        8064.000000 8064.000000  8.064000e+03   8064.00000 8064.0000000
##               CAratio
## mean        1.2043486
## geoMean     1.0023744
## sd          0.7738973
## median      1.0001687
## minimum     0.2047481
## maximum     4.9762593
## n        8064.0000000
```

Socio demographics between treatments

```
##                    NN.RR     RR.NN     RR.RR    pvalue
## Females        0.6339286 0.5408163 0.6428571 0.2645056
## Males          0.3571429 0.4387755 0.3469388 0.3441606
## Econ           0.1607143 0.2653061 0.2244898 0.1760888
## Age             23.88393  24.00000  23.68367 0.2557022
## RiskGeneral     3.883929  4.336735  3.867347 0.4744193
## RiskFinancial   3.017857  3.132653  2.785714 0.6377065
## LossAversion    3.482143  3.673469  3.489796 0.8579533
```

```
## Riskdisclosure  40.48214  41.70745  38.97959 0.7359256
## Opinionpenalty  4.383929  4.683673  4.489796 0.2259928
```

Wealth distribution

```
##                              NN.RR        RR.NN        RR.RR
## embTreatment                 NN.RR        RR.NN        RR.RR
## HHInitialAssets         0.08231434   0.08233123   0.08164045
## HHEndAssets              0.1302420    0.1193319    0.1221980
## HHInitialEndowment      0.07668821   0.07701467   0.07681490
## HHEndEndowment          0.07901163   0.07799416   0.07967402
## HHEndEndowmentPun       0.07833553   0.07759145   0.07912599
## HHVolume                 0.1454077    0.1456533    0.1477512
## HHPDbefore              0.07247006   0.07182909   0.07260612
## HHPDPun                 0.07245494   0.07181917   0.07258671
## HHI_InitialAssets       0.01345829   0.01367210   0.01233478
## HHI_EndAssets           0.07834710   0.06529113   0.06161956
## HHI_InitialEndowment  0.006501523  0.006856600  0.006424854
## HHI_EndEndowment       0.009509260  0.008101680  0.009915942
## HHI_EndEndowmentPun    0.009312170  0.007934672  0.009846212
## HHI_Volume               0.1536964    0.1519157    0.1618840
## HHI_PDbefore           0.001358461  0.000521262  0.001425156
## HHI_PDPun            0.0013383802 0.0005091779 0.0013989388
## GiniPDbefore             0.03847043   0.02674131   0.03660073
## GiniPDPun                0.03803891   0.02637061   0.03599794
## GiniProfit               0.1574957    0.1224899    0.1464645
## GiniAssets               0.2033730    0.2030721    0.1949669
## GiniEndowment            0.1392349    0.1434349    0.1413646
```

Informed traders' activity

```
##            Volume LimitVolume TradingProfit ProfitPeriod       Active
## mean      22.8546    24.29253      78.21017     33.65104    0.9144965
## sd        26.7690    36.53477     458.13457     13.97466    0.2796902
## median    15.0000    12.00000      22.00000     31.43593    1.0000000
## minimum    0.0000     0.00000  -10862.60000      5.00000    0.0000000
## maximum  230.0000   480.00000    3951.60000    144.66067    1.0000000
## n       2304.0000  2304.00000    2304.00000   2304.00000 2304.0000000
##         TPUnProfitTransaction VolUnprofitTransaction NumUnprofitTransactions
## mean                 90.17875              7.131076                2.070747
## sd                  380.56500             16.788180                4.822938
## median                0.00000              0.000000                0.000000
## minimum               0.00000              0.000000                0.000000
## maximum           11544.60000            206.000000               80.000000
## n                  2304.00000           2304.000000             2304.000000
```

Uninformed traders' activity

```
##             Volume LimitVolume TradingProfit ProfitPeriod       Active
## mean      17.86858    18.12413     -31.28407     29.51287    0.8796875
## sd        24.38855    28.32152     355.84807     11.64260    0.3253549
## median    10.00000    10.00000       0.00000     29.96420    1.0000000
## minimum    0.00000     0.00000   -7837.20000      5.00000    0.0000000
## maximum  369.00000   510.00000    6926.80000    242.72096    1.0000000
## n       5760.00000  5760.00000    5760.00000   5760.00000 5760.0000000
```

```
##         TPUnProfitTransaction VolUnprofitTransaction NumUnprofitTransactions
## mean                121.1425               10.65278                3.260069
## sd                  312.9996               18.24259                5.641338
## median               19.3500                5.00000                2.000000
## minimum               0.0000                0.00000                0.000000
## maximum            7837.6000              367.00000              102.000000
## n                  5760.0000             5760.00000             5760.000000
```

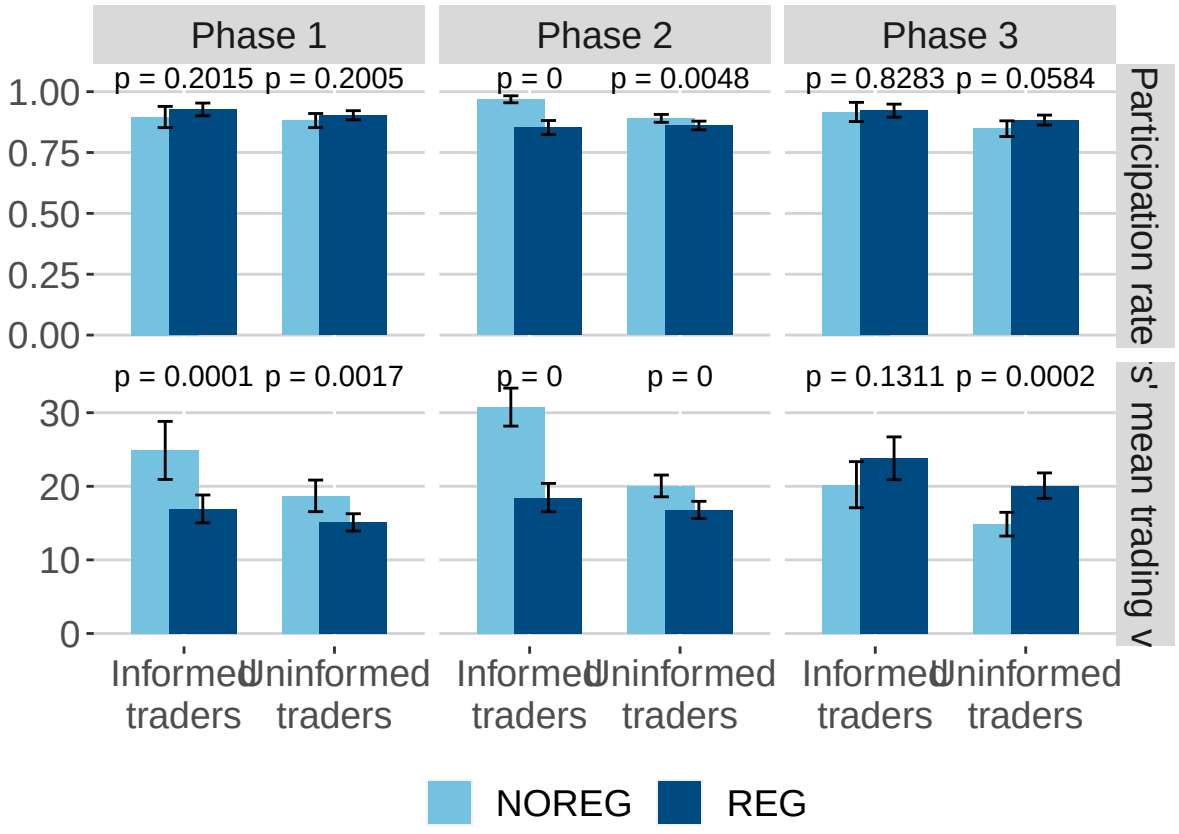
Observers' success rates

```
##                    NN.RR     RR.NN     RR.RR    pvalue
## Selected     0.1335565 0.1168155 0.1056548 0.2351967
## Any selected 0.8385417 0.6927083 0.7395833 0.3387719
## Unveiled     0.1757812 0.1276042 0.1367188 0.2739035
## Any unveiled 0.5156250 0.3750000 0.4270833 0.3441758
```

Active trader

Traders are active, if they either placed a limit order or accepted a market order..

Figure 1: Participation rates and traders' mean trading volume in a market by regulatory regime, trader type, and phase.



Informed traders participation rates

```
##                       NOREG     REG       pvalues_Informed NOREG     REG
## PR all phases         "0.9438"  "0.8936"  "0"              "0.8800"  "0.8795"
```

```
## PR Phase 1           "0.8958"  "0.9271"  "0.2015"         "0.8812"  "0.9031"
## PR Phase 2           "0.9688"  "0.8524"  "0"              "0.8903"  "0.8611"
## PR Phase 3           "0.9167"  "0.9219"  "0.8283"         "0.8479"  "0.8833"
## PR Phase 1 & 3       "0.9062"  "0.9245"  "0.2871"         "0.8646"  "0.8932"
## Vol all phases       "27.4760" "19.5536" "0"              "18.7413" "17.2452"
## Vol Phase 1          "24.8750" "16.9297" "0.0001"         "18.7000" "15.0927"
## Vol Phase 2          "30.7622" "18.4670" "0"              "20.0507" "16.7868"
## Vol Phase 3          "20.2188" "23.8073" "0.1311"         "14.8542" "20.0854"
## Vol Phase 1 & 3      "22.5469" "20.3685" "0.1603"         "16.7771" "17.5891"
## LimitVol all phases  "27.7552" "21.8192" "0.0001"         "18.0829" "18.1536"
## LimitVol Phase 1     "25.4271" "16.5911" "0.0015"         "16.1271" "14.3052"
## LimitVol Phase 2     "30.4462" "18.9653" "0"              "18.6903" "17.8993"
## LimitVol Phase 3     "22.0104" "31.3281" "0.0142"         "18.2167" "22.3833"
## LimitVol Phase 1 & 3 "23.7188" "23.9596" "0.9191"         "17.1719" "18.3443"
##                      pvalues_Uninformed
## PR all phases        "0.9509"
## PR Phase 1           "0.2005"
## PR Phase 2           "0.0048"
## PR Phase 3           "0.0584"
## PR Phase 1 & 3       "0.0238"
## Vol all phases       "0.0217"
## Vol Phase 1          "0.0017"
## Vol Phase 2          "0"
## Vol Phase 3          "0.0002"
## Vol Phase 1 & 3      "0.3677"
## LimitVol all phases  "0.9256"
## LimitVol Phase 1     "0.1594"
## LimitVol Phase 2     "0.3222"
## LimitVol Phase 3     "0.0228"
## LimitVol Phase 1 & 3 "0.2985"
```

Uninformed traders participation rates

```
##               NOREG    REG      pvalues_Informed pvalues_prob_test_Informed
## PR all phases "0.9438" "0.8936" "0"              "0"
## PR Phase 1    "0.8958" "0.9271" "0.2015"         "0.263"
## PR Phase 2    "0.9688" "0.8524" "0"              "0"
## PR Phase 3    "0.9167" "0.9219" "0.8283"         "0.9567"
##               NOREG    REG      pvalues_Uninformed pvalues_prob_test_Uninformed
## PR all phases "0.8800" "0.8795" "0.9509"           "0.9836"
## PR Phase 1    "0.8812" "0.9031" "0.2005"           "0.2342"
## PR Phase 2    "0.8903" "0.8611" "0.0048"           "0.0206"
## PR Phase 3    "0.8479" "0.8833" "0.0584"           "0.0703"
```

Table 10: Regressions of participation rate by trader type and phase

	All traders			Informed trader			Uninformed trader		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	0.42***	0.39***	0.34***	0.80***	0.95***	0.87***	0.90***	0.85***	0.78***
	(0.02)	(0.02)	(0.05)	(0.04)	(0.04)	(0.07)	(0.03)	(0.02)	(0.07)
REGBoth	0.02		0.02	0.03		−0.01	0.02		0.03
	(0.02)		(0.04)	(0.03)		(0.04)	(0.03)		(0.05)
BBVCent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.00*	0.00	0.00	0.00	0.00	0.00	−0.00*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
marketTop	0.04***	0.04**	0.05**	0.07**	0.03	0.06*	0.04***	0.05**	0.06**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Period0	0.00	−0.00	−0.01	0.03*	−0.01	0.02	0.00	−0.00	−0.01
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
historyR		−0.00			0.03			−0.01	
		(0.02)			(0.02)			(0.02)	
REGSH		−0.03*			−0.12***			−0.03	
		(0.01)			(0.02)			(0.02)	
historyN.R			−0.00			−0.05			0.00
			(0.02)			(0.04)			(0.03)
historyR.N			0.00			−0.05			0.01
			(0.03)			(0.04)			(0.03)
historyR.R			−0.01			−0.05			−0.02
			(0.03)			(0.04)			(0.04)
R^2	0.13	0.10	0.14	0.14	0.17	0.12	0.12	0.08	0.13
Adj. R^2	0.10	0.08	0.09	0.11	0.15	0.06	0.09	0.06	0.08
Num. obs.	144	288	144	144	288	144	144	288	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

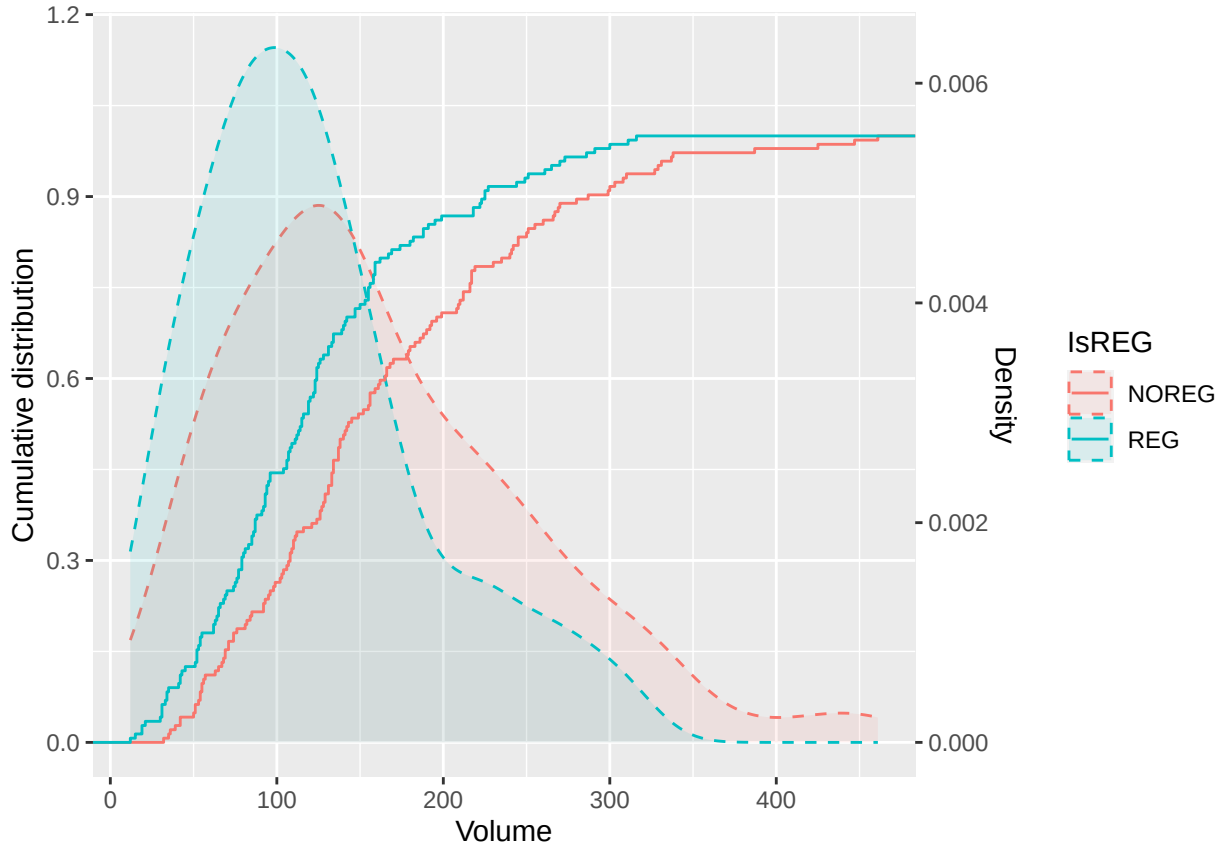
Between regulation t-tests by Treatment

```
##         NOREG    REG pvalues_Informed  NOREG    REG pvalues_Uninformed
## Vol NR 0.7760 0.5885            0e+00 0.6542 0.6271             0.2672
## Vol RN 0.7812 0.6354            3e-04 0.6167 0.5812             0.1668
## Vol RR 0.7969 0.6406            2e-04 0.6812 0.6688             0.6270
```

Volume

```
## Warning: The dot-dot notation (`..density..`) was deprecated in ggplot2 3.4.0.
## i Please use `after_stat(density)` instead.
```

Figure 2: Distribution of Volume per market in Phase 2




```
##                       NOREG      REG        pvalues_market NOREG      REG
## Vol all phases        "148.6583" "125.3333" "0.0005"       "96.7833"  "69.1905"
## Vol Phase 1           "143.2500" "109.3229" "0.002"        "89.1042"  "61.0208"
## Vol Phase 2           "161.7778" "120.8681" "0"            "107.6042" " 64.7847"
## Vol Phase 3           "114.7083" "148.0417" "0.0278"       "72.0000"  "83.9688"
## Vol Phase 1 & 3       "128.9792" "128.6823" "0.975"        "80.5521"  "72.4948"
## LimitVol all phases   "291.8500" "268.8125" "0.0548"       "111.0208" " 87.2768"
## LimitVol Phase 1      "262.9792" "209.4167" "0.0054"       "101.7083" " 66.3646"
## LimitVol Phase 2      "308.6875" "254.8542" "0"            "121.7847" " 75.8611"
## LimitVol Phase 3      "270.2083" "349.1458" "0.0037"       " 88.0417" "125.3125"
## LimitVol Phase 1 & 3  "266.5938" "279.2812" "0.4771"       "94.8750"  "95.8385"
##                       pvalues_Informed NOREG      REG        pvalues_Uninformed
## Vol all phases        "0"              "135.5375" "116.3095" "0.002"
## Vol Phase 1           "0.0001"         "132.8542" "102.6250" "0.0041"
## Vol Phase 2           "0"              "146.3333" "111.7847" "0"
## Vol Phase 3           "0.2012"         "105.8333" "136.7812" "0.0265"
## Vol Phase 1 & 3       "0.1798"         "119.3438" "119.7031" "0.9675"
## LimitVol all phases   "0.0007"         "180.8292" "181.5357" "0.9345"
## LimitVol Phase 1      "0.0038"         "161.2708" "143.0521" "0.1914"
## LimitVol Phase 2      "0"              "186.9028" "178.9931" "0.1909"
```

```
## LimitVol Phase 3     "0.0326"          "182.1667" "223.8333" "0.0336"
## LimitVol Phase 1 & 3 "0.9297"          "171.7188" "183.4427" "0.3535"
```

Figure 3: Mean market trading volume by combination of trading partners, regulatory regime, phase, and treatment.

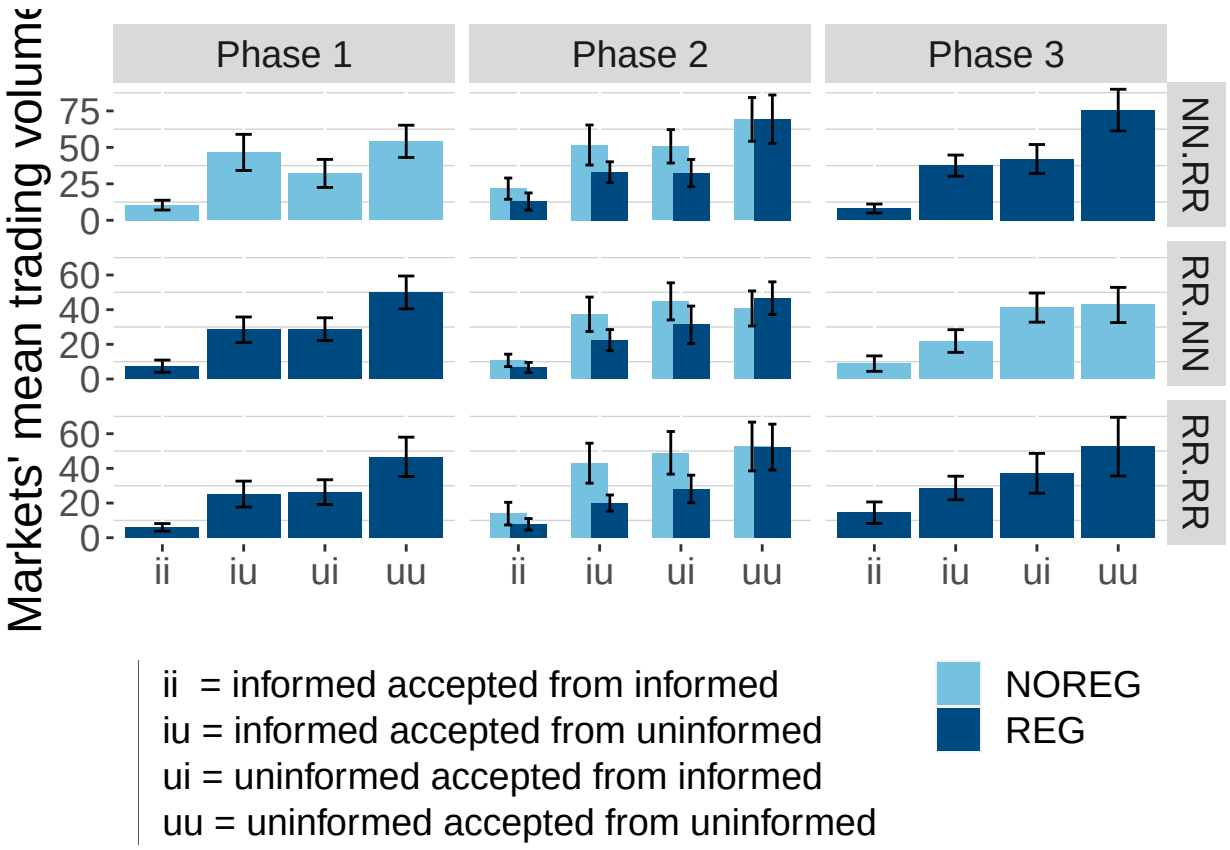


Figure 4: Mean market trading volume by combination of trading partners and regulatory regime, in Phase 2.

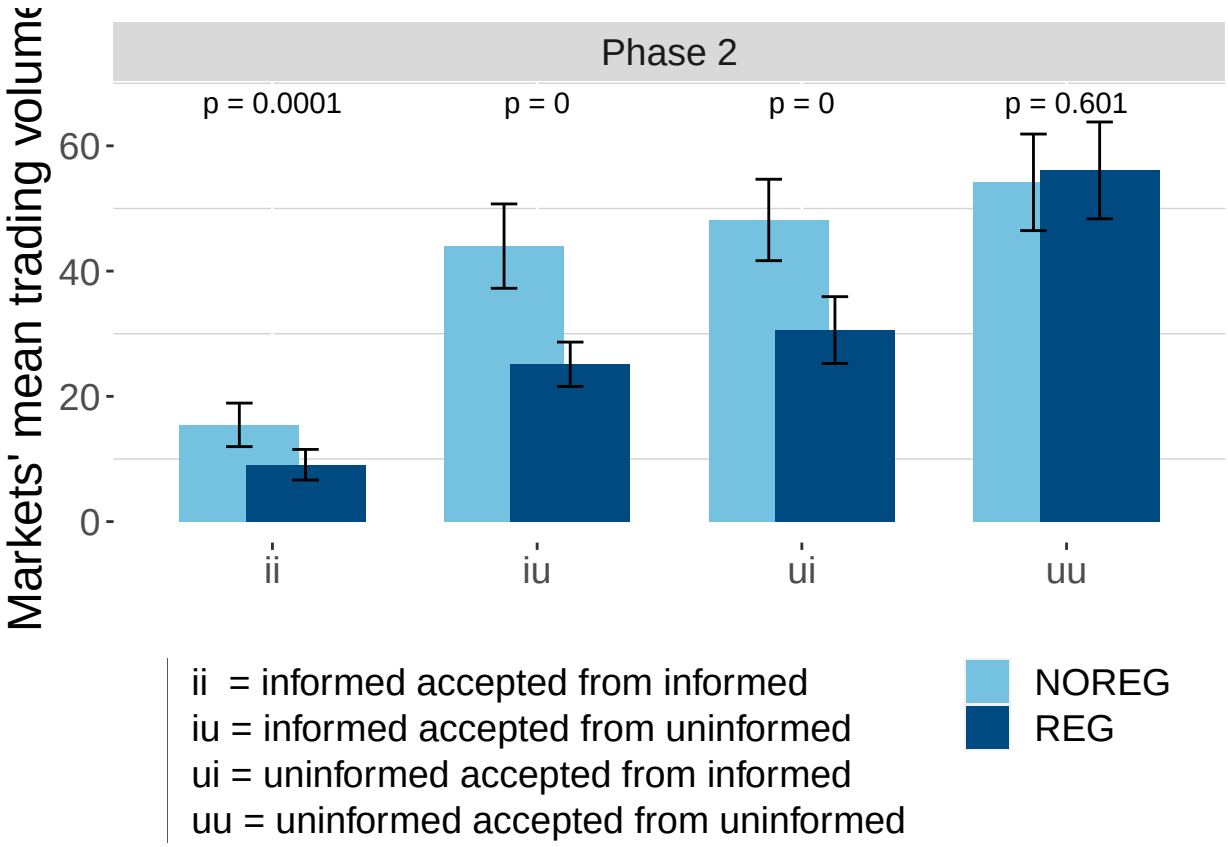


Table 11: Regressions of trading volume ('ln(transaction volume)') by trader type and phase.

	All traders			Informed trader			Uninformed trader		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	4.72***	4.86***	4.44***	4.09***	4.44***	4.08***	4.67***	4.70***	4.39***
	(0.17)	(0.24)	(0.50)	(0.17)	(0.24)	(0.41)	(0.17)	(0.25)	(0.52)
REGBoth	−0.33		0.11	−0.43*		−0.02	−0.33		0.08
	(0.20)		(0.40)	(0.19)		(0.37)	(0.20)		(0.40)
BBVCent	0.00	0.01**	0.01	0.00	0.01***	0.00	0.00	0.01*	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.00	0.01	0.02	0.00	0.01	0.01	−0.01	0.01	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	0.20*	0.27***	0.36***	0.16	0.27**	0.22**	0.21*	0.29***	0.35**
	(0.09)	(0.08)	(0.10)	(0.11)	(0.09)	(0.07)	(0.09)	(0.08)	(0.11)
Period0	0.11*	0.01	−0.01	0.11	0.01	0.06	0.12*	0.01	0.01
	(0.05)	(0.01)	(0.06)	(0.07)	(0.02)	(0.07)	(0.05)	(0.01)	(0.06)
historyR		−0.31			−0.28			−0.27	
		(0.22)			(0.19)			(0.22)	
REGSH		−0.32***			−0.57***			−0.29***	
		(0.08)			(0.09)			(0.08)	
historyN.R			0.01			0.02			0.03
			(0.10)			(0.08)			(0.11)
historyR.N			−0.27			−0.20			−0.34
			(0.37)			(0.34)			(0.37)
historyR.R			−0.49			−0.32			−0.54
			(0.38)			(0.35)			(0.39)
R^2	0.13	0.21	0.17	0.12	0.27	0.10	0.14	0.18	0.18
Adj. R^2	0.10	0.19	0.13	0.08	0.26	0.04	0.11	0.16	0.13
Num. obs.	144	288	144	144	287	143	144	288	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

```
##                                              all   center      end
## 1$^{st}$ phase effect in the 2$^{nd}$ phase 0.145 7.72e-27       NA
## 1$^{st}$ phase effect in the 3$^{rd}$ phase 0.109       NA 1.86e-09
## 2$^{nd}$ phase effect                        0.329       NA 5.00e-18
```

```
##          NOREG     REG pvalues_Informed   NOREG     REG pvalues_Uninformed
## Vol NR 36.4427 22.7760                0 24.0729 20.3979             0.0106
## Vol RN 25.9010 16.7344                0 16.3562 14.6979             0.0652
## Vol RR 29.9427 15.8906                0 19.7229 15.2646             0.0019
```

Limit orders

Figure 5: Histogram of limit order volume per market in Phase 2

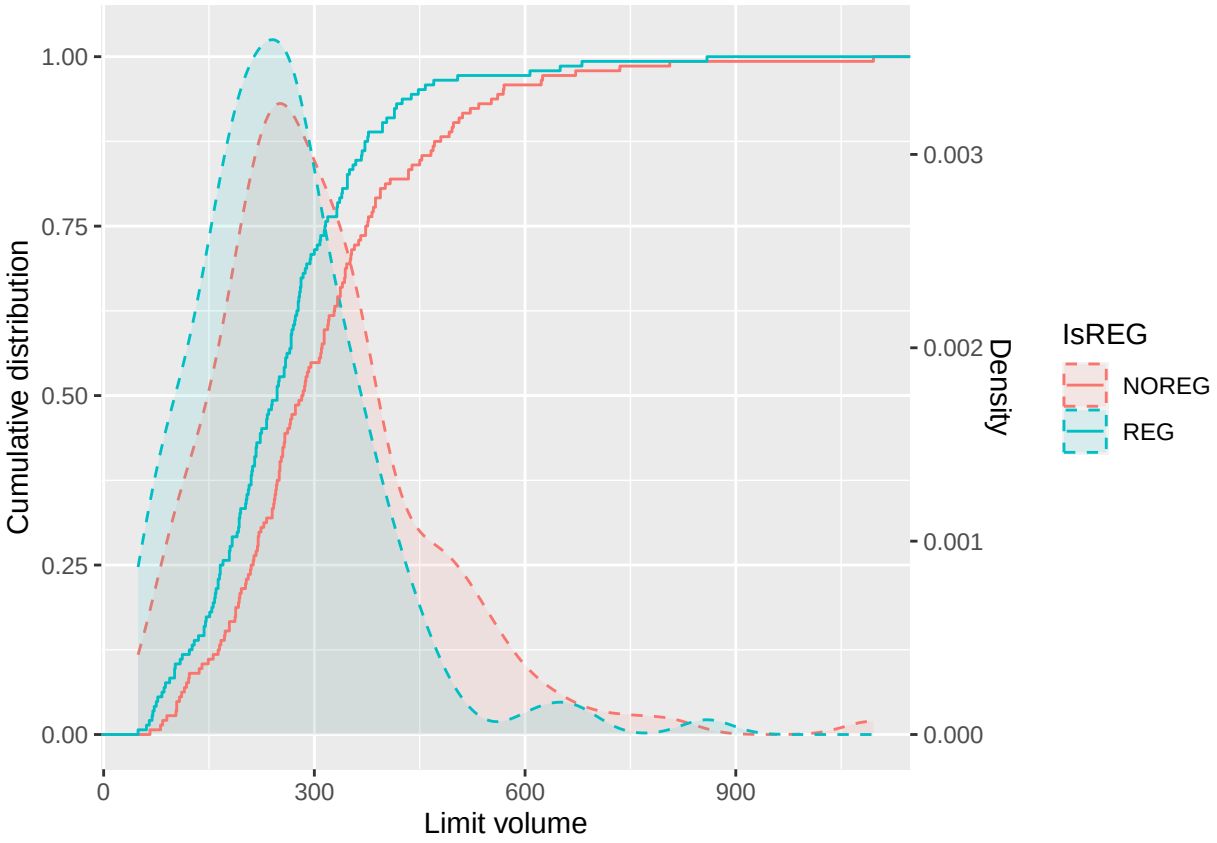


Figure 6: Mean market limit order volume, short selling volume and margin buys by trader type, regulatory regime, phase

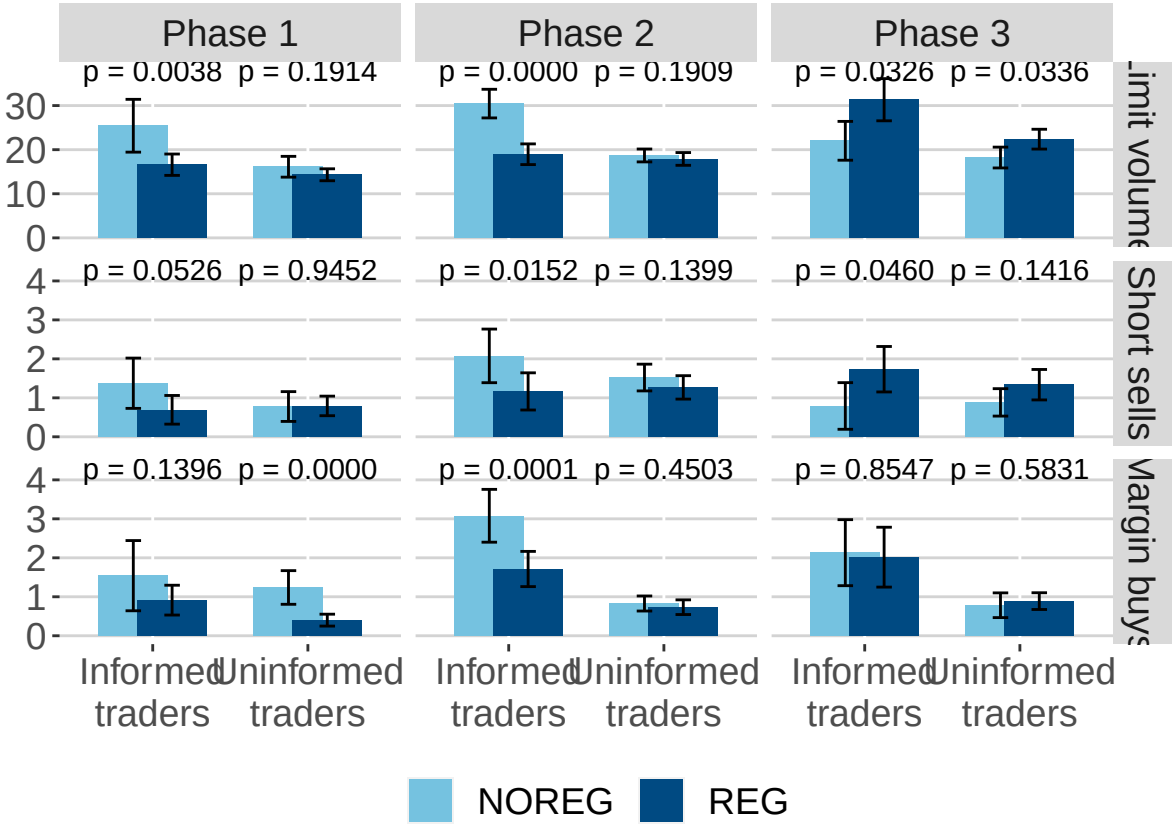


Table 12: Regressions of offered volume ('ln(limit volume)') by trader type and phase.

	All traders			Informed trader			Uninformed trader		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	5.18***	5.54***	5.59***	3.77***	4.67***	4.38***	4.77***	4.92***	5.12***
	(0.14)	(0.22)	(0.37)	(0.20)	(0.29)	(0.43)	(0.16)	(0.22)	(0.37)
REGBoth	−0.19		0.21	−0.30		0.42	−0.16		0.12
	(0.19)		(0.26)	(0.22)		(0.36)	(0.19)		(0.26)
BBVCent	−0.00	0.00	0.00	−0.01	−0.00	−0.01*	0.00	0.00	0.01**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	0.00	0.01	−0.00	0.01	−0.00	−0.01	0.00	0.01	0.00
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	0.17**	0.15**	0.14**	0.15	0.24**	0.10	0.18**	0.13	0.17**
	(0.06)	(0.05)	(0.04)	(0.09)	(0.07)	(0.08)	(0.07)	(0.07)	(0.05)
Period0	0.12***	0.03**	−0.01	0.21*	0.01	−0.05	0.11*	0.03	−0.01
	(0.03)	(0.01)	(0.03)	(0.08)	(0.03)	(0.09)	(0.05)	(0.02)	(0.05)
historyR		−0.20			−0.28			−0.21	
		(0.20)			(0.20)			(0.22)	
REGSH		−0.20***			−0.55***			−0.04	
		(0.05)			(0.07)			(0.07)	
historyN.R			−0.01			−0.15			0.06
			(0.05)			(0.08)			(0.07)
historyR.N			−0.12			−0.08			−0.16
			(0.26)			(0.29)			(0.29)
historyR.R			−0.12			−0.17			−0.14
			(0.26)			(0.28)			(0.28)
R^2	0.12	0.11	0.10	0.19	0.17	0.15	0.07	0.07	0.14
Adj. R^2	0.09	0.09	0.05	0.16	0.15	0.10	0.04	0.05	0.09
Num. obs.	144	288	144	143	288	144	144	288	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

```
##                                              all  center      end
## 1$^{st}$ phase effect in the 2$^{nd}$ phase 0.308 2.5e-35       NA
## 1$^{st}$ phase effect in the 3$^{rd}$ phase 0.627      NA 2.30e-37
## 2$^{nd}$ phase effect                       0.976      NA 6.22e-33
```

```
##          NOREG     REG pvalues_Informed   NOREG     REG pvalues_Uninformed
## Vol NR 36.7656 23.6354            1e-04 20.8083 19.6938             0.5063
## Vol RN 24.9062 15.9740            0e+00 17.8042 17.1771             0.6094
## Vol RR 29.6667 17.2865            0e+00 17.4583 16.8271             0.5987
```

Odds

$$\ln\left(odds_{Phase}\right) = \ln\left(\frac{\sum_{p}^{Periods} Volume_{p,Top(Bottom)}}{\sum_{p}^{Periods} Volume_{p,Bottom(Top)}}\right) \tag{1}$$

Figure 7: Distribution of odds of the upper market in Phase 2

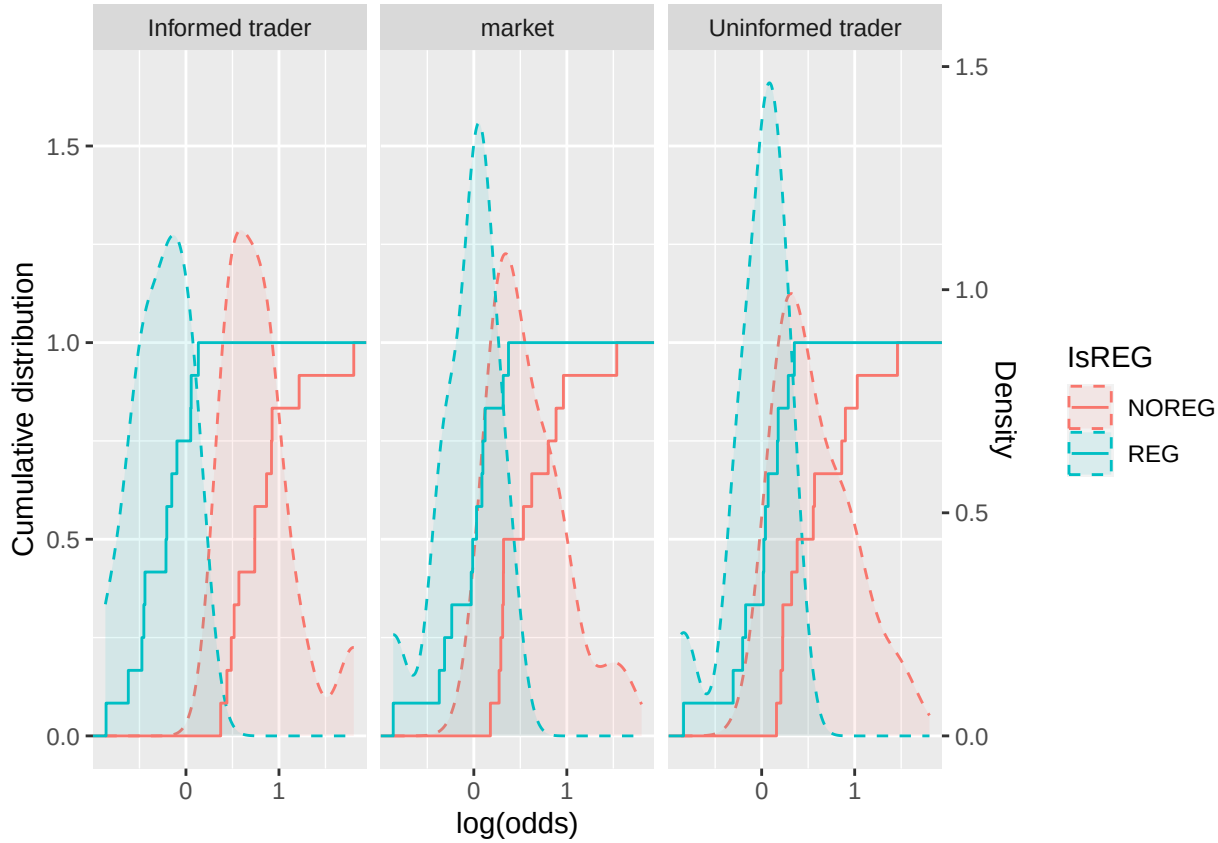


Figure 8: Volume migration between phases by trader type and treatment.

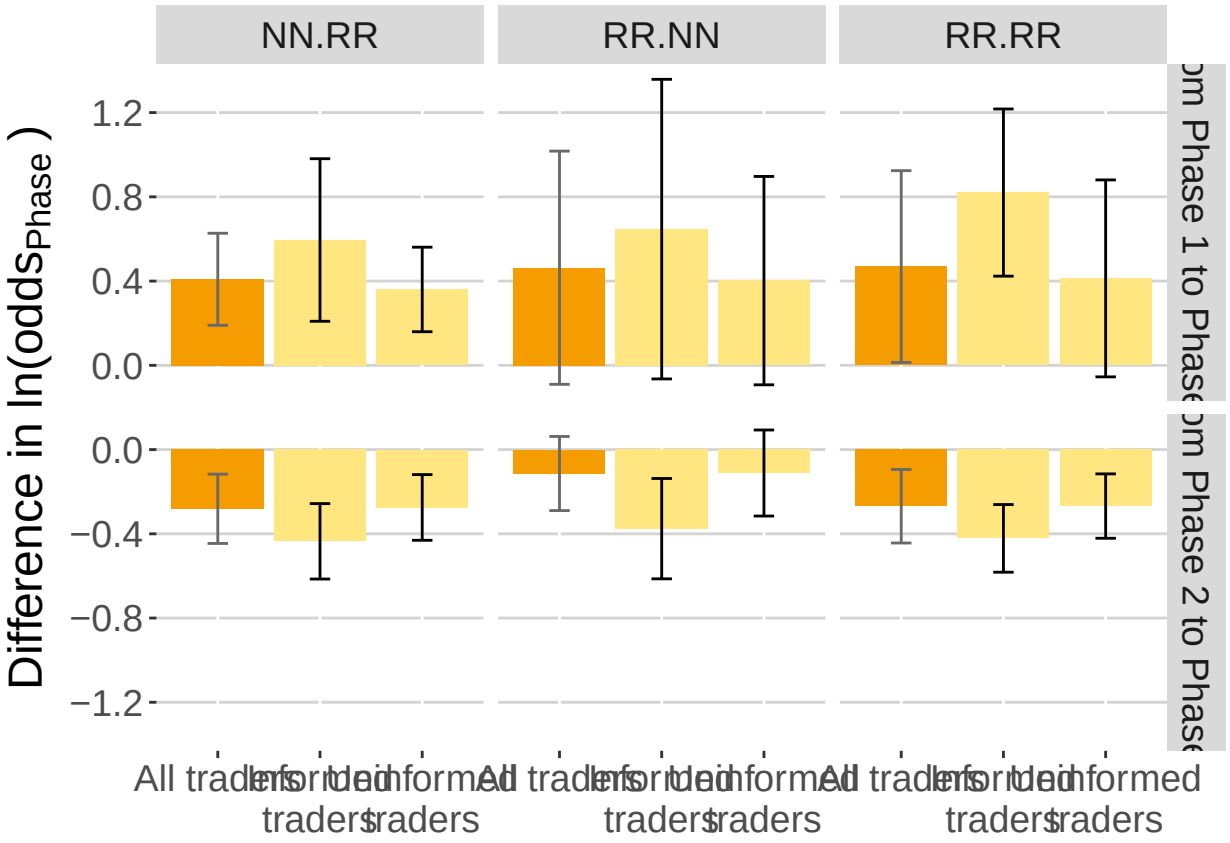
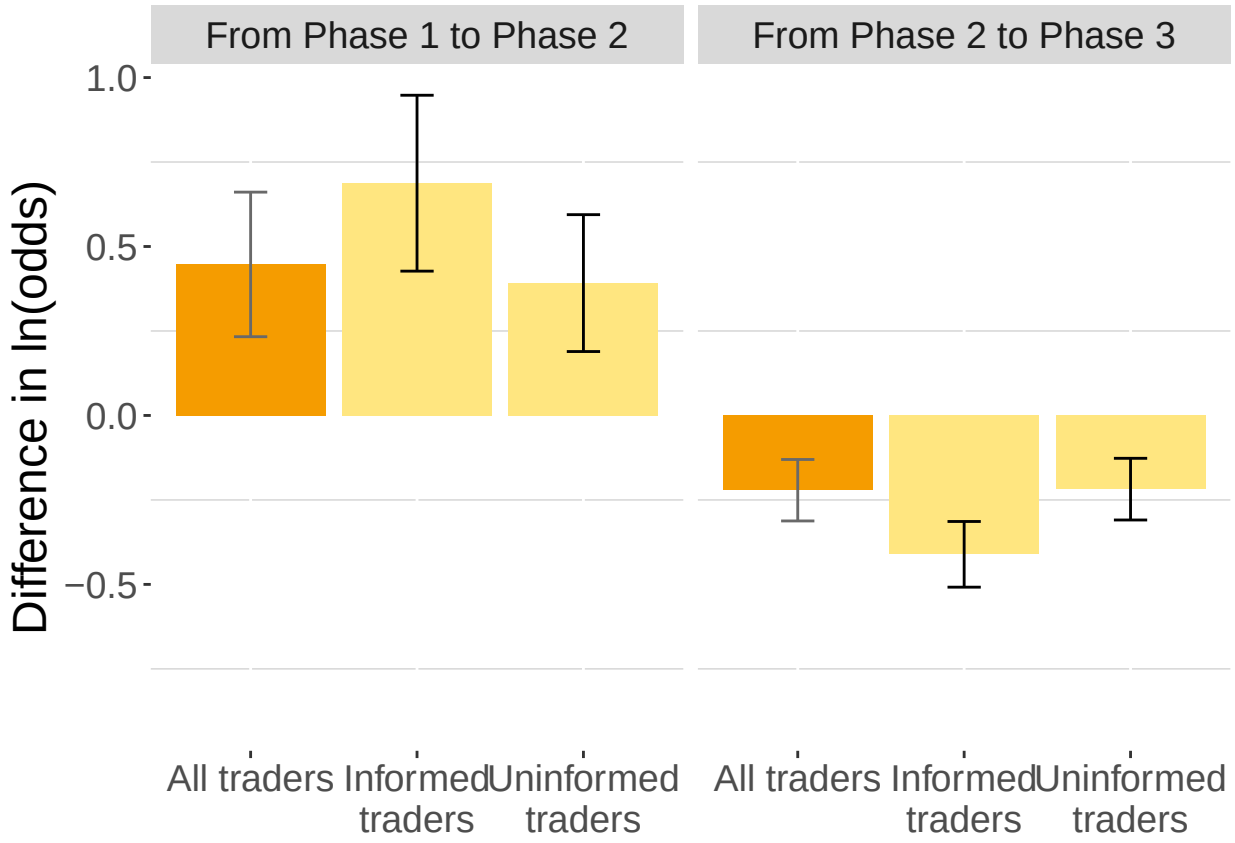


Figure 9: Mean volume migration between phases by trader type.




```
##                           Market                 Informed traders
## Diff.0.Phase1.Phase2     "V=270, p =0.00024  " "V=290, p =0.000005 "
## Diff.0.Phase2.Phase3     "V=283, p =0.00002  " "V=299, p =0.0000002"
## Diff.Phase1.Phase3       "V=211, p =0.08392  " "V=216, p =0.06043  "
## Treat.diff.Phase1.Phase3 "H=0.195, p =0.9071 " "H=0.755, p =0.6856 "
##                           Uninformed traders    Role difference
## Diff.0.Phase1.Phase2     "V=261, p =0.0008   " "V=279, p =0.00005  "
## Diff.0.Phase2.Phase3     "V=273, p =0.0001   " "V=282, p =0.00003  "
## Diff.Phase1.Phase3       "V=202, p =0.1434   " "                   "
## Treat.diff.Phase1.Phase3 "H=0.315, p =0.8543 " "                   "
```

Geometric odds

$$ln(odds)_{geom} = \frac{1}{Periods} \sum_{p}^{Periods} \ln\left(\frac{Volume_{p,NOREG}}{Volume_{p,REG}}\right) \tag{2}$$

Figure 10: Odds of upper market over time and regulation

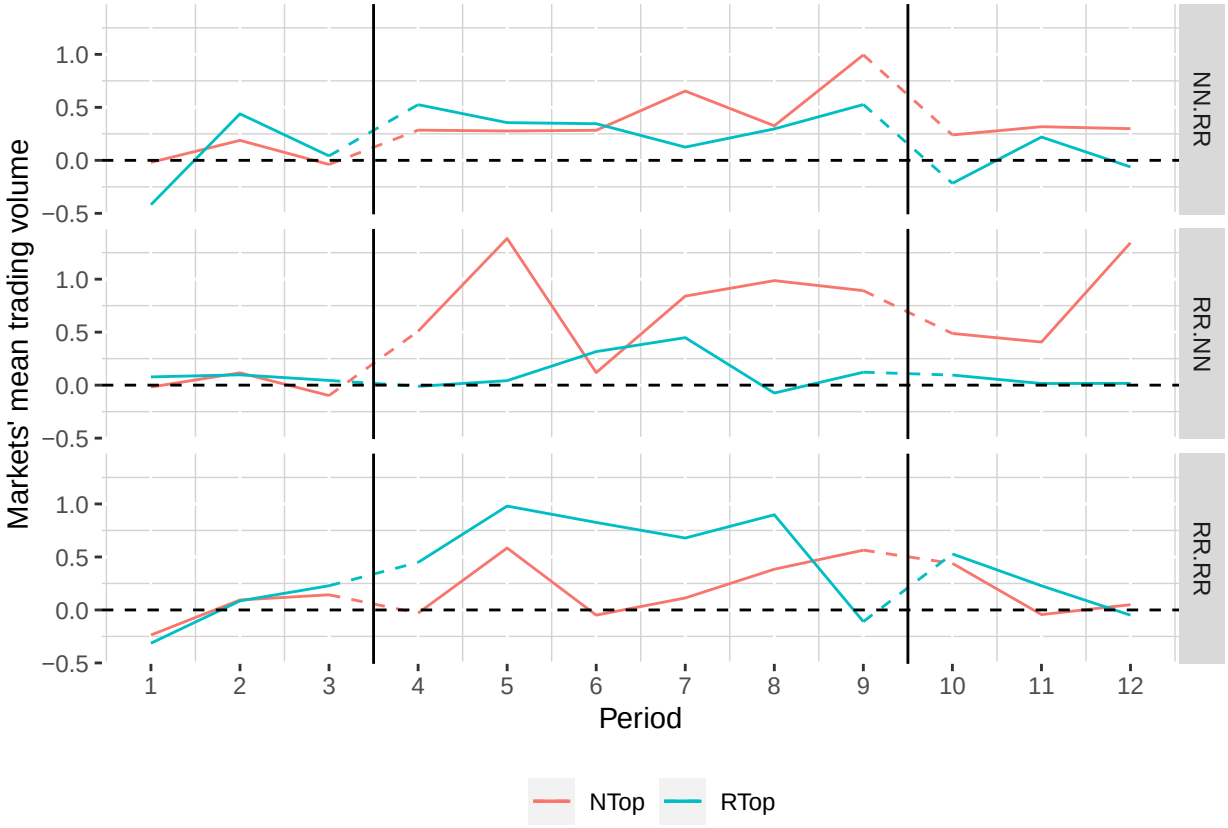


Figure 11: Distribution of odds of the upper market in Periods between the 4th and the 9th Period

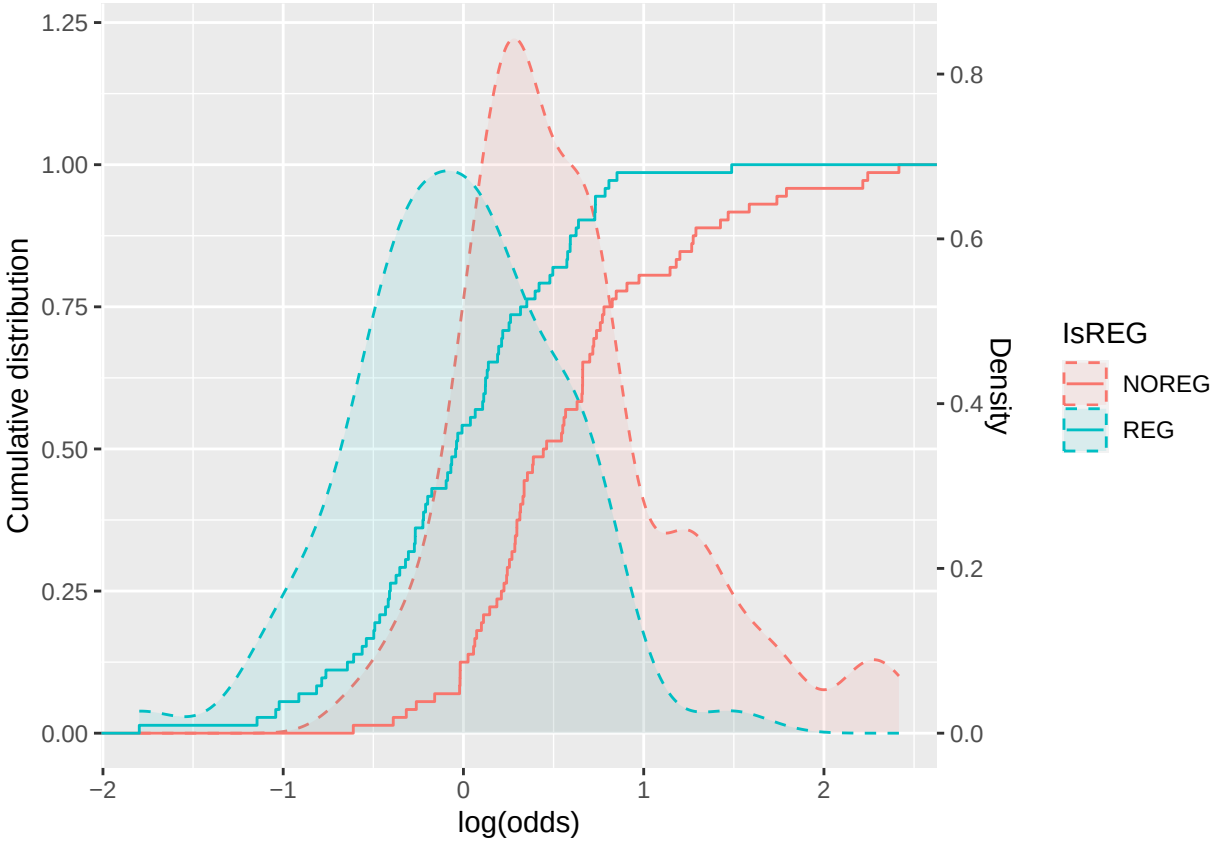


Figure 12: Geometric volume migration between phases by trader type and treatment observing each period individually.

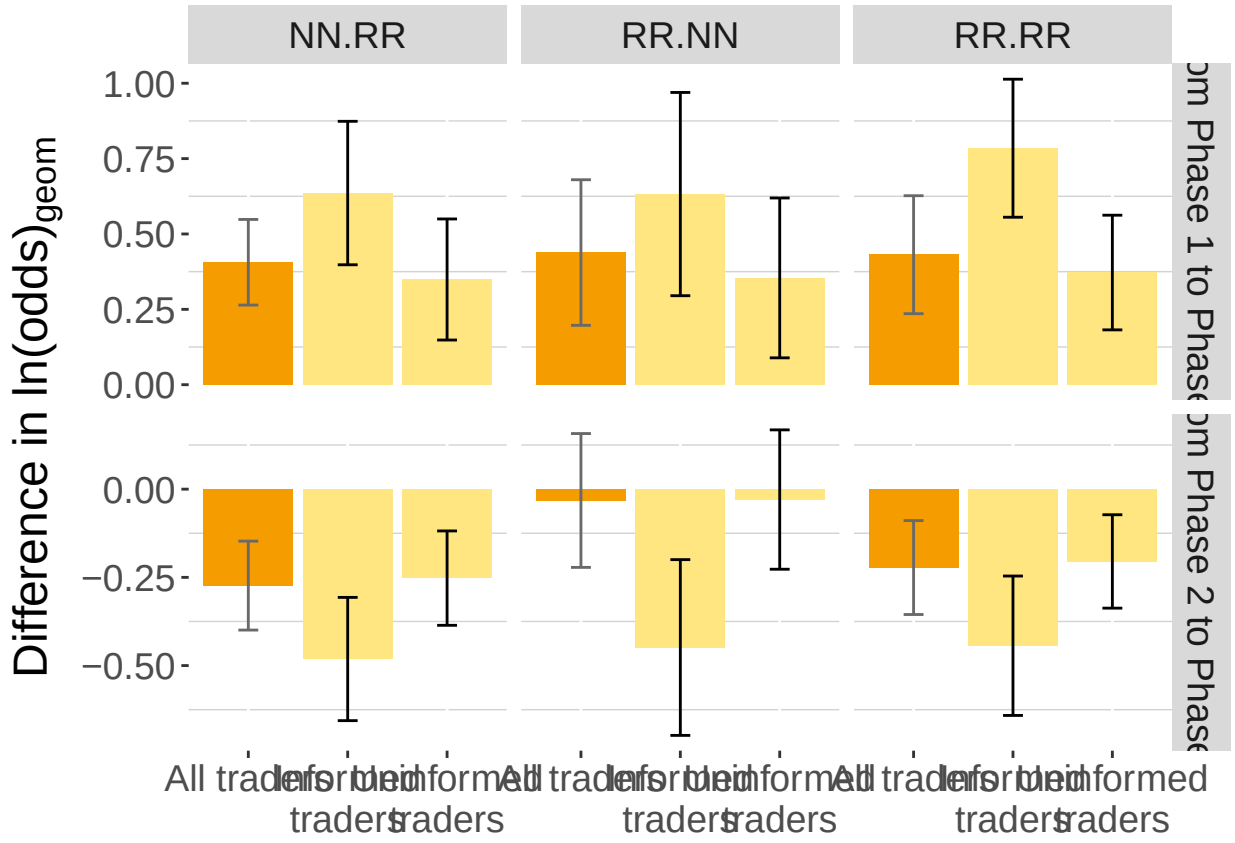


Figure 13: Winsorized geometric volume migration between phases by trader type and treatment observing each period individually.

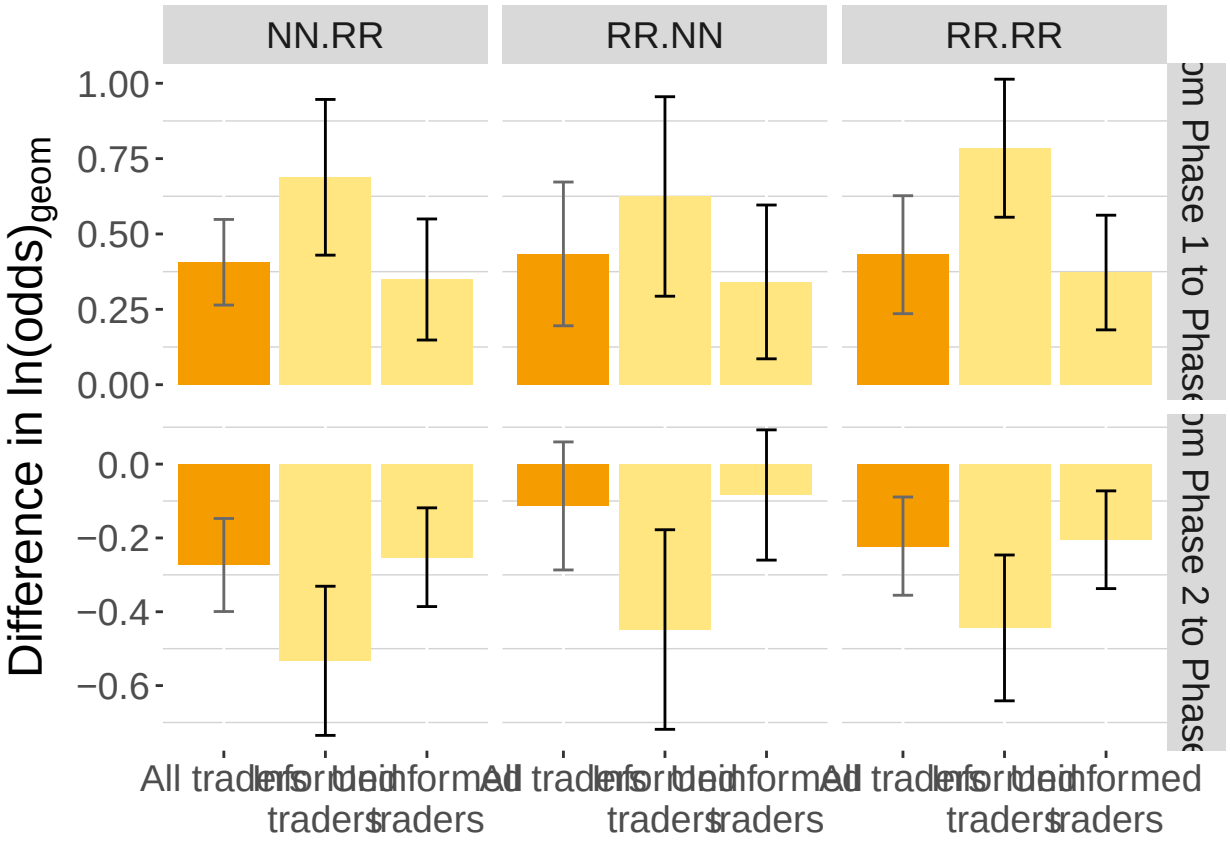


Figure 14: Geometric volume migration between phases by trader type and treatment.

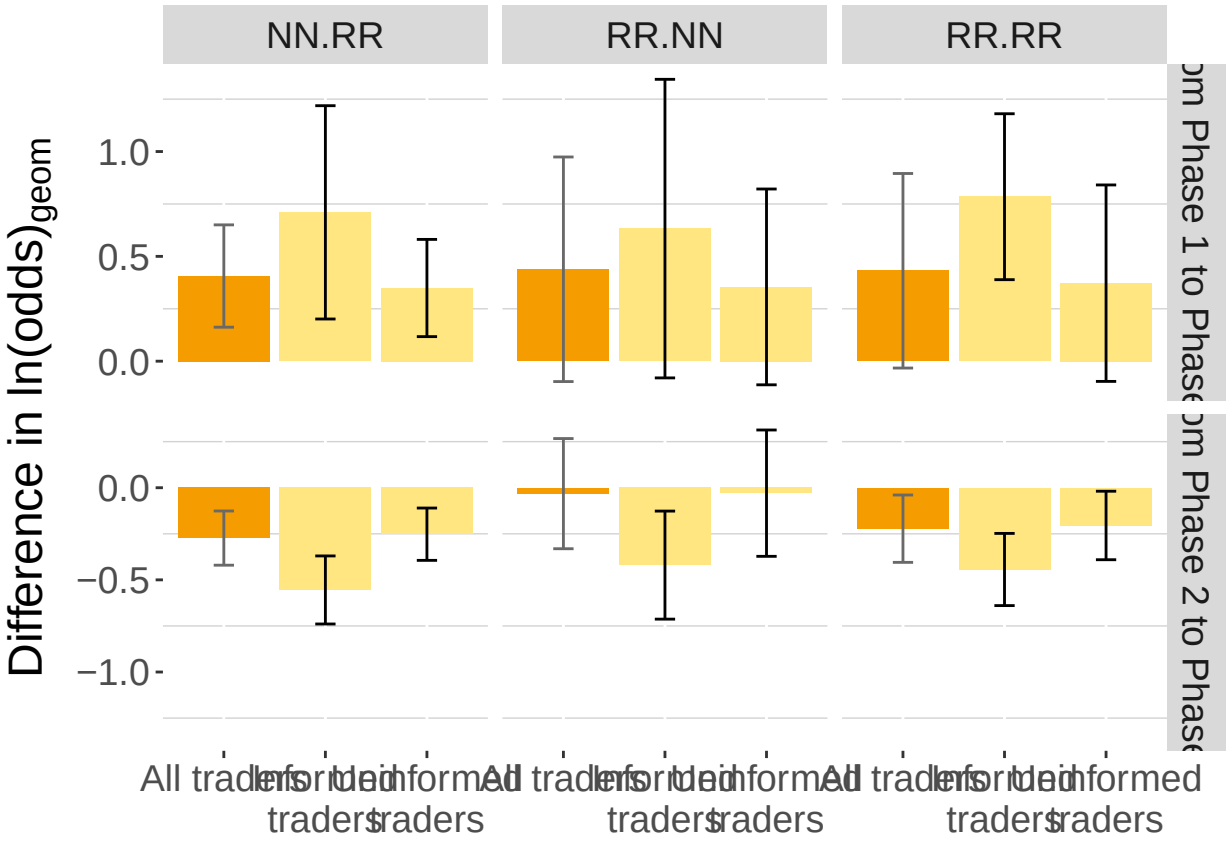
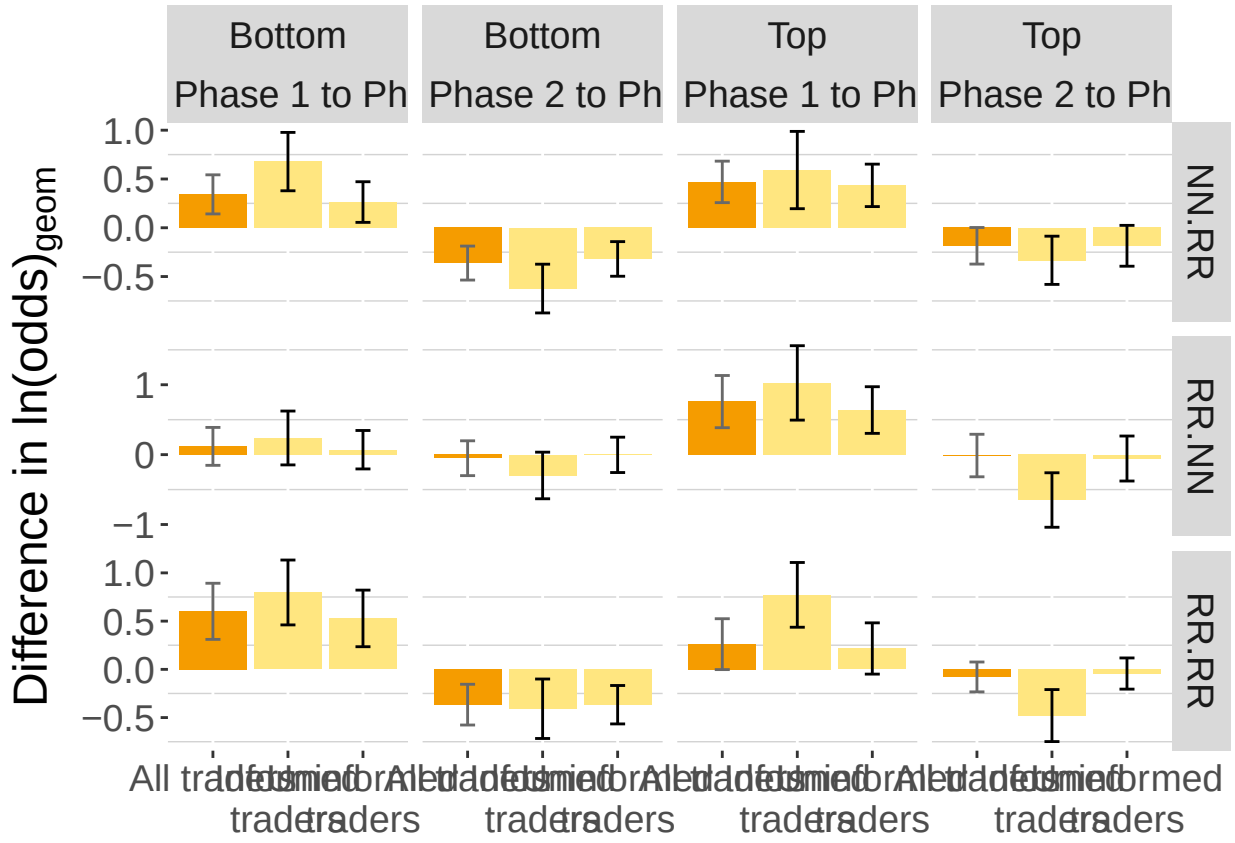


Figure 15: Geometric volume migration between phases by trader type, treatment, and market observing each period individually.



Tests observing phases

```
##                                market                 Informed traders
## Diff.0.Phase1.Phase2          "V=266, p =0.0004    " "V=287, p =0.00001   "
## Diff.0.Phase2.Phase3          "V=256, p =0.00158   " "V=298, p =0.0000004"
## Diff.Phase1.Phase3            "V=213, p =0.07379   " "V=196, p =0.1974    "
## Treatment.diff.Phase1.Phase3 "H=0.18, p =0.9139   " "H=1.005, p =0.605   "
##                               Uninformed traders     Role difference
## Diff.0.Phase1.Phase2          "V=257, p =0.0014    " "V=283, p =0.00002   "
## Diff.0.Phase2.Phase3          "V=245, p =0.00533   " "V=282, p =0.00003   "
## Diff.Phase1.Phase3            "V=206, p =0.114     " "                    "
## Treatment.diff.Phase1.Phase3 "H=0.065, p =0.968   " "                    "
```

Tests observing periods

```
##                       market                    Informed traders
## Diff.0.Phase1.Phase2 "t=-4.666, p =0.000005  " "t=-5.912, p =0.00000001"
## Diff.0.Phase2.Phase3 "t=1.803, p =0.07284    " "t=4.152, p =0.00005    "
## Diff.Phase1.Phase3   "t=-2.587, p =0.012     " "t=-2.067, p =0.0424    "
##                       Uninformed traders       Role difference
## Diff.0.Phase1.Phase2 "t=-3.862, p =0.0001    " "t=6.71, p =4e-10       "
## Diff.0.Phase2.Phase3 "t=1.647, p =0.101      " "t=6.881, p =2e-10      "
## Diff.Phase1.Phase3   "t=-2.103, p =0.03904   " "                       "
```

```
##            start middle p_market   start middle  p_Inf   start middle  p_Uni
## odds all -0.1101 0.3152   0.0000 -0.1083 0.5961 0.0000 -0.0726 0.2859 0.0001
## odds NR  -0.1472 0.2590   0.0022 -0.1739 0.5221 0.0007 -0.1307 0.2183 0.0115
## odds RN  -0.1099 0.3286   0.0184  0.0058 0.6382 0.0126 -0.0512 0.3030 0.0572
## odds RR  -0.0733 0.3580   0.0101 -0.1566 0.6279 0.0000 -0.0358 0.3363 0.0265

##          middle     end p_market middle     end  p_Inf middle     end  p_Uni
## odds all 0.3152  0.1393   0.0728 0.5961  0.1211 0.0001 0.2859  0.1237 0.1010
## odds NR  0.2590 -0.0143   0.0298 0.5221 -0.0188 0.0015 0.2183 -0.0339 0.0608
## odds RN  0.3286  0.2965   0.8855 0.6382  0.1980 0.0975 0.3030  0.2735 0.8929
## odds RR  0.3580  0.1358   0.1340 0.6279  0.1841 0.0126 0.3363  0.1314 0.1752

##            start     end p_market   start     end  p_Inf   start     end  p_Uni
## odds all -0.1101  0.1393   0.0117 -0.1083  0.1211 0.0424 -0.0726  0.1237 0.0390
## odds NR  -0.1472 -0.0143   0.2194 -0.1739 -0.0188 0.3905 -0.1307 -0.0339 0.3598
## odds RN  -0.1099  0.2965   0.0680  0.0058  0.1980 0.3940 -0.0512  0.2735 0.1149
## odds RR  -0.0733  0.1358   0.2260 -0.1566  0.1841 0.0728 -0.0358  0.1314 0.3403
```

Table 13: Regressions of geometric trader migration ('ln(odds)') by trader type and phase.

	All traders			Informed trader			Uninformed trader		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	−0.20	0.26	0.32	0.01	0.25	0.15	−0.24	0.21	0.26
	(0.18)	(0.26)	(0.35)	(0.25)	(0.41)	(0.52)	(0.20)	(0.22)	(0.31)
REGBoth	0.06		−0.13	0.09		0.13	0.12		−0.09
	(0.21)		(0.33)	(0.31)		(0.40)	(0.21)		(0.32)
BBVCent	−0.00	−0.00	−0.00	0.00	−0.01	−0.00	−0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.02*	0.00	−0.01	−0.02*	0.01	−0.02	−0.02	0.00	−0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	0.37	0.15	0.22	0.28	0.28	0.14	0.42*	0.15	0.20
	(0.19)	(0.23)	(0.21)	(0.25)	(0.29)	(0.28)	(0.20)	(0.21)	(0.20)
Period0	0.12*	0.02	−0.03	−0.07	0.08*	0.03	0.09	0.02	−0.00
	(0.05)	(0.03)	(0.06)	(0.10)	(0.04)	(0.09)	(0.07)	(0.03)	(0.05)
historyR		0.02			0.00			0.00	
		(0.20)			(0.31)			(0.18)	
historyR.N			0.07			0.18			0.07
			(0.25)			(0.32)			(0.23)
R^2	0.19	0.02	0.09	0.10	0.05	0.06	0.18	0.02	0.08
Adj. R^2	0.13	−0.01	0.01	0.03	0.02	−0.02	0.12	−0.01	−0.00
Num. obs.	72	144	72	72	144	72	72	144	72

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
One market per session and period is taken into account since the other corresponds to the negative complement. Markets considered had *NOREG* in Phase 2, i.e. top markets in Treatments .NR. and bottom markets in Treatmens .RN.

Table 14: Regressions of winsorized geometric tradermigration ('ln(odds)') by trader type and phase.

	All traders			Informed trader			Uninformed trader		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	−0.20	−0.07	0.10	0.01	−0.05	0.09	−0.24	−0.13	0.08
	(0.18)	(0.23)	(0.23)	(0.25)	(0.27)	(0.31)	(0.20)	(0.21)	(0.25)
REGBoth	0.06		−0.06	0.09		0.01	0.12		−0.06
	(0.21)		(0.22)	(0.31)		(0.24)	(0.21)		(0.26)
BBVCent	−0.00	−0.00	−0.00	0.00	−0.01	−0.00	−0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.02*	−0.00	−0.02*	−0.02*	0.00	−0.03*	−0.02	0.00	−0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	0.37	0.55**	0.59***	0.28	0.61***	0.44**	0.42*	0.57**	0.59***
	(0.19)	(0.17)	(0.15)	(0.25)	(0.18)	(0.16)	(0.20)	(0.17)	(0.17)
Period0	0.12*	0.02	−0.03	−0.07	0.08*	0.03	0.09	0.02	0.00
	(0.05)	(0.03)	(0.06)	(0.10)	(0.04)	(0.09)	(0.07)	(0.03)	(0.06)
historyR		0.08			0.10			0.09	
		(0.15)			(0.17)			(0.15)	
historyR.N			0.16			0.21			0.18
			(0.15)			(0.15)			(0.17)
R^2	0.19	0.19	0.41	0.10	0.16	0.26	0.18	0.20	0.38
Adj. R^2	0.13	0.16	0.36	0.03	0.13	0.19	0.12	0.18	0.32
Num. obs.	72	144	72	72	144	72	72	144	72

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
One market per session and period is taken into account since the other corresponds to the negative complement. Markets considered had *NOREG* in Phase 2, i.e. top markets in Treatments .NR. and bottom markets in Treatmens .RN.

Deviations

$$
\begin{aligned}
RD =& \frac{\sum Volume_i (Price_i - BBV)}{BBV \sum Volume_i} = \frac{\sum Volume_i Price_i}{BBV \sum Volume_i} - 1 \\
RAD =& \frac{\sum Volume_i |Price_i - BBV|}{BBV \sum Volume_i} \\
GD_{Market} =& \exp\left(\frac{1}{Vol} \sum_{j=1}^{\#TRA_m} \ln\left(\frac{P_j}{BBV}\right) \cdot Vol_j \right) - 1 \\
GAD_{Market} =& \exp\left(\frac{1}{Vol} \sum_{j=1}^{\#TRA_m} \left|\ln\left(\frac{P_j}{BBV}\right)\right| \cdot Vol_j \right) - 1 \\
Efficiency_{Market} =& 1 - \exp\left(\frac{1}{Vol} \sum_{j=1}^{\#TRA_m} \left(\left|\ln\left(\frac{P_j}{BBV}\right)\right| - \left|\ln\left(\frac{57.5}{BBV}\right)\right| \right) \cdot Vol_j \right)
\end{aligned}
\tag{3}
$$

Figure 16: Distribution of RD in Periods between the 4th and the 9th Period

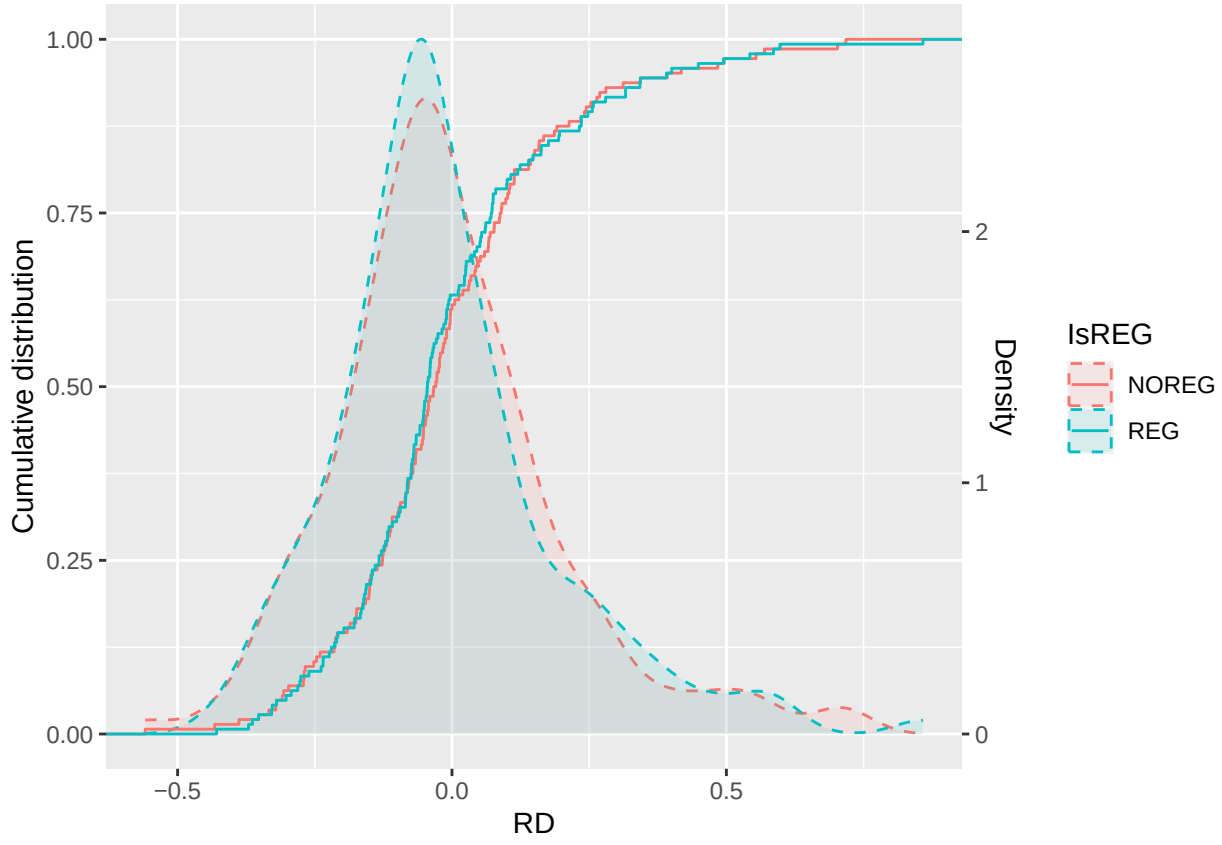


Figure 17: Distribution of RAD in Periods between the 4th and the 9th Period

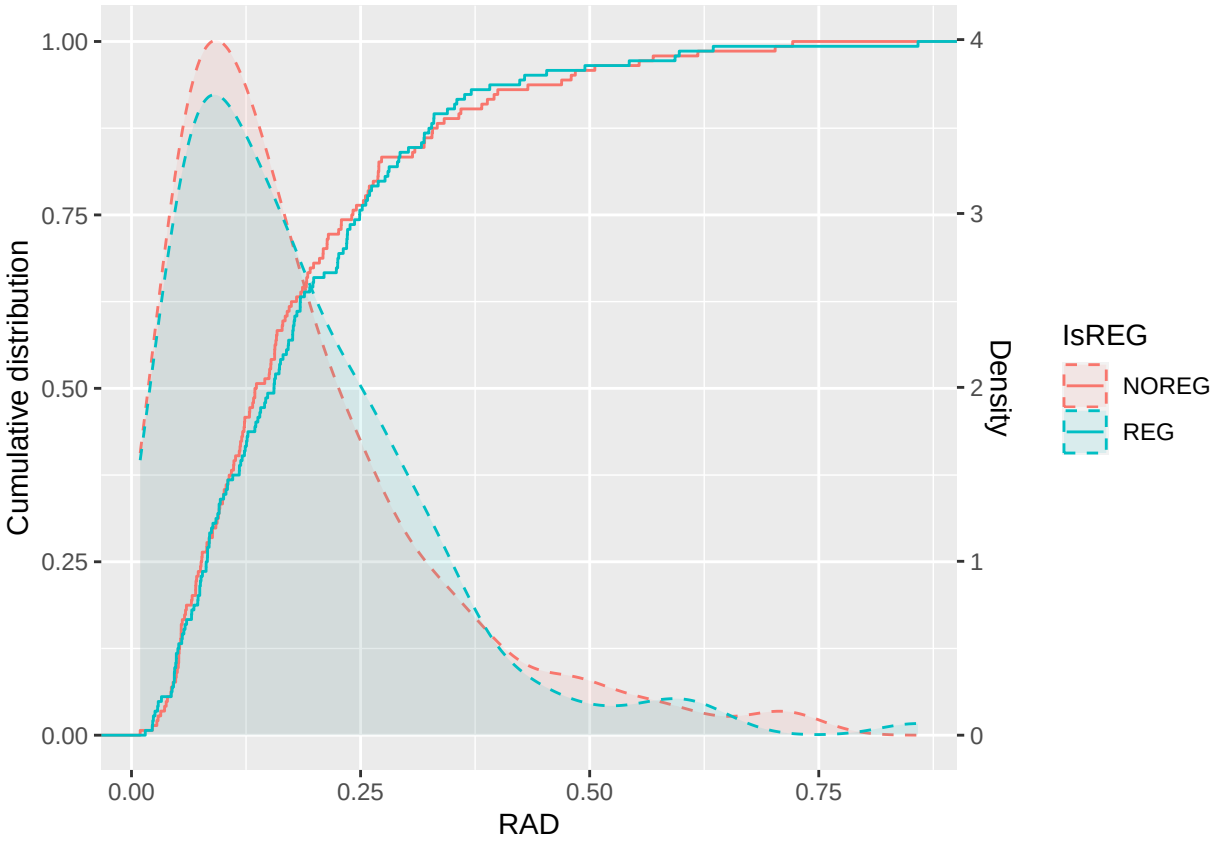


Figure 18: Distribution of GD in Periods between the 4th and the 9th Period

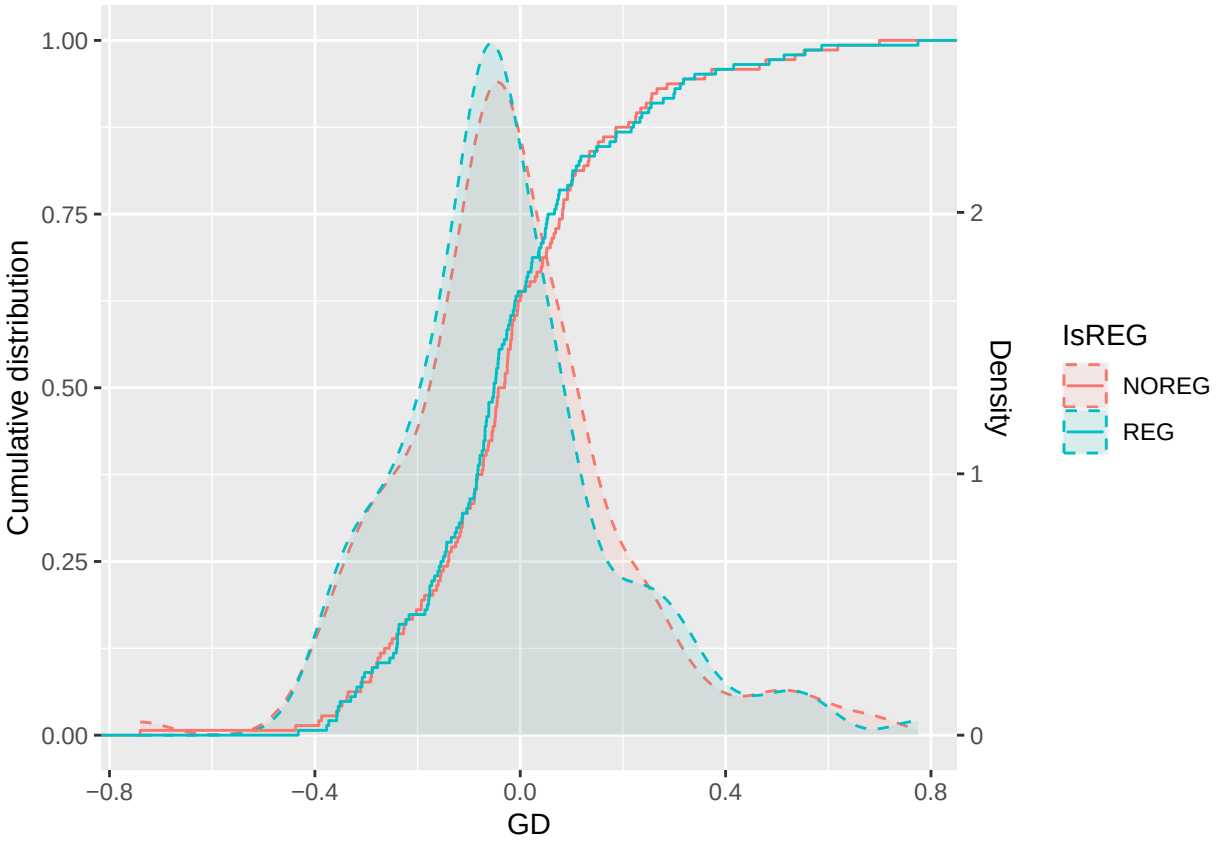


Figure 19: Distribution of GAD in Periods between the 4th and the 9th Period

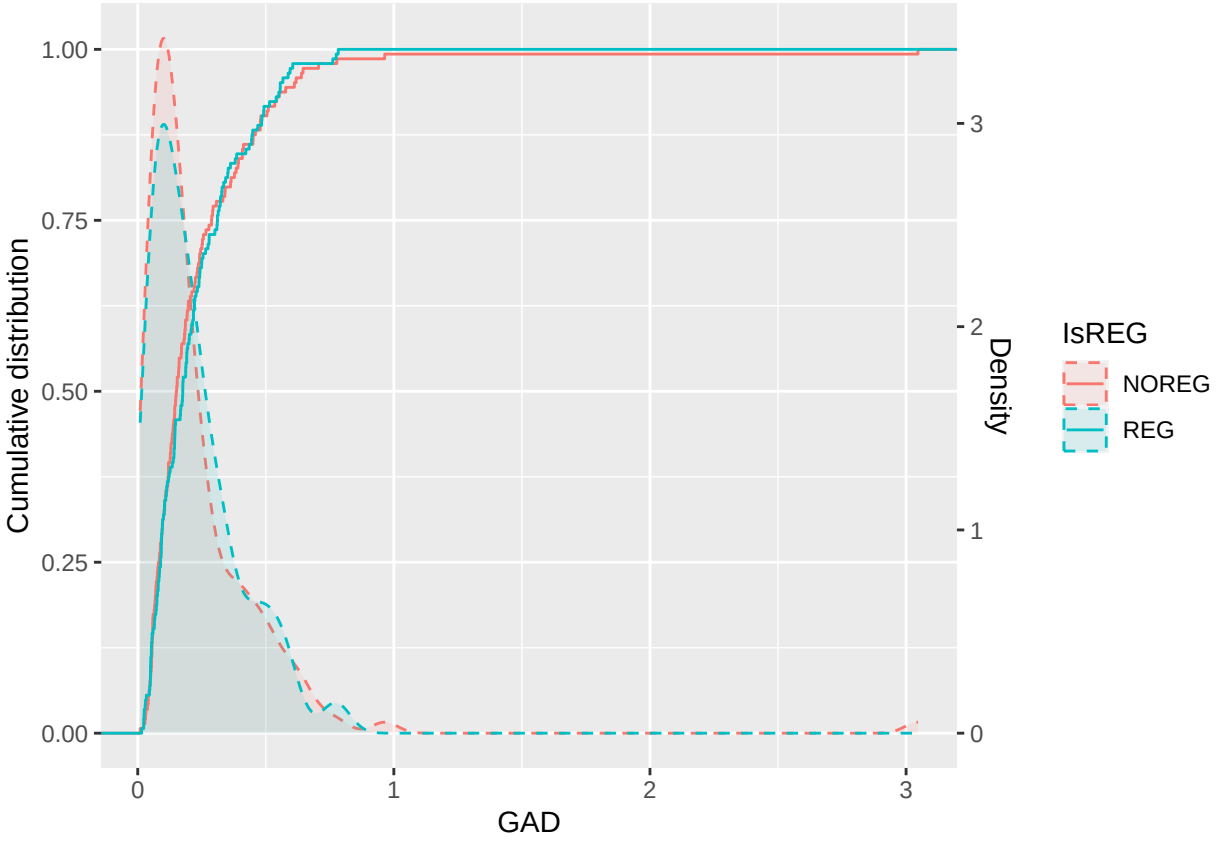


Table 15: Regressions of measures for the informational efficiency of prices ('GD', 'GAD', adn 'Efficiency') by phase.

	GD			GAD			Efficiency		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	-0.22^{***}	-0.09^{*}	-0.05	0.30^{**}	0.16^{**}	-0.05	-1.13^{*}	-0.86	0.47^{*}
	(0.05)	(0.05)	(0.04)	(0.10)	(0.05)	(0.06)	(0.56)	(0.48)	(0.19)
REGBoth	0.04		-0.02	0.01		0.08	-0.16		-0.43
	(0.06)		(0.02)	(0.09)		(0.05)	(0.34)		(0.24)
BBVCent	-0.01^{***}	-0.01^{***}	-0.01^{***}	0.00	0.00	0.00	-0.02^{**}	-0.01^{*}	-0.01^{**}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
abs(BBVCent)	0.01^{**}	0.00^{*}	0.00	0.01	0.01^{***}	0.01^{***}	0.05	0.05^{**}	0.02
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.02)	(0.01)
marketTop	0.01	-0.00	0.00	0.01	-0.03	0.02	0.02	0.17	-0.06
	(0.02)	(0.01)	(0.01)	(0.04)	(0.02)	(0.01)	(0.16)	(0.14)	(0.05)
Period0	0.01	-0.00	-0.01	-0.07^{*}	-0.01	0.00	0.19	0.04	-0.08
	(0.02)	(0.01)	(0.02)	(0.03)	(0.01)	(0.01)	(0.17)	(0.06)	(0.08)
historyR		0.04			-0.00			0.03	
		(0.04)			(0.05)			(0.23)	
REGSH		-0.00			-0.01			0.07	
		(0.01)			(0.02)			(0.14)	
historyN.R			0.00			-0.01			0.02
			(0.02)			(0.01)			(0.05)
historyR.N			0.01			0.05			-0.29
			(0.03)			(0.05)			(0.24)
historyR.R			0.02			0.03			-0.16
			(0.03)			(0.05)			(0.22)
R^2	0.61	0.57	0.66	0.09	0.07	0.35	0.19	0.09	0.24
Adj. R^2	0.60	0.56	0.64	0.06	0.05	0.32	0.15	0.06	0.19
Num. obs.	144	288	144	144	288	144	112	230	124

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 16: Regressions of measures for the informational efficiency of prices ('GD', 'GAD', adn 'Efficiency') by phase considering short selling activity.

	GD			
	Phase 1	Phase 1	Phase 2	Phase
(Intercept)	-0.22^{***}	0.00	-0.09^{*}	−0.07
	(0.05)	(0.27)	(0.05)	(0.12)
REGBoth	0.04	0.04		
	(0.06)	(0.06)		
BBVCent	-0.01^{***}	-0.01^{***}	-0.01^{***}	-0.01^{**}
	(0.00)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	0.01^{**}	0.01^{*}	0.00^{*}	0.00^{*}
	(0.00)	(0.00)	(0.00)	(0.00)
marketTop	0.01	0.02	−0.00	−0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Period0	0.01	0.02	−0.00	−0.00
	(0.02)	(0.02)	(0.01)	(0.00)
log(VolumeInf - marginbuysAsset_Informed - shortsells_Informed + 1)		−0.01		0.01
		(0.05)		(0.02)
log(VolumeUni - marginbuysAsset_Uninformed - shortsells_Uninformed + 1)		−0.04		−0.01
		(0.07)		(0.03)
log(shortsells_Informed + 1)		0.01		−0.00
		(0.02)		(0.01)
log(marginbuysAsset_Informed + 1)		0.01		0.01
		(0.02)		(0.01)
log(shortsells_Uninformed + 1)		−0.03		-0.03^{*}
		(0.02)		(0.01)
log(marginbuysAsset_Uninformed + 1)		0.01		0.02^{*}
		(0.02)		(0.01)
historyR			0.04	0.01
			(0.04)	(0.04)
REGSH			−0.00	0.00
			(0.01)	(0.01)
historyN.R				
historyR.N				
historyR.R				
AIC	−102.93	−103.84	−314.51	−331.6
R^2	0.61	0.64	0.57	0.62
Adj. R^2	0.60	0.61	0.56	0.60
Num. obs.	144	144	288	288

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

VIF of GD in Phase 1 considering short selling activity

```
##                                REGBoth
##                               1.282718
##                                BBVCent
##                               1.625597
##                           abs(BBVCent)
##                               1.211051
##                                 market
```

```
##                                                                  1.190891
##                                                                   Period0
##                                                                  1.105160
##     log(VolumeInf - marginbuysAsset_Informed - shortsells_Informed + 1)
##                                                                  3.001357
## log(VolumeUni - marginbuysAsset_Uninformed - shortsells_Uninformed + 1)
##                                                                  3.291888
##                                           log(shortsells_Informed + 1)
##                                                                  1.488788
##                                     log(marginbuysAsset_Informed + 1)
##                                                                  1.636607
##                                        log(shortsells_Uninformed + 1)
##                                                                  1.701344
##                                   log(marginbuysAsset_Uninformed + 1)
##                                                                  1.572901
```

Mean GADA and Efficiency by phase and time range.

```
## Warning in log(sGADfv$rGAD + 1): NaNs produced
```

```
##             NOREG     REG       pvalues_GADA NOREG     REG
## all phases  " 0.2305" " 0.2516" " 0.2994"    " 0.1716" " 0.0808"
## Phase 1     " 0.3037" " 0.3460" " 0.4040"    " 0.0858" "-0.2658"
## Phase 2     " 0.2315" " 0.2187" " 0.5713"    " 0.0990" " 0.1721"
## Phase 3     " 0.1542" " 0.2065" " 0.0493"    " 0.4620" " 0.2612"
## Phase 1 & 3 " 0.2289" " 0.2762" " 0.1130"    " 0.2787" " 0.0144"
##             pvalues_Efficiency
## all phases  " 0.3839"
## Phase 1     " 0.1556"
## Phase 2     " 0.5787"
## Phase 3     " 0.0730"
## Phase 1 & 3 " 0.0508"
```

```
## Warning in log(sGADfv120$rGAD120 + 1): NaNs produced
```

```
## [1] "Analysing the last 60sec"
```

```
##             NOREG    REG      pvalues_GADA NOREG    REG      pvalues_Efficiency
## all phases  "0.1861" "0.2013" "0.4111"     "0.3965" "0.2770" "0.0904"
## Phase 1     "0.3066" "0.2624" "0.4372"     "0.1777" "0.0541" "0.4974"
## Phase 2     "0.1666" "0.1812" "0.0902"     "0.3978" "0.3189" "0.0383"
## Phase 3     "0.1241" "0.1702" "0.1188"     "0.6009" "0.4161" "0.1130"
## Phase 1 & 3 "0.2153" "0.2163" "0.9760"     "0.3947" "0.2466" "0.1736"
```

Bid-Ask spread

$$
\begin{aligned}
Spread_{Market} &= \frac{1}{\#S_m} \sum_{s=1}^{\#S_m} (Ask_s - Bid_s) \\
Volatility_{Market} &= \sqrt{\frac{1}{\#TRA_m - 1} \sum_{j=1}^{\#TRA_m} \left(RET_j - \overline{RET}\right)^2}
\end{aligned}
\tag{4}
$$

The Bid-Ask spread is analysed via the per second observation of the Bid and Ask prices and four variables:

"BA-spread at the last second" describes the difference between the ask price and the bid price at the last second; therefore, for those markets where either one of the values was not given, there is no BA-spread.

"BA-spread in the last 30 seconds" describes the mean difference between the ask and bid for the last 30 seconds by second. Only those seconds are considered where there has contemporarily been an ask and bid price.

"Mean BA-spread" considers the whole timespan within a market and calculates the mean BA-spread by second.

Figure 20: Histogram of BA-spread in Periods between the 4th and the 9th Period

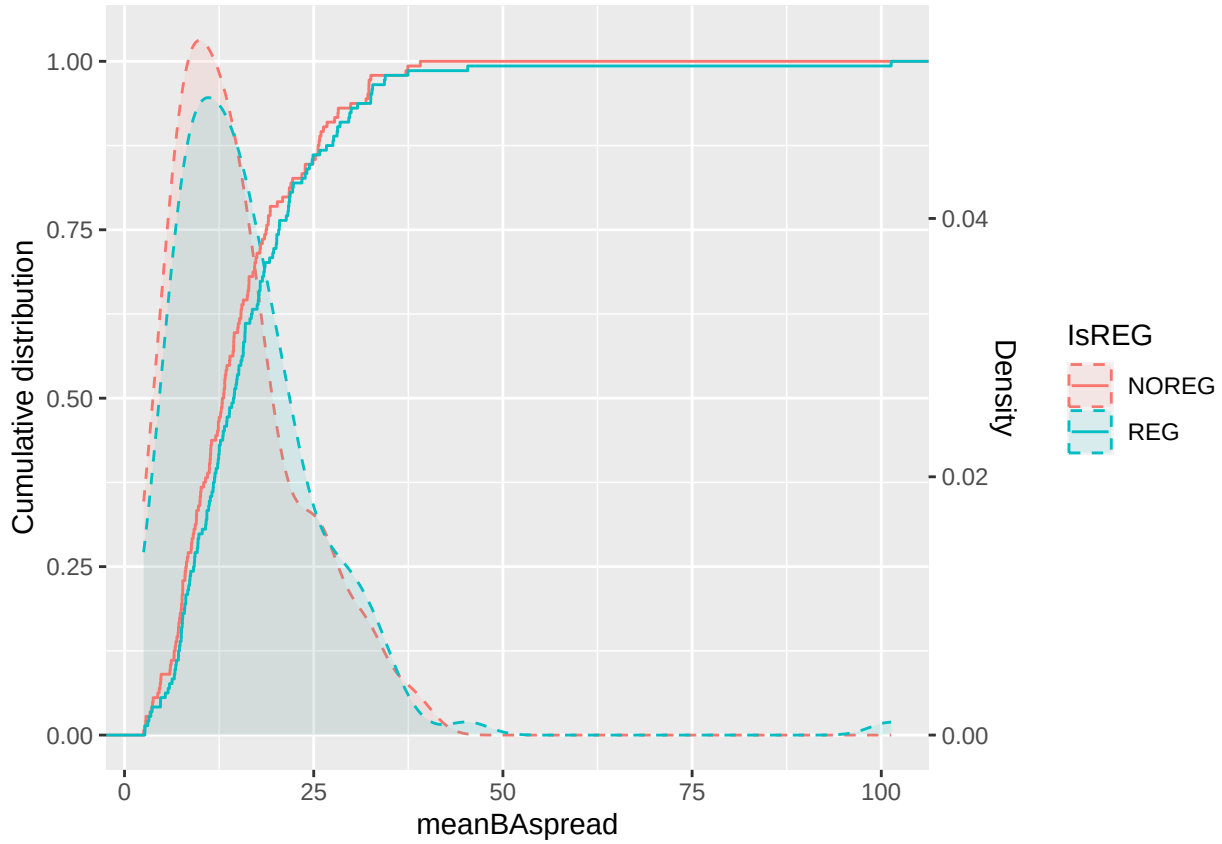


Table 17: Regressions of 'Spread ' and 'Volatility' by phase.

	Spread			Volatility		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	20.70***	17.25***	3.19	0.38***	0.19***	0.04
	(4.96)	(2.89)	(3.54)	(0.10)	(0.04)	(0.05)
REGBoth	−1.81		3.12	−0.04		0.03
	(4.17)		(2.90)	(0.09)		(0.04)
BBVCent	0.20*	0.18***	0.13*	0.00	0.00	0.00
	(0.09)	(0.04)	(0.05)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.05	0.02	0.34***	−0.00	0.00	0.00*
	(0.20)	(0.10)	(0.10)	(0.00)	(0.00)	(0.00)
marketTop	−0.79	−1.15*	−0.25	−0.03	−0.00	0.01
	(0.96)	(0.49)	(0.19)	(0.03)	(0.01)	(0.01)
Period0	−0.15	−0.63**	−0.77	−0.05	−0.01*	−0.01
	(1.45)	(0.23)	(0.55)	(0.03)	(0.00)	(0.01)
historyR		−1.07			−0.04	
		(2.57)			(0.05)	
REGSH		1.16*			0.02	
		(0.49)			(0.01)	
historyN.R			0.44			0.01
			(0.42)			(0.01)
historyR.N			3.35			0.03
			(2.95)			(0.04)
historyR.R			3.07			0.01
			(2.90)			(0.04)
R^2	0.06	0.14	0.25	0.07	0.06	0.11
Adj. R^2	0.03	0.12	0.20	0.04	0.04	0.06
Num. obs.	144	288	144	144	288	143

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 18: Regressions of 'Spread ' and winsorized 'Volatility' by phase.

	Spread			Volatility		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	20.70***	17.25***	3.19	0.25***	0.18***	0.04
	(4.96)	(2.89)	(3.54)	(0.05)	(0.04)	(0.05)
REGBoth	−1.81		3.12	0.00		0.03
	(4.17)		(2.90)	(0.05)		(0.04)
BBVCent	0.20*	0.18***	0.13*	0.00	0.00	0.00
	(0.09)	(0.04)	(0.05)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.05	0.02	0.34***	−0.00	0.00	0.00*
	(0.20)	(0.10)	(0.10)	(0.00)	(0.00)	(0.00)
marketTop	−0.79	−1.15*	−0.25	−0.02	−0.01	0.00
	(0.96)	(0.49)	(0.19)	(0.01)	(0.01)	(0.01)
Period0	−0.15	−0.63**	−0.77	−0.02	−0.01**	−0.01
	(1.45)	(0.23)	(0.55)	(0.01)	(0.00)	(0.01)
historyR		−1.07			−0.03	
		(2.57)			(0.04)	
REGSH		1.16*			0.01	
		(0.49)			(0.01)	
historyN.R			0.44			0.01
			(0.42)			(0.01)
historyR.N			3.35			0.02
			(2.95)			(0.04)
historyR.R			3.07			0.01
			(2.90)			(0.04)
R^2	0.06	0.14	0.25	0.02	0.07	0.12
Adj. R^2	0.03	0.12	0.20	−0.01	0.05	0.06
Num. obs.	144	288	144	144	288	143

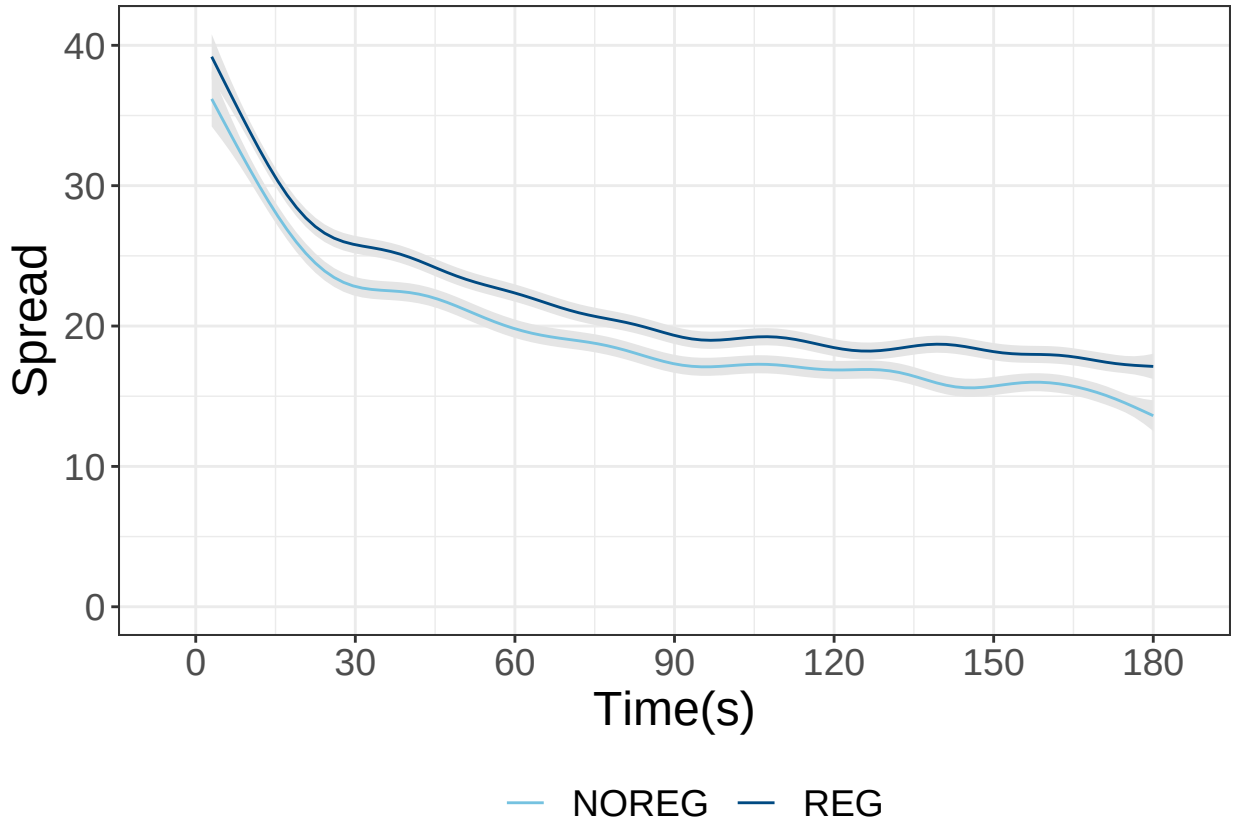
$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 19: Regressions of 'Spread ' and 'Volatility' by phase considering short selling activity.

	Spread							
	Phase 1	Phase 1	Phase 2	Phase 2	Phase 3	Phase 3	Phase 1	Phas
(Intercept)	20.70***	19.12***	17.25***	14.39***	3.19	1.10	0.38***	0.33*
	(4.96)	(4.66)	(2.89)	(2.93)	(3.54)	(4.26)	(0.10)	(0.0
REGBoth	−1.81	−3.14			3.12	2.65	−0.04	−0.0
	(4.17)	(4.09)			(2.90)	(2.70)	(0.09)	(0.0
BBVCent	0.20*	0.13	0.18***	0.20**	0.13*	0.14*	0.00	−0.0
	(0.09)	(0.11)	(0.04)	(0.07)	(0.05)	(0.06)	(0.00)	(0.0
abs(BBVCent)	−0.05	0.09	0.02	−0.04	0.34***	0.31***	−0.00	−0.0
	(0.20)	(0.18)	(0.10)	(0.10)	(0.10)	(0.08)	(0.00)	(0.0
marketTop	−0.79	−0.11	−1.15*	−1.47*	−0.25	−0.70	−0.03	−0.0
	(0.96)	(1.03)	(0.49)	(0.60)	(0.19)	(0.39)	(0.03)	(0.0
Period0	−0.15	−0.88	−0.63**	−0.71**	−0.77	−0.82	−0.05	−0.0
	(1.45)	(1.58)	(0.23)	(0.24)	(0.55)	(0.62)	(0.03)	(0.0
log(shortsells_Informed + 1)		0.47		0.36		0.83		0.0
		(1.09)		(0.44)		(0.67)		(0.0
log(marginbuysAsset_Informed + 1)		−2.04		−0.18		0.78		−0.0
		(1.22)		(0.79)		(0.73)		(0.0
log(shortsells_Uninformed + 1)		2.96*		1.09*		0.16		0.07
		(1.36)		(0.47)		(0.35)		(0.0
log(marginbuysAsset_Uninformed + 1)		−1.44		1.03		0.86		−0.0
		(1.45)		(0.54)		(0.71)		(0.0
historyR			−1.07	−0.14				
			(2.57)	(2.39)				
REGSH			1.16*	1.56*				
			(0.49)	(0.69)				
historyN.R					0.44	0.29		
					(0.42)	(0.43)		
historyR.N					3.35	3.23		
					(2.95)	(2.84)		
historyR.R					3.07	3.40		
					(2.90)	(3.06)		
AIC	1121.12	1115.99	2002.30	1985.60	955.44	943.14	−34.05	−47.
R^2	0.06	0.15	0.14	0.21	0.25	0.35	0.07	0.2
Adj. R^2	0.03	0.09	0.12	0.18	0.20	0.29	0.04	0.1
Num. obs.	144	144	288	288	144	144	144	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Figure 21: GAM-smoothed development of predicted 'Spread' over time.



Trading Profits

$$PD^{Before} = \cdot \frac{\sum_j \theta_j \cdot (P_j - BBV) \cdot Vol_j}{W_{t=0}}, \tag{5}$$

$$PD^{After\ redistribution} = PD^{Before} + \cdot \frac{Redist}{W_{t=0}}, \tag{6}$$

$$PD^{After\ punishment} = PD^{After\ redistribution} - \cdot \frac{Pen}{W_{t=0}}, \tag{7}$$

Figure 22: Mean gross trading profits per trader ('PD') by regulatory regime, trader type, and phase.

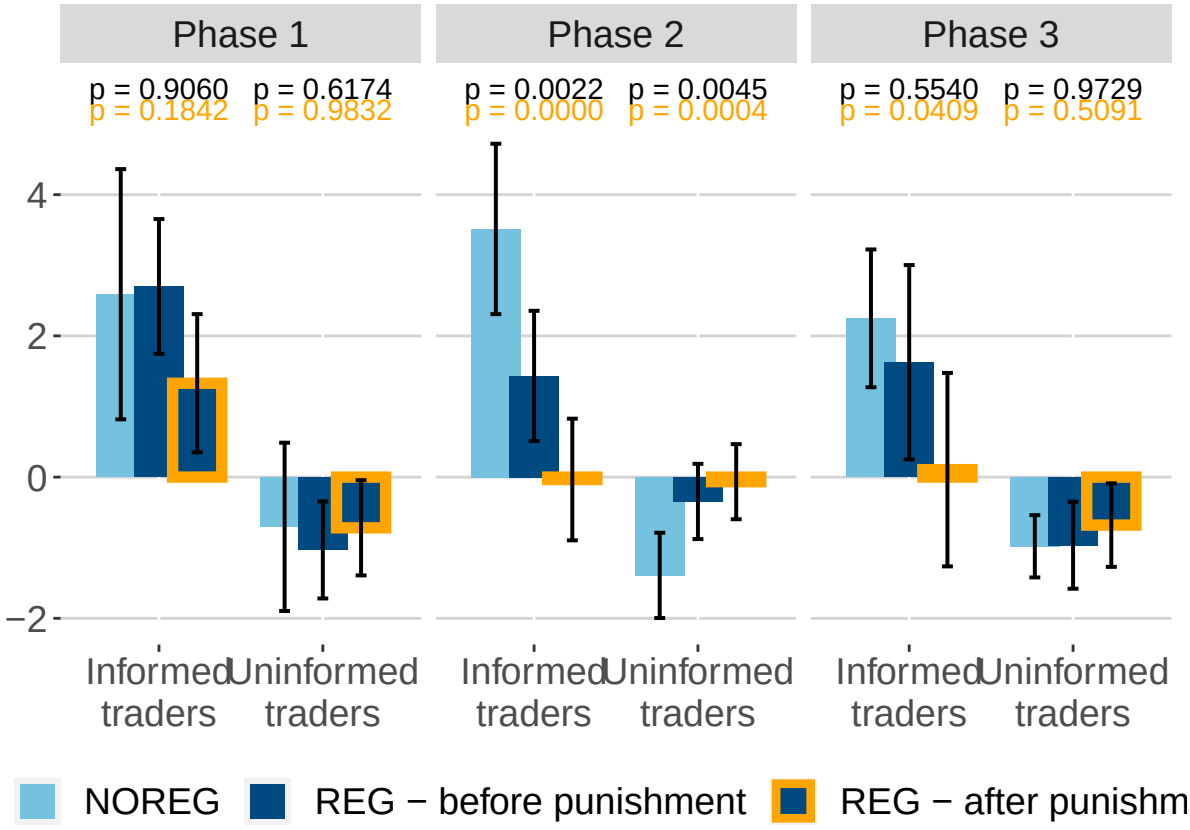


Figure 23: Mean trading profits including compensations over time by regulation

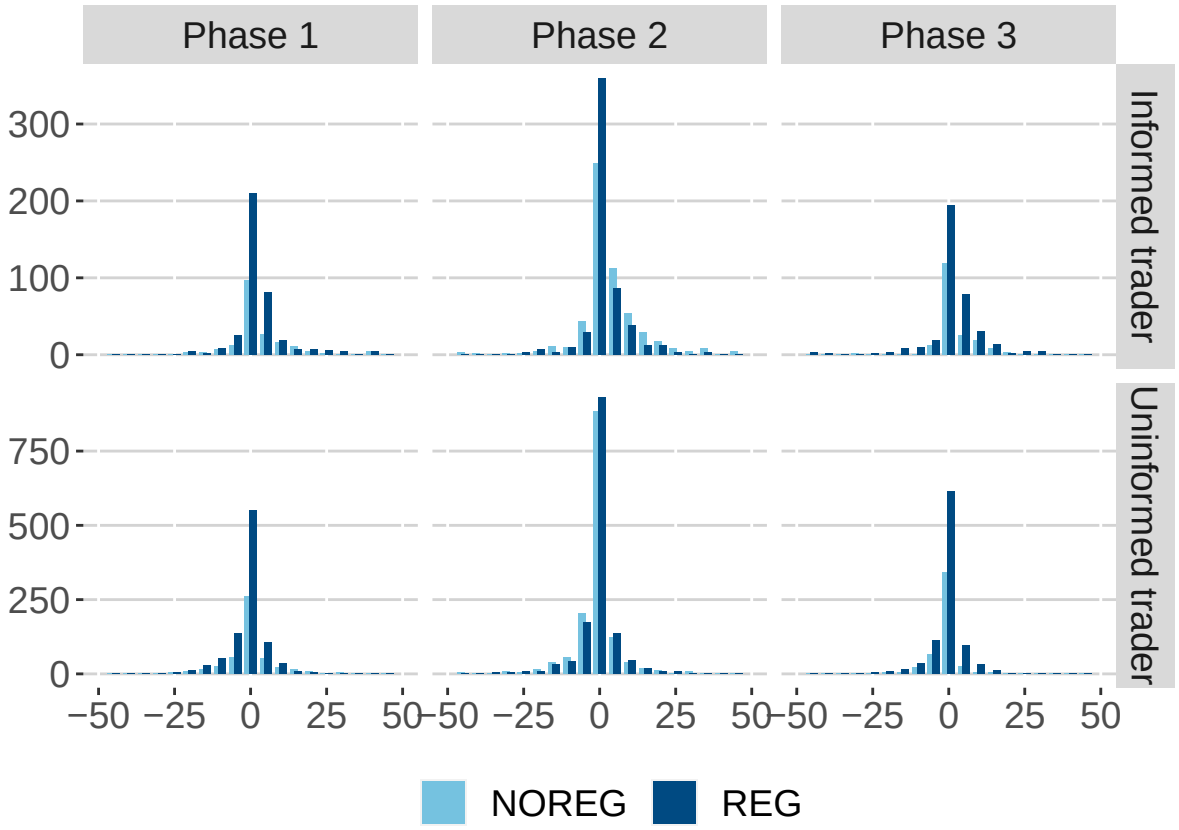
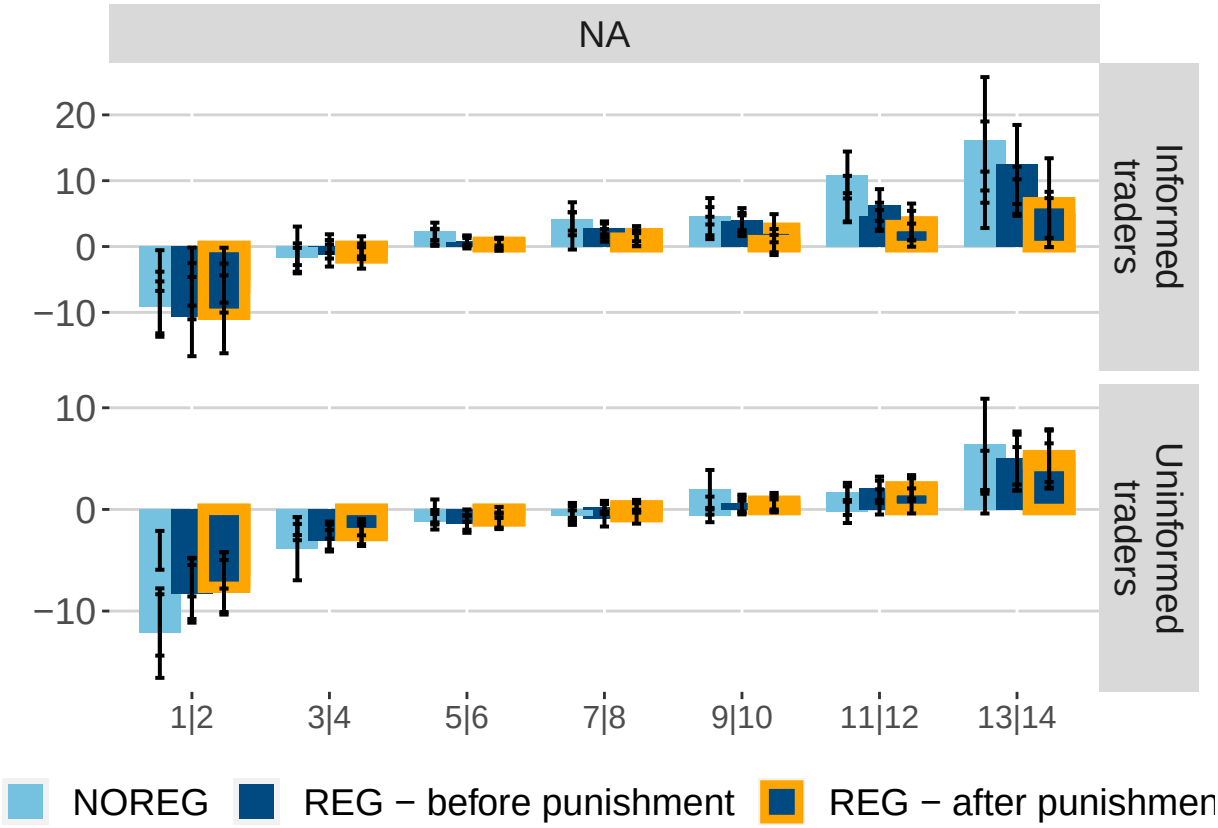


Figure 24: Mean gross trading profits per trader ('PD') by trader type, phase, and profit rank.



$$\pi^{Before} = 1000 \cdot \frac{\sum_j \theta_j \cdot (P_j - BBV) \cdot Vol_j}{W_{t=0} \cdot \sum Vol_j}, \tag{8}$$

$$\pi^{After\ redistribution} = \pi^{Before} + 1000 \cdot \frac{Redist}{W_{t=0} \cdot \sum Vol_j}, \tag{9}$$

$$\pi^{After\ punishment} = \pi^{After\ redistribution} - 1000 \cdot \frac{Pen}{W_{t=0} \cdot \sum Vol_j}, \tag{10}$$

Figure 25: Mean gross trading profits per trader per share ('π') by regulatory regime, trader type, and phase.

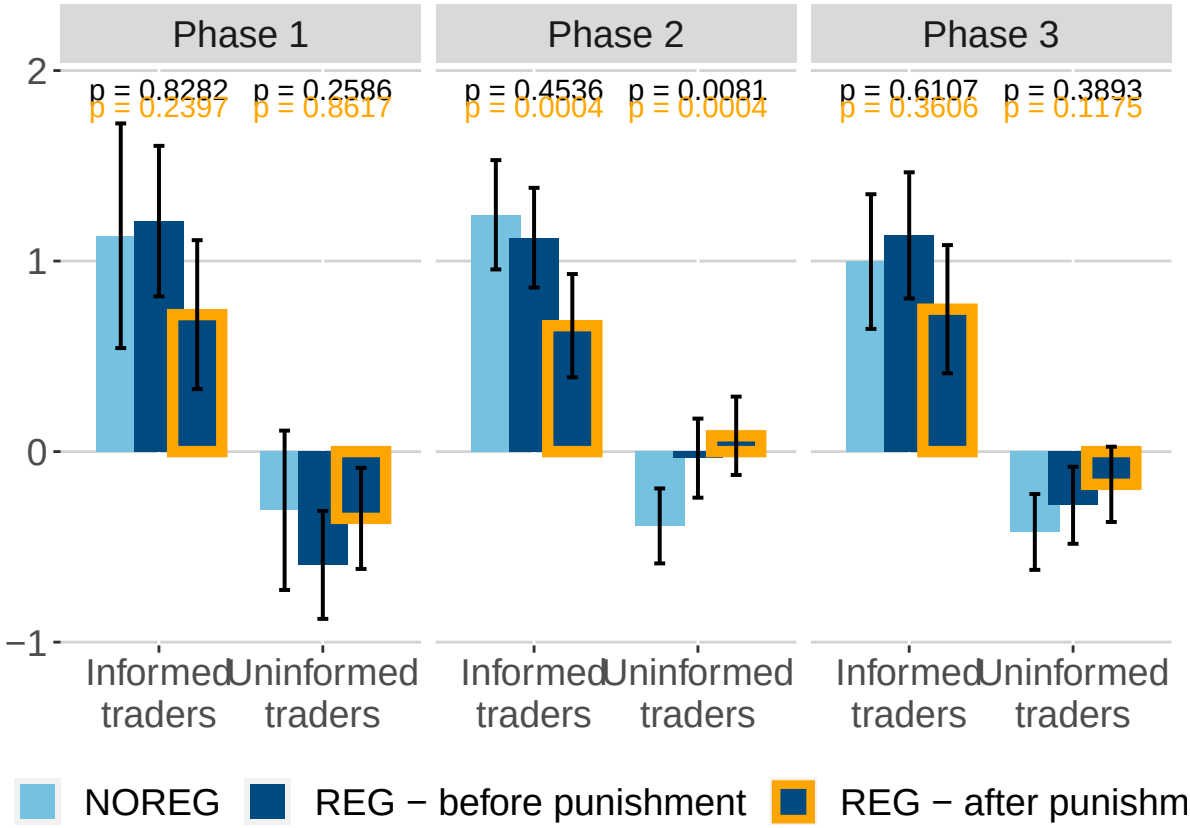


Table 20: Regressions of trading profits per share ('π') of informed traders by phase.

	Phase 1			Phase 2			Phase 3		
	before	after redist	after pun	before	after redist	after pun	before	after redist	after pun
(Intercept)	0.20	0.24	0.29	0.22	0.57	0.39	−0.58	−0.06	−0.32
	(0.45)	(0.47)	(0.45)	(0.54)	(0.53)	(0.56)	(0.51)	(0.50)	(0.52)
REGBoth	−0.01	−0.22	−0.44				0.12	−0.32	−0.10
	(0.56)	(0.58)	(0.56)				(0.32)	(0.31)	(0.33)
BBVCent	0.01	0.00	0.00	−0.01	−0.00	−0.01	−0.01	−0.01	−0.01
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
abs(BBVCent)	0.07	0.06	0.05	0.07*	0.05*	0.06*	0.07***	0.05***	0.06***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
marketTop	0.06	0.01	−0.05	0.06	−0.10	−0.02	0.23	0.04	0.14
	(0.21)	(0.22)	(0.21)	(0.18)	(0.16)	(0.19)	(0.13)	(0.13)	(0.15)
Period0	0.05	0.10	0.15	0.04	−0.00	0.02	0.34	0.41	0.38
	(0.25)	(0.25)	(0.25)	(0.06)	(0.06)	(0.06)	(0.21)	(0.21)	(0.22)
historyR				−0.19	0.05	−0.07			
				(0.36)	(0.27)	(0.24)			
REGSH				−0.12	−0.58*	−0.35**			
				(0.18)	(0.16)	(0.19)			
historyN.R							0.01	−0.43	−0.21
							(0.21)	(0.22)	(0.26)
historyR.N							0.22	−0.21	0.00
							(0.38)	(0.36)	(0.40)
historyR.R							0.15	0.03	0.09
							(0.34)	(0.34)	(0.36)
R^2	0.02	0.02	0.02	0.03	0.02	0.02	0.04	0.04	0.04
Adj. R^2	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.03
Num. obs.	576	576	576	1152	1152	1152	576	576	576

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 21: Regressions of trading profits per share ('π') of uninformed traders by phase.

	Phase 1		Phase 2		Phase 3	
	before	after redist	after pun	before	after redist	after pun
(Intercept)	1.05^{**}	0.92^{*}	0.23	0.19	0.59	0.45
	(0.37)	(0.36)	(0.33)	(0.32)	(0.37)	(0.34)
REGBoth	-0.60	-0.30			0.17	0.27
	(0.36)	(0.33)			(0.21)	(0.18)
BBVCent	0.03^{*}	0.03^{*}	0.02^{**}	0.01^{**}	0.03^{***}	0.03^{***}
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
abs(BBVCent)	-0.08^{***}	-0.07^{**}	-0.05^{***}	-0.05^{***}	-0.04^{**}	-0.03^{*}
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	-0.32	-0.25	-0.04	0.01	-0.09	-0.04
	(0.17)	(0.18)	(0.16)	(0.18)	(0.09)	(0.09)
Period0	0.19	0.01	0.05	0.05	-0.11	-0.15
	(0.16)	(0.14)	(0.04)	(0.04)	(0.12)	(0.13)
historyR			-0.35	-0.38		
			(0.20)	(0.23)		
REGSH			0.36^{*}	0.47^{**}		
			(0.16)	(0.18)		
historyN.R					-0.15	0.01
					(0.10)	(0.11)
historyR.N					-0.49	-0.36
					(0.27)	(0.22)
historyR.R					-0.41	-0.38
					(0.24)	(0.21)
R^2	0.04	0.03	0.02	0.02	0.03	0.03
Adj. R^2	0.03	0.02	0.02	0.02	0.03	0.03
Num. obs.	1440	1440	2880	2880	1440	1440

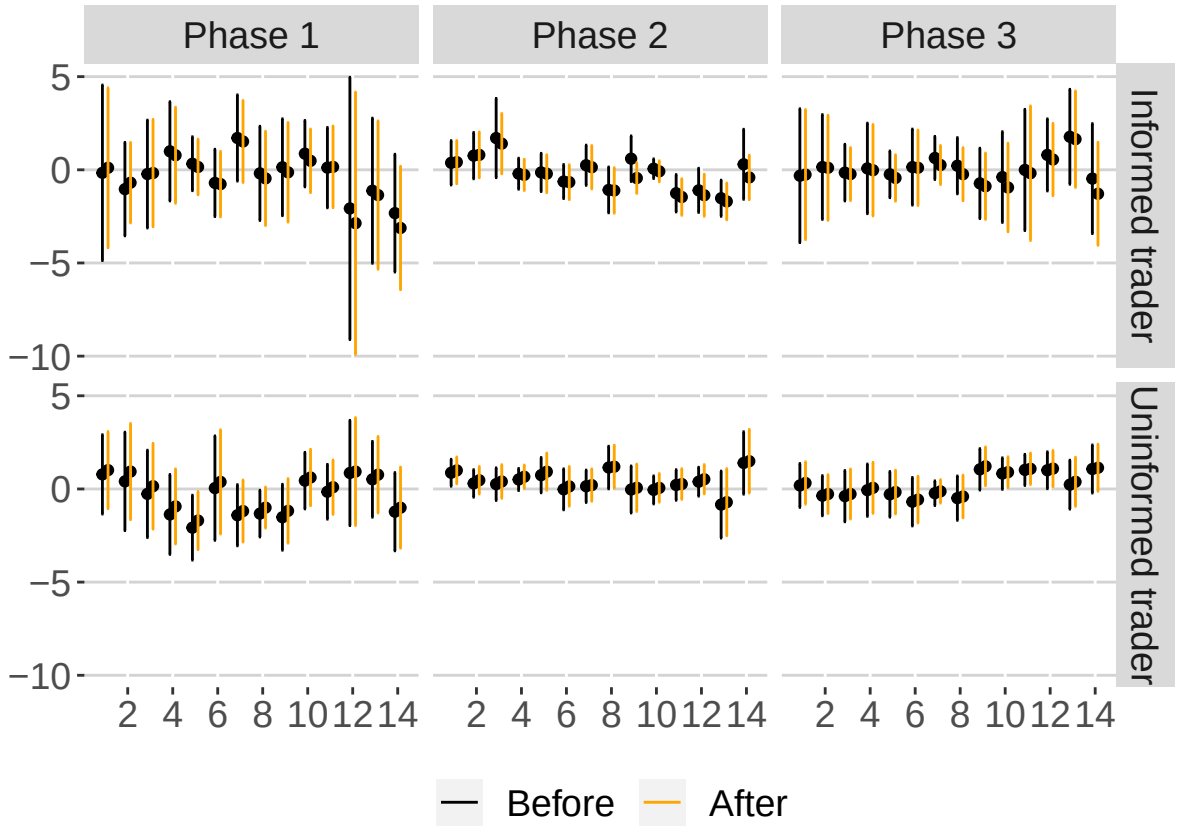
$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 22: Regressions of trading profits per share ('π') of both trader types by phase.

	Phase 1		Phase 2		Phase 3	
	before	after redist	before	after redist	before	after redist
(Intercept)	2.01^{***}	1.70^{***}	1.22^{***}	1.12^{***}	1.27^{***}	1.10^{***}
	(0.30)	(0.29)	(0.31)	(0.31)	(0.27)	(0.25)
REGBoth	−0.43	−0.28			0.16	0.17
	(0.26)	(0.19)			(0.14)	(0.13)
RoleUninformed trader	-1.68^{***}	-1.36^{***}	-1.40^{***}	-1.22^{***}	-1.42^{***}	-1.22^{***}
	(0.28)	(0.29)	(0.16)	(0.15)	(0.18)	(0.17)
BBVCent	0.03^{*}	0.02^{**}	0.01^{*}	0.01^{*}	0.02^{***}	0.02^{***}
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	-0.04^{*}	-0.03^{**}	−0.02	−0.02	−0.01	−0.01
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	−0.21	−0.18	−0.01	0.00	0.00	0.01
	(0.14)	(0.14)	(0.14)	(0.14)	(0.06)	(0.06)
Period0	0.15	0.04	0.05	0.04	0.02	0.00
	(0.14)	(0.10)	(0.04)	(0.04)	(0.07)	(0.07)
historyR			−0.30	−0.29		
			(0.21)	(0.21)		
REGSH			0.22	0.24		
			(0.14)	(0.14)		
historyN.R					−0.11	−0.06
					(0.08)	(0.09)
historyR.N					−0.29	−0.25
					(0.17)	(0.16)
historyR.R					−0.25	−0.25
					(0.17)	(0.17)
R^2	0.04	0.03	0.03	0.03	0.06	0.04
Adj. R^2	0.04	0.03	0.03	0.03	0.05	0.04
Num. obs.	2016	2016	4032	4032	2016	2016

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Figure 26: Effect size of regulation by traders' rank, i.e. coefficient and 95% confidence interval of the interaction between regulation and the traders' rank on trading profit per share.



Mean trading profts ('PD') by regulatory regime, trader type, and phase.

```
##                   NOREG     REG       pvalues_Informed NOREG     REG
## Inf all phases   "3.0766"  "1.8505"  "0.0177"         "3.0766"  "0.3952"
## Uninf all phases "-1.1722" "-0.7181" "0.1097"         "-1.1722" "-0.4272"
## Inf Phase 1      "2.5901"  "2.7006"  "0.906"          "2.5901"  "1.3289"
## Uni Phase 1      "-0.7046" "-1.0319" "0.6174"         "-0.7046" "-0.7182"
## Inf Phase 2      "3.5148"  "1.4328"  "0.0022"         " 3.5148" "-0.0342"
## Uni Phase 2      "-1.3921" "-0.3450" "0.0045"         "-1.3921" "-0.0648"
## Inf Phase 3      "2.2487"  "1.6269"  "0.554"          "2.2487"  "0.1056"
## Uni Phase 3      "-0.9802" "-0.9642" "0.9729"         "-0.9802" "-0.6797"
##                   pvalues_Uninformed
## Inf all phases   "0"
## Uninf all phases "0.0081"
## Inf Phase 1      "0.1842"
## Uni Phase 1      "0.9832"
## Inf Phase 2      "0"
## Uni Phase 2      "0.0004"
## Inf Phase 3      "0.0409"
## Uni Phase 3      "0.5091"
```

```
##              NOREG REG   REG
## Inf Phase 1 "**"  "***" "**"
## Uni Phase 1 ""    "**"  "*"
```

```
## Inf Phase 2 "***" "**"  ""
## Uni Phase 2 "***" ""    ""
## Inf Phase 3 "***" "*"   ""
## Uni Phase 3 "***" "**"  "*"
```

```
##                  NOREG     REG       pvalues_Informed NOREG     REG
## Inf all phases   "1.1718"  "1.1511"  "0.8869"         "1.1718"  "0.7022"
## Uninf all phases "-0.3800" "-0.2651" "0.2658"         "-0.3800" "-0.1137"
## Inf Phase 1      "1.1329"  "1.2097"  "0.8282"         "1.1329"  "0.7188"
## Uni Phase 1      "-0.3081" "-0.5947" "0.2586"         "-0.3081" "-0.3505"
## Inf Phase 2      "1.2430"  "1.1228"  "0.4536"         "1.243"   "0.661"
## Uni Phase 2      "-0.3902" "-0.0343" "0.0081"         "-0.3902" " 0.0830"
## Inf Phase 3      "0.9974"  "1.1348"  "0.6107"         "0.9974"  "0.7475"
## Uni Phase 3      "-0.4215" "-0.2818" "0.3893"         "-0.4215" "-0.1719"
##                  pvalues_Uninformed
## Inf all phases   "0.0014"
## Uninf all phases "0.0085"
## Inf Phase 1      "0.2397"
## Uni Phase 1      "0.8617"
## Inf Phase 2      "0.0004"
## Uni Phase 2      "0.0004"
## Inf Phase 3      "0.3606"
## Uni Phase 3      "0.1175"
```

```
##             NOREG REG   REG
## Inf Phase 1 "***" "***" "***"
## Uni Phase 1 ""    "***" "**"
## Inf Phase 2 "***" "***" "***"
## Uni Phase 2 "***" ""    ""
## Inf Phase 3 "***" "***" "***"
## Uni Phase 3 "***" "**"  ""
```

Mean trading profits per share (‘
pi’**) by regulatory regime, trader type, and phase.**

```
##         NOREG    REG      REG
## Phase 1 "0.0025" "0"      "0.0008"
## Phase 2 "0"      "0.0011" "0.9526"
## Phase 3 "0"      "0.0008" "0.3014"
```

Short selling activity

Mean short selling activity by regulatory regime, trader type, and phase.

```
##                          NOREG    REG      pvalues_before NOREG    REG
## Short sells all phases  "1.6792" "1.1927" "0.0598"       "1.2446" "1.1521"
## Short sells Phase 1     "1.3750" "0.6927" "0.0526"       "0.7771" "0.7927"
## Short sells Phase 2     "2.0764" "1.1649" "0.0152"       "1.5208" "1.2681"
## Short sells Phase 3     "0.7917" "1.7344" "0.046"        "0.8833" "1.3375"
## Short sells Phase 1 & 3 "1.0833" "1.2135" "0.6591"       "0.8302" "1.0651"
##                          pvalues_after
## Short sells all phases  "0.5359"
## Short sells Phase 1     "0.9452"
## Short sells Phase 2     "0.1399"
## Short sells Phase 3     "0.1416"
## Short sells Phase 1 & 3 "0.2208"
```

Table 23: Zero inflated negative binomial model for short selling

	All traders			Informed traders			Uninformed trader		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	P
Count model: (Intercept)	2.97***	3.34***	1.92***	2.76***	2.89***	2.15***	3.19***	3.18***	1
	(0.30)	(0.21)	(0.36)	(0.42)	(0.30)	(0.46)	(0.39)	(0.24)	(
Count model: REGBoth	−0.35		0.69**	−0.33		−0.28	−0.75*		0
	(0.24)		(0.21)	(0.31)		(0.31)	(0.36)		(
Count model: BBVCent	0.01	0.01	0.01*	−0.01	0.01	0.00	0.03**	0.01	0
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(
Count model: abs(BBVCent)	0.00	0.01	0.01	0.01	0.01	0.04**	−0.02	0.01	
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(
Count model: marketTop	−0.49*	0.05	0.32*	−0.69*	0.22	0.35	−0.28	−0.10	
	(0.21)	(0.13)	(0.16)	(0.28)	(0.19)	(0.22)	(0.25)	(0.15)	(
Count model: Period0	0.22	0.03	0.18	−0.02	−0.04	−0.02	0.21	0.05	
	(0.13)	(0.04)	(0.10)	(0.20)	(0.06)	(0.12)	(0.16)	(0.05)	(
Count model: Log(theta)	0.07	0.14	0.50**	0.54	0.17	0.61*	−0.01	0.10	
	(0.20)	(0.11)	(0.17)	(0.31)	(0.18)	(0.26)	(0.24)	(0.14)	(
Zero model: (Intercept)	−0.88	−1.70**	−0.77	1.69**	0.83	1.24	−0.58	−1.32**	−
	(0.60)	(0.57)	(0.91)	(0.58)	(0.44)	(0.78)	(0.60)	(0.49)	(
Zero model: REGBoth	0.34		−0.15	0.24		−1.22*	−0.01		
	(0.47)		(0.49)	(0.43)		(0.50)	(0.47)		(
Zero model: BBVCent	−0.02	−0.03*	0.01	0.03*	0.05***	0.04***	−0.05**	−0.06***	−
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(
Zero model: abs(BBVCent)	−0.00	−0.04	−0.06*	−0.03	−0.04*	0.02	0.05	−0.01	−
	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(
Zero model: marketTop	0.35	−0.05	−0.28	0.27	0.08	−0.11	0.32	−0.21	−
	(0.42)	(0.34)	(0.41)	(0.41)	(0.27)	(0.38)	(0.42)	(0.29)	(
Zero model: Period0	−0.47	−0.07	0.09	−0.47	−0.19*	−0.01	−0.59*	0.07	−
	(0.26)	(0.10)	(0.25)	(0.25)	(0.08)	(0.23)	(0.26)	(0.08)	(
Count model: historyR		−0.56***			−0.26			−0.55***	
		(0.13)			(0.19)			(0.16)	
Count model: REGSH		−0.22			−0.40*			−0.10	
		(0.13)			(0.19)			(0.15)	
Zero model: historyR		0.67			0.54			0.89**	
		(0.39)			(0.29)			(0.32)	
Zero model: REGSH		0.88*			0.51			0.37	
		(0.35)			(0.28)			(0.29)	
Count model: historyN.R			−0.07			−0.15			
			(0.26)			(0.35)			(
Count model: historyR.N			0.33			0.22			
			(0.25)			(0.33)			(
Count model: historyR.R			0.09			−0.46			
			(0.26)			(0.35)			(
Zero model: historyN.R			0.31			0.17			
			(0.83)			(0.63)			(
Zero model: historyR.N			0.66			−0.05			
			(0.76)			(0.60)			(
Zero model: historyR.R			0.95			−0.22			
			(0.75)			(0.61)			(
Hurdle test p-value	0.21	0.00	0.31	0.00	0.00	1.00	0.00	0.00	
$sum_i hatf_i(0)$	48	63	38	104	176	88	69	115	
mu_i	13.76	23.94	4.68	2.46	5.47	1.92	15.50	19.04	
$mu_i(BBV12.5)$	16.39	33.95	7.53	2.47	6.82	1.76	17.36	27.27	
$mu_i(BBV - 12.5)$	11.58	27.08	6.01	6.06	11.35	4.13	3.97	16.64	
AIC	927.54	2193.91	1054.11	453.25	1210.08	598.29	740.26	1772.48	8
Log Likelihood	−450.77	−1081.96	−508.06	−213.62	−590.04	−280.15	−357.13	−871.24	−
Num. obs.	144	288	144	144	288	144	144	288	

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Margin buying activity

Mean short margin buying at BBV activity by regulatory regime, trader type, and phase.

```
##                          NOREG    REG      pvalues_Informed NOREG    REG
## Margin buys all phases  "2.2495" "1.4018" "0.0006"         "1.0074" "0.7860"
## Margin buys Phase 1     "1.3192" "0.7735" "0.122"          "1.2937" "0.4740"
## Margin buys Phase 2     "2.7091" "1.5247" "0.0001"         "0.9611" "0.8434"
## Margin buys Phase 3     "1.8010" "1.8457" "0.9362"         "0.8600" "1.0119"
## Margin buys Phase 1 & 3 "1.5601" "1.3096" "0.4493"         "1.0768" "0.7430"
##                          pvalues_Uninformed
## Margin buys all phases  "0.0446"
## Margin buys Phase 1     "0.0001"
## Margin buys Phase 2     "0.4355"
## Margin buys Phase 3     "0.486"
## Margin buys Phase 1 & 3 "0.0281"
```

Mean short margin buying at market prices activity by regulatory regime, trader type, and phase.

```
##                          NOREG    REG      pvalues_Informed NOREG    REG
## Margin buys all phases  "2.5820" "1.5715" "0.0003"         "0.9008" "0.6824"
## Margin buys Phase 1     "1.5416" "0.9142" "0.1396"         "1.2390" "0.4008"
## Margin buys Phase 2     "3.0787" "1.7128" "0.0001"         "0.8274" "0.7327"
## Margin buys Phase 3     "2.1322" "2.0167" "0.8547"         "0.7830" "0.8886"
## Margin buys Phase 1 & 3 "1.8369" "1.4654" "0.3295"         "1.0110" "0.6447"
##                          pvalues_Uninformed
## Margin buys all phases  "0.0219"
## Margin buys Phase 1     "0"
## Margin buys Phase 2     "0.4503"
## Margin buys Phase 3     "0.5831"
## Margin buys Phase 1 & 3 "0.007"
```

Table 24: Zero inflated negative binomial model for margin buying evaluated at BBV

	All traders			Informed traders			Uninformed trad	
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2
Count model: (Intercept)	2.85***	2.80***	2.70***	2.65***	2.66***	2.90***	2.64***	2.54***
	(0.30)	(0.19)	(0.48)	(0.54)	(0.25)	(0.65)	(0.35)	(0.26)
Count model: REGBoth	−0.58**		0.12	−0.13		0.19	−0.57*	
	(0.22)		(0.30)	(0.47)		(0.41)	(0.24)	
Count model: BBVCent	−0.01	−0.00	−0.01	−0.00	0.01	0.01	−0.02*	−0.02***
	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Count model: abs(BBVCent)	0.02	0.03***	−0.02	0.01	0.03*	−0.01	0.00	0.01
	(0.01)	(0.01)	(0.02)	(0.03)	(0.01)	(0.02)	(0.02)	(0.01)
Count model: marketTop	−0.18	−0.02	0.14	−0.14	−0.13	0.20	−0.24	−0.01
	(0.21)	(0.12)	(0.22)	(0.34)	(0.15)	(0.26)	(0.24)	(0.16)
Count model: Period0	0.03	−0.01	0.09	−0.13	−0.00	−0.16	0.15	−0.00
	(0.13)	(0.03)	(0.13)	(0.24)	(0.05)	(0.17)	(0.16)	(0.05)
Count model: Log(theta)	0.09	0.31**	−0.20	−0.06	0.30	0.08	0.14	0.22
	(0.19)	(0.11)	(0.19)	(0.34)	(0.16)	(0.25)	(0.24)	(0.15)
Zero model: (Intercept)	−0.29	−0.97	−3.90	0.76	−0.53	0.86	0.33	1.00*
	(0.62)	(0.58)	(14.32)	(0.65)	(0.47)	(0.85)	(0.55)	(0.46)
Zero model: REGBoth	0.93		0.65	1.86**		−0.24	0.37	
	(0.52)		(0.72)	(0.60)		(0.54)	(0.44)	
Zero model: BBVCent	−0.01	0.01	−0.01	−0.08***	−0.08***	−0.07***	0.06***	0.07***
	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
Zero model: abs(BBVCent)	−0.06*	−0.02	−0.16**	−0.05	0.01	0.00	−0.00	−0.05*
	(0.03)	(0.02)	(0.06)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
Zero model: marketTop	−0.02	−0.78	−0.66	−0.23	−0.18	−0.27	−0.25	−0.50
	(0.44)	(0.42)	(0.77)	(0.46)	(0.29)	(0.41)	(0.41)	(0.29)
Zero model: Period0	−0.60*	−0.12	0.22	−0.34	0.01	−0.07	−0.41	−0.04
	(0.29)	(0.12)	(0.56)	(0.29)	(0.09)	(0.25)	(0.26)	(0.08)
Count model: historyR		−0.04			−0.04			−0.03
		(0.12)			(0.16)			(0.17)
Count model: REGSH		−0.36**			−0.43**			−0.10
		(0.11)			(0.15)			(0.15)
Zero model: historyR		−0.20			0.14			−0.35
		(0.40)			(0.31)			(0.31)
Zero model: REGSH		0.14			0.50			0.08
		(0.39)			(0.30)			(0.29)
Count model: historyN.R			0.11			−0.20		
			(0.35)			(0.47)		
Count model: historyR.N			0.52			0.08		
			(0.36)			(0.47)		
Count model: historyR.R			0.48			−0.20		
			(0.36)			(0.49)		
Zero model: historyN.R			1.25			−0.23		
			(13.51)			(0.72)		
Zero model: historyR.N			4.03			−0.75		
			(14.07)			(0.68)		
Zero model: historyR.R			4.60			−0.67		
			(14.14)			(0.69)		
Hurdle test p-value	0.00	0.00	0.77	0.99	0.00	1.00	0.00	0.93
$sum_i hatf_i(0)$	46	44	30	100	146	78	75	139
mu_i	9.92	11.94	14.55	4.52	9.00	5.42	5.84	3.40
$mu_i(BBV12.5)$	14.47	17.46	9.82	11.06	17.49	8.00	2.93	2.42
$mu_i(BBV - 12.5)$	17.53	19.60	13.49	3.93	6.16	2.03	11.99	12.39
AIC	922.89	2205.51	1078.86	476.59	1414.64	694.89	696.07	1481.26
Log Likelihood	−448.44	−1087.75	−520.43	−225.30	−692.32	−328.45	−335.04	−725.63
Num. obs.	144	288	144	144	288	144	144	288

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 25: Zero inflated negative binomial model for margin buying evaluated at market prices

	All traders			Informed traders			Uninformed trac	
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2
Count model: (Intercept)	3.03***	2.91***	2.66***	2.79***	2.89***	2.59***	2.84***	2.47***
	(0.31)	(0.18)	(0.46)	(0.59)	(0.25)	(0.64)	(0.35)	(0.25)
Count model: REGBoth	−0.75***		0.16	−0.34		0.37	−0.69**	
	(0.22)		(0.29)	(0.51)		(0.40)	(0.24)	
Count model: BBVCent	0.00	0.01	−0.00	0.01	0.01*	0.02	−0.01	−0.02**
	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Count model: abs(BBVCent)	0.01	0.03***	−0.02	0.01	0.02	−0.01	−0.00	0.01
	(0.01)	(0.01)	(0.02)	(0.03)	(0.01)	(0.02)	(0.02)	(0.01)
Count model: marketTop	−0.25	−0.04	0.13	−0.20	−0.17	0.22	−0.35	0.02
	(0.21)	(0.11)	(0.22)	(0.36)	(0.15)	(0.26)	(0.24)	(0.15)
Count model: Period0	0.04	−0.00	0.09	−0.11	−0.00	−0.09	0.16	0.02
	(0.14)	(0.03)	(0.13)	(0.27)	(0.05)	(0.17)	(0.16)	(0.04)
Count model: Log(theta)	0.05	0.34**	−0.22	−0.15	0.34*	0.07	0.14	0.32*
	(0.20)	(0.11)	(0.16)	(0.34)	(0.15)	(0.24)	(0.26)	(0.16)
Zero model: (Intercept)	−0.26	−0.95	−11.02	0.76	−0.50	0.79	0.37	1.01*
	(0.62)	(0.58)	(387.79)	(0.66)	(0.46)	(0.84)	(0.55)	(0.46)
Zero model: REGBoth	0.89		0.74	1.83**		−0.18	0.34	
	(0.52)		(0.71)	(0.60)		(0.52)	(0.45)	
Zero model: BBVCent	−0.00	0.01	−0.00	−0.08***	−0.08***	−0.07***	0.06***	0.07***
	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Zero model: abs(BBVCent)	−0.06*	−0.02	−0.16**	−0.05	0.01	0.01	−0.00	−0.05**
	(0.03)	(0.02)	(0.05)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
Zero model: marketTop	−0.02	−0.76	−0.70	−0.24	−0.17	−0.27	−0.27	−0.49
	(0.45)	(0.41)	(0.66)	(0.46)	(0.29)	(0.41)	(0.41)	(0.29)
Zero model: Period0	−0.62*	−0.11	0.24	−0.34	0.01	−0.07	−0.41	−0.04
	(0.30)	(0.11)	(0.42)	(0.29)	(0.09)	(0.25)	(0.26)	(0.08)
Count model: historyR		−0.11			−0.12			−0.06
		(0.12)			(0.16)			(0.17)
Count model: REGSH		−0.38***			−0.46**			−0.10
		(0.11)			(0.15)			(0.15)
Zero model: historyR		−0.22			0.13			−0.35
		(0.40)			(0.31)			(0.30)
Zero model: REGSH		0.14			0.50			0.08
		(0.39)			(0.29)			(0.29)
Count model: historyN.R			0.12			−0.15		
			(0.34)			(0.47)		
Count model: historyR.N			0.55			0.23		
			(0.35)			(0.47)		
Count model: historyR.R			0.48			−0.11		
			(0.35)			(0.49)		
Zero model: historyN.R			8.09			−0.23		
			(387.76)			(0.71)		
Zero model: historyR.N			11.09			−0.72		
			(387.78)			(0.67)		
Zero model: historyR.R			11.64			−0.64		
			(387.79)			(0.67)		
Hurdle test p-value	0.00	0.00	0.76	0.99	0.00	1.00	0.00	0.91
$sum_i hat{f}_i(0)$	46	44	30	100	146	78	75	139
mu_i	11.68	13.19	14.30	5.19	11.20	4.19	6.98	3.15
$mu_i(BBV12.5)$	19.41	20.33	10.87	15.00	21.95	7.02	3.65	2.36
$mu_i(BBV - 12.5)$	17.36	18.53	11.47	4.09	6.46	1.45	11.78	10.25
AIC	922.64	2199.76	1080.72	487.80	1443.57	708.67	684.03	1443.80
Log Likelihood	−448.32	−1084.88	−521.36	−230.90	−706.79	−335.33	−329.02	−706.90
Num. obs.	144	288	144	144	288	144	144	288

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 26: OLS for margin buying evaluated at market prices

	All traders			Informed traders			Uninformed traders		
	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	13.43*	13.05*	9.69	4.58	9.72*	5.22	8.85*	3.33	4.47
	(6.61)	(5.07)	(11.89)	(3.13)	(3.91)	(6.39)	(3.90)	(2.80)	(7.25)
REGBoth	−11.58		1.34	−5.10		3.34	−6.48		−2.00
	(7.01)		(11.42)	(3.51)		(6.95)	(3.83)		(5.49)
BBVCent	0.06	0.10	−0.03	0.25*	0.44***	0.31*	−0.19*	−0.34***	−0.35***
	(0.15)	(0.09)	(0.14)	(0.10)	(0.09)	(0.13)	(0.08)	(0.07)	(0.09)
abs(BBVCent)	0.34	0.53**	0.07	0.26	0.26*	−0.14	0.08	0.27*	0.21
	(0.22)	(0.17)	(0.34)	(0.19)	(0.12)	(0.27)	(0.13)	(0.13)	(0.17)
marketTop	−2.06	1.45	4.12*	0.12	−0.27	2.89	−2.18	1.72	1.23
	(2.30)	(2.65)	(2.07)	(1.54)	(1.70)	(1.79)	(1.92)	(1.33)	(1.46)
Period0	2.11	0.38	0.87	0.03	0.14	−0.61	2.08	0.24	1.49
	(1.54)	(0.56)	(1.94)	(1.69)	(0.57)	(1.71)	(1.25)	(0.39)	(1.63)
historyR		−1.97			−1.54			−0.43	
		(4.38)			(3.13)			(2.42)	
REGSH		−6.41*			−5.46**			−0.95	
		(2.65)			(1.70)			(1.33)	
historyN.R			1.53			0.24			1.29
			(4.06)			(2.78)			(2.82)
historyR.N			4.87			5.02			−0.15
			(10.76)			(7.58)			(4.24)
historyR.R			0.77			1.10			−0.33
			(9.52)			(5.94)			(4.91)
R^2	0.14	0.10	0.02	0.14	0.25	0.13	0.20	0.21	0.16
Adj. R^2	0.11	0.08	−0.04	0.11	0.24	0.08	0.17	0.20	0.11
Num. obs.	144	288	144	144	288	144	144	288	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Volume on stock

Table 27: OLS for volume on stock (Volume - short sells - margin buys) evaluated at market prices

	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
(Intercept)	4.48***	4.60***	4.51***	4.01***	4.27***	3.97***	4.51***	4.57***	4.53***
	(0.15)	(0.24)	(0.40)	(0.16)	(0.25)	(0.37)	(0.16)	(0.24)	(0.42)
REGBoth	−0.25		0.02	−0.41*		−0.04	−0.28		−0.02
	(0.16)		(0.34)	(0.17)		(0.33)	(0.18)		(0.36)
BBVCent	0.00	0.01*	0.01	0.00	0.01***	0.01	0.01	0.01***	0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	−0.01	−0.00	0.00	0.00	0.00	0.01	−0.01	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
marketTop	0.31***	0.31***	0.25***	0.22*	0.31***	0.19**	0.27**	0.30***	0.25***
	(0.09)	(0.07)	(0.07)	(0.10)	(0.09)	(0.07)	(0.09)	(0.07)	(0.07)
Period0	0.08	0.00	0.01	0.11	0.01	0.07	0.09	0.01	0.03
	(0.05)	(0.01)	(0.04)	(0.07)	(0.02)	(0.06)	(0.05)	(0.01)	(0.03)
historyR		−0.22			−0.27			−0.22	
		(0.21)			(0.19)			(0.20)	
REGSH		−0.30***			−0.56***			−0.30***	
		(0.07)			(0.09)			(0.07)	
historyN.R			0.04			0.06			0.05
			(0.10)			(0.11)			(0.10)
historyR.N			−0.40			−0.21			−0.44
			(0.35)			(0.29)			(0.36)
historyR.R			−0.44			−0.30			−0.49
			(0.34)			(0.31)			(0.35)
R^2	0.15	0.17	0.16	0.13	0.27	0.11	0.16	0.21	0.18
Adj. R^2	0.12	0.15	0.11	0.10	0.25	0.06	0.13	0.19	0.13
Num. obs.	144	288	143	144	287	143	144	288	143

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Inequality

Table 28: HHIPDbefore(volume)

	all	Phase 1	Phase 2	Phase 3	all	Phase 1	Phase 2	Phase 3
(Intercept)	0.04	0.11*	0.13	−0.16	7.18***	7.23***	7.26***	7.00***
	(0.08)	(0.05)	(0.10)	(0.17)	(0.07)	(0.04)	(0.09)	(0.14)
historyN	0.09				0.07			
	(0.09)				(0.07)			
historyN.N	−0.07*				−0.06*			
	(0.04)				(0.03)			
historyN.R	−0.06			0.01	−0.05			0.01
	(0.04)			(0.03)	(0.03)			(0.02)
historyR	0.02		−0.06		0.03		−0.04	
	(0.08)		(0.10)		(0.07)		(0.08)	
historyR.N	0.02			0.14	0.02			0.12
	(0.10)			(0.15)	(0.08)			(0.12)
historyR.R	−0.06			0.06	−0.05			0.05
	(0.05)			(0.09)	(0.04)			(0.07)
REGBoth	0.03	−0.05		0.13	0.02	−0.04		0.10
	(0.06)	(0.07)		(0.11)	(0.05)	(0.06)		(0.09)
REGSH	−0.03		−0.03		−0.04		−0.04	
	(0.06)		(0.06)		(0.05)		(0.05)	
BBVCent	0.00	−0.00	0.00	−0.00	0.00	−0.00	0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
abs(BBVCent)	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
marketTop	0.02	0.00	0.01	0.04	0.01	0.01	0.00	0.04
	(0.04)	(0.05)	(0.06)	(0.04)	(0.03)	(0.04)	(0.05)	(0.04)
Period0	−0.01	−0.00	−0.01	0.02	−0.00	0.00	−0.01	0.01
	(0.01)	(0.03)	(0.01)	(0.01)	(0.00)	(0.03)	(0.01)	(0.01)
R^2	0.02	0.02	0.02	0.10	0.02	0.02	0.02	0.10
Adj. R^2	0.00	−0.02	0.00	0.05	0.00	−0.02	−0.00	0.05
Num. obs.	576	144	288	144	576	144	288	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

Table 29: GiniProfit(volume)

	all	Phase 1	Phase 2	Phase 3	all	Phase 1	Phase 2	Phase 3
(Intercept)	10.97***	15.14***	11.34***	1.65	2.14*	3.38***	3.26**	−1.11
	(3.20)	(3.47)	(3.05)	(6.39)	(1.01)	(0.92)	(1.14)	(2.19)
historyN	0.51				1.10			
	(3.14)				(1.06)			
historyN.N	−3.13				−1.17			
	(2.71)				(0.74)			
historyN.R	−3.13			0.00	−0.96			0.20
	(2.71)				(0.89)			(0.37)
historyR	−2.14		−2.59		0.14		−0.94	
	(3.60)		(3.63)		(1.14)		(1.27)	
historyR.N	−3.43			1.99	−0.39			1.53
	(3.13)			(5.33)	(1.18)			(1.88)
historyR.R	−3.43			1.99	−1.38			0.55
	(3.13)			(5.33)	(0.81)			(1.50)
REGBoth	−0.49	−4.32		4.11	0.19	−1.01		1.71
	(3.34)	(4.44)		(5.21)	(1.00)	(1.22)		(1.61)
REGSH	−0.00		−0.00		−1.07		−1.07	
	(0.00)		(0.00)		(0.55)		(0.56)	
BBVCent	0.02	0.03	0.05	−0.01	0.00	0.01	0.01	0.00
	(0.04)	(0.11)	(0.05)	(0.08)	(0.01)	(0.03)	(0.02)	(0.02)
abs(BBVCent)	0.39***	0.28	0.41**	0.47**	0.10**	0.07	0.11*	0.12**
	(0.10)	(0.20)	(0.13)	(0.14)	(0.03)	(0.05)	(0.05)	(0.04)
marketTop	−0.00	0.00	0.00	0.00	0.40	0.25	0.31	0.71
	(0.00)		(0.00)	(0.00)	(0.40)	(0.55)	(0.56)	(0.39)
Period0	−0.29	−0.42	−0.34	0.12	−0.09	−0.01	−0.12	0.10
	(0.34)	(1.23)	(0.33)	(0.78)	(0.09)	(0.36)	(0.10)	(0.19)
R^2	0.11	0.09	0.12	0.15	0.08	0.05	0.09	0.14
Adj. R^2	0.09	0.05	0.10	0.10	0.06	0.01	0.07	0.09
Num. obs.	576	144	288	144	576	144	288	144

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.