Register

Study Information

Title

Provide the working title of your study. It may be the same title that you submit for publication of your final manuscript, but it is not a requirement.

How do different type of traders react to shocks?

Authors

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Description

Please give a brief description of your study, including some background, the purpose of the study, or broad research questions.

In my study, my focus market will be stock market. In the automated stock markets, buyers and seller don't arrive simulatenously (this is the friction of the market) and liquidity provision is the essential function of markets where buyers and sellers don't arrive simultaneously. There are liquidity providers- called as LPs- (intraday intermediaries or market makers) to fill the gap arising from the imperfect syncronization between the arrivals of buyers and sellers. But the provision of continuous market presence is costly. For that reason, LPs choose to maintain equilibrium risk exposure but that may be too low to offset large but temporary liquidity imbalances. In the event of large enough selling pressure, the liquidity on the buy side can only be obtained after a price drop that’s large enough to compensate reluctant LPs for taking on additional risky inventory. In these times, theory suggest that LP's risk bearing capacity is overwhelmed and they may become unwilling to accumulate more inventory without large price concessions. This may even trigger a market crash in the absence of fundamental shocks.

I will have an exogenous, big selling pressure event happened in Turkish Stock Exchange and I will try to answer the below questions emprically by using this selling pressure as an identification strategy.

- How does sudden excess selling pressure affect LP's behaviour in the stock market.
- Do LPs stabilize the stock market during the crash?

Hypotheses

List specific, concise, and testable hypotheses. Please state if the hypotheses are directional or non-directional. If directional, state the direction. A predicted effect is also appropriate here. If a specific interaction or moderation is important to your research, you can list that as a separate hypothesis.

- In case of high selling pressure, trading pattern of the LPs is changing or not. Trading pattern means here their inventory holding dynamics with respect to stock price changes.

- In theory, LPs supposed to stabilize the price. However, in cases of high selling pressure, theory suggests that LPs risk bearing capacity may be overwhelmed and they may become unwilling to accumulate more inventory w/o large price concessions. I want to check whether they are stabilizing the market or not.

Design Plan

Study type

Please check one of the following statements

Other

Blinding

Blinding describes who is aware of the experimental manipulations within a study. Mark all that apply.

Personnel who analyze the data collected from the study are not aware of the treatment applied to any given group.

Is there any additional blinding in this study?

Blinding (Other)

Study design

Describe your study design. Examples include two-group, factorial, randomized block, and repeated measures. Is it a between (unpaired), within-subject (paired), or mixed design? Describe any counterbalancing required. Typical study designs for observation studies include cohort, cross sectional, and case-control studies.

I will have exogenous, relatively big shock from swap market to stock market. This shock - exogenous high seling pressure- will be used as an identification strategy. This is temporary government measure taken in TRYUSD swap market on March 27 just before the local elections. In brief, it created a high selling pressure in the stock market on March 27 and this selling pressure leads to second highest fall of 5.86% in BIST30 index which is the benchmark index of Turkish Stock Exchange.

But, I need to implicitly assume that this shock is not created any change in the fundamentals which is very important for my identification strategy.

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Randomization

If you are doing a randomized study, how will you randomize, and at what level?

Sampling Plan

Existing Data

Preregistration is designed to make clear the distinction between confirmatory tests, specified prior to seeing the data, and exploratory analyses conducted after observing the data. Therefore, creating a research plan in which existing data will be used presents unique challenges. Please select the description that best describes your situation. Please see https://cos.io/prereg for more information.

Registration prior to analysis of the data

Explanation of existing data

If you indicate that you will be using some data that already exist in this study, please describe the steps you have taken to assure that you are unaware of any patterns or summary statistics in the data. This may include an explanation of how access to the data has been limited, who has observed the data, or how you have avoided observing any analysis of the specific data you will use in your study.

I have two weeks of tradebook and orderbook data. The data interval is March 18 - 29, 2019. I will have a seven trading days before the event.

Every transaction realized in microseconds both in orderbook and tradebook. Following variables will be used for this study.
-intermediary IDs
-stock IDs
-account IDs

-order type, price, volume and value
-trade type, price, volume and value
-buy/sell indicator
-user connection type (HFT, Colocation, Fix etc.)
-date and update timestamps
- change reasons of orders

Data collection procedures

Please describe the process by which you will collect your data. If you are using human subjects, this should include the population from which you obtain subjects, recruitment efforts, payment for participation, how subjects will be selected for eligibility from the initial pool (e.g. inclusion and exclusion rules), and your study timeline. For studies that don't include human subjects, include information about how you will collect samples, duration of data gathering efforts, source or location of samples, or batch numbers you will use.

Both the intraday orderbook and tradebook datasets are directly from the Stock Exchange's database.

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Sample size

Describe the sample size of your study. How many units will be analyzed in the study? This could be the number of people, birds, classrooms, plots, interactions, or countries included. If the units are not individuals, then describe the size requirements for each unit. If you are using a clustered or multilevel design, how many units are you collecting at each level of the analysis?

My individual units will be the individual trading account ids for each of the 30 stock under the benchmark index. Number of trading accounts differ across stocks and across days. For example, there are around 3500 trading account trading for an arbitrary day and stock.

Sample size rationale

This could include a power analysis or an arbitrary constraint such as time, money, or personnel.

Stopping rule

If your data collection procedures do not give you full control over your exact sample size, specify how you will decide when to terminate your data collection.

Variables

Manipulated variables

Describe all variables you plan to manipulate and the levels or treatment arms of each variable. This is not applicable to any observational study.

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Measured variables

Describe each variable that you will measure. This will include outcome measures, as well as any predictors or covariates that you will measure. You do not need to include any variables that you plan on collecting if they are not going to be included in the confirmatory analyses of this study.

My outcome variable should be an indicator for their inventory holding dynamics with respect tp stock price dynamics. So, it could be an inventory change (from tradebook) for some time frequency or price and signed quantity pairs (from orderbook?) for each pair of trader time and stock to show their demand.

My covariates could be, for example, the actual market price of the stock, some lagged market price of the stock, volatility (a proxy for risk), actual inventory holding of the LPs or actual net position of the LP, past cumulative profit of the LP (if calculable since I can use it as a proxy for marked-to-market equity and thus for inventory limit) and measure of sudden excess selling pressure (e.g. event day dummy) and hourly time fixed effect..

Time frequency has not decided yet.

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Indices

If any measurements are going to be combined into an index (or even a mean), what measures will you use and how will they be combined? Include either a formula or a precise description of your method. If you are using a more complicated statistical method to combine measures (e.g. a factor analysis), you can note that here but describe the exact method in the analysis plan section.

no file selected

Analysis Plan

Statistical models

What statistical model will you use to test each hypothesis? Please include the type of model (e.g. ANOVA, multiple regression, SEM, etc) and the specification of the model (this includes each variable that will be included as predictors, outcomes, or covariates). Please specify any interactions, subgroup analyses, pairwise or complex contrasts, or follow-up tests from omnibus tests. If you plan on using any positive controls, negative controls, or manipulation checks you may mention that here. Remember that any test not included here must be noted as an exploratory test in your final article.

I have one benchmark model in mind which is an dynamic panel regression to examine the comovement between LPs inventory and stock price changes w/o making causal inference since inventories and stock prices are jointly determined.

My unit of observation will be each trading account for some frequency. LHS variable will be change in inventory, RHS will be lagged change in inventory, lagged inventory and some predetermined lags of stock price change scaled by stock's tick price.

But I haven't decided yet. I will look for VAR models as well.

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Transformations

If you plan on transforming, centering, recoding the data, or will require a coding scheme for categorical variables, please describe that process.

I will need to create new categorical variables for trader types by using both tradebook and orderbook data.

There is no info about liqudity providers (or any other trader category) from the data set since the stock market has no formally required liquidity providers. So, liquidity providers are endogenously arising in this market. For this reason, I need to classify the traders by looking their directly observed individual inventory and trading volume patterns. What I have in mind for now (I will improve this) is as follows: trader volume scaled by market trading volume and end of day net position scaled by trader volume. These observations are calculated from the tradebook data for now.

I will also use the orderbook data to have a better trader classification. I have many criteria in mind such as intertrade duration, order frequency etc.

Inference criteria

What criteria will you use to make inferences? Please describe the information you'll use (e.g. specify the p-values, Bayes factors, specific model fit indices), as well as cut-off criterion, where appropriate. Will you be using one or two tailed tests for each of your analyses? If you are comparing multiple conditions or testing multiple hypotheses, will you account for this?

Data exclusion

How will you determine which data points or samples if any to exclude from your analyses? How will outliers be handled? Will you use any awareness check?

Missing data

How will you deal with incomplete or missing data?

Exploratory analysis

If you plan to explore your data set to look for unexpected differences or relationships, you may describe those tests here. An exploratory test is any test where a prediction is not made up front, or there are multiple possible tests that you are going to use. A statistically significant finding in an exploratory test is a great way to form a new confirmatory hypothesis, which could be registered at a later time.

Other

Other

If there is any additional information that you feel needs to be included in your preregistration, please enter it here. Literature cited, disclosures of any related work such as replications or work that uses the same data, or other context that will be helpful for future readers would be appropriate here.

Continue editing (/h8rje/drafts/5ddb934de15e44000c1dc27c/)

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