## Appendix I
## Sample instructions ($\pi = 2/3$)

### Introduction

This is an experiment in decision-making. Research foundations have provided funds for conducting this research. Your payoffs will depend partly only on your decisions and partly on chance. It will not depend on the decisions of the other participants in the experiments. Please pay careful attention to the instructions as a considerable amount of money is at stake.

The entire experiment should be complete within an hour and a half. At the end of the experiment you will be paid privately. At this time, you will receive $5 as a participation fee (simply for showing up on time). Details of how you will make decisions and receive payments will be provided below.

During the experiment we will speak in terms of experimental tokens instead of dollars. Your payoffs will be calculated in terms of tokens and then translated at the end of the experiment into dollars at the following rate:

2 Tokens = 1 Dollar

### A decision problem

In this experiment, you will participate in 50 independent decision problems that share a common form. This section describes in detail the process that will be repeated in all decision problems and the computer program that you will use to make your decisions.

In each decision problem you will be asked to allocate tokens between two accounts, labeled $x$ and $y$. The $x$ account corresponds to the $x$-axis and the $y$ account corresponds to the $y$-axis in a two-dimensional graph. Each choice will involve choosing a point on a line representing possible token allocations. Examples of lines that you might face appear in Attachment 1.

*[Attachment 1 here]*

In each choice, you may choose any $x$ and $y$ pair that is on the line. For example, as illustrated in Attachment 2, choice $A$ represents a decision to allocate $q$ tokens in the $x$ account and $r$ tokens in the $y$ account. Another possible allocation is $B$, in which you allocate $w$ tokens in the $x$ account and $z$ tokens in the $y$ account.

*[Attachment 2 here]*

Each decision problem will start by having the computer select such a line randomly from the set of lines that intersect with at least one of the axes at 50 or more tokens but with no intercept exceeding 100 tokens. The lines selected for you in different decision problems are independent of each other and independent of the lines selected for any of the other participants in their decision problems.

To choose an allocation, use the mouse to move the pointer on the computer screen to the allocation that you desire. When you are ready to make your decision, left-click to enter your chosen allocation. After that, confirm your decision by clicking on the Submit button. Note that you can choose only $x$ and $y$ combinations that are on the line. To move on to the next round, press the OK button. The computer program dialog window is shown in Attachment 3.

*[Attachment 3 here]*

Your payoff at each decision round is determined by the number of tokens in your $x$ account and the number of tokens in your $y$ account. At the end of the round, the computer will randomly select one of the accounts, $x$ or $y$. For each participant, account $y$ will be selected with 1/3 chance and account $x$ will be selected with 2/3 chance. You will only receive the number of tokens you allocated to the account that was chosen.

Next, you will be asked to make an allocation in another independent decision. This process will be repeated until all 50 rounds are completed. At the end of the last round, you will be informed the experiment has ended.

## Earnings

Your earnings in the experiment are determined as follows. At the end of the experiment, the computer will randomly select one decision round from each participant to carry out (that is, 1 out of 50). The round selected depends solely upon chance. For each participant, it is equally likely that any round will be chosen.

The round selected, your choice and your payment will be shown in the large window that appears at the center of the program dialog window. At the end of the experiment, the tokens will be converted into money. Each token will be worth 0.5 Dollars. Your final earnings in the experiment will be your earnings in the round selected plus the $5 show-up fee. You will receive your payment as you leave the experiment.

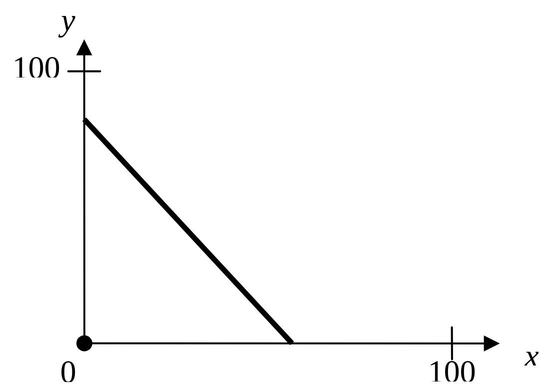
## Rules

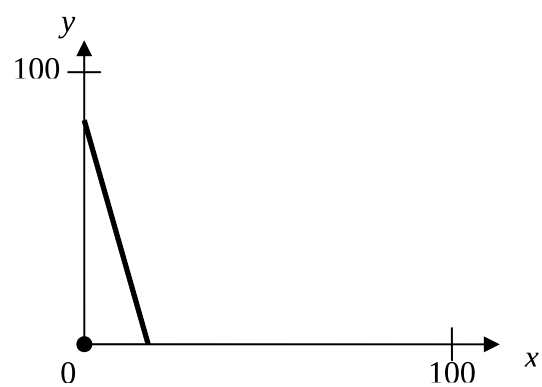
Your participation in the experiment and any information about your payoffs will be kept strictly confidential. Your payment-receipt and participant form are the only places in which your name and social security number are recorded.

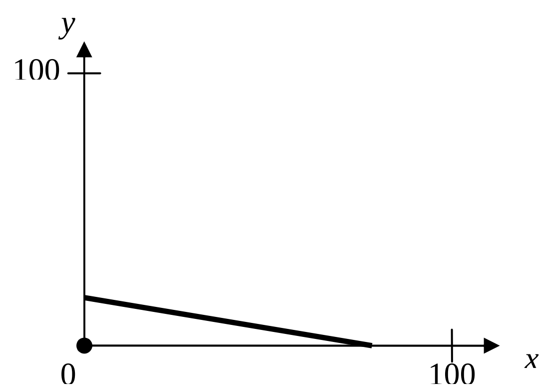
You will never be asked to reveal your identity to anyone during the course of the experiment. Neither the experimenters nor the other participants will be able to link you to any of your decisions. In order to keep your decisions private, please do not reveal your choices to any other participant.

Please do not talk with anyone during the experiment. We ask everyone to remain silent until the end of the last round. If there are no further questions, you are ready to start. An instructor will approach your desk and activate your prog

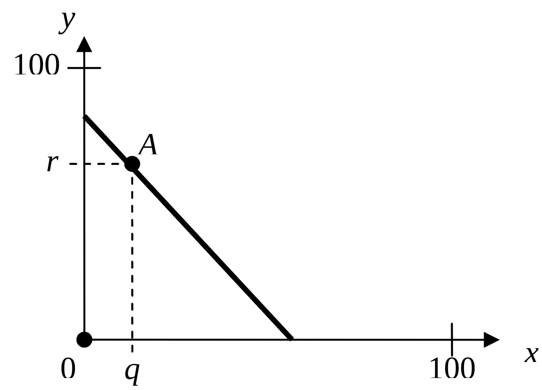
**Attachment 1**

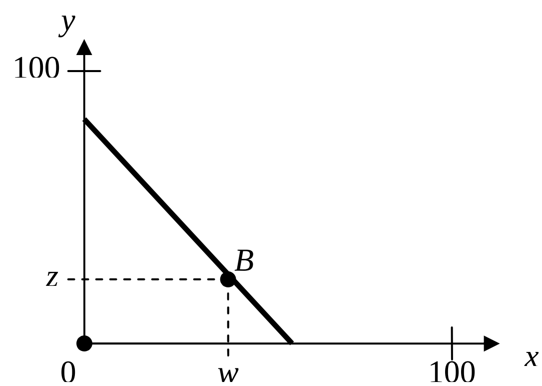


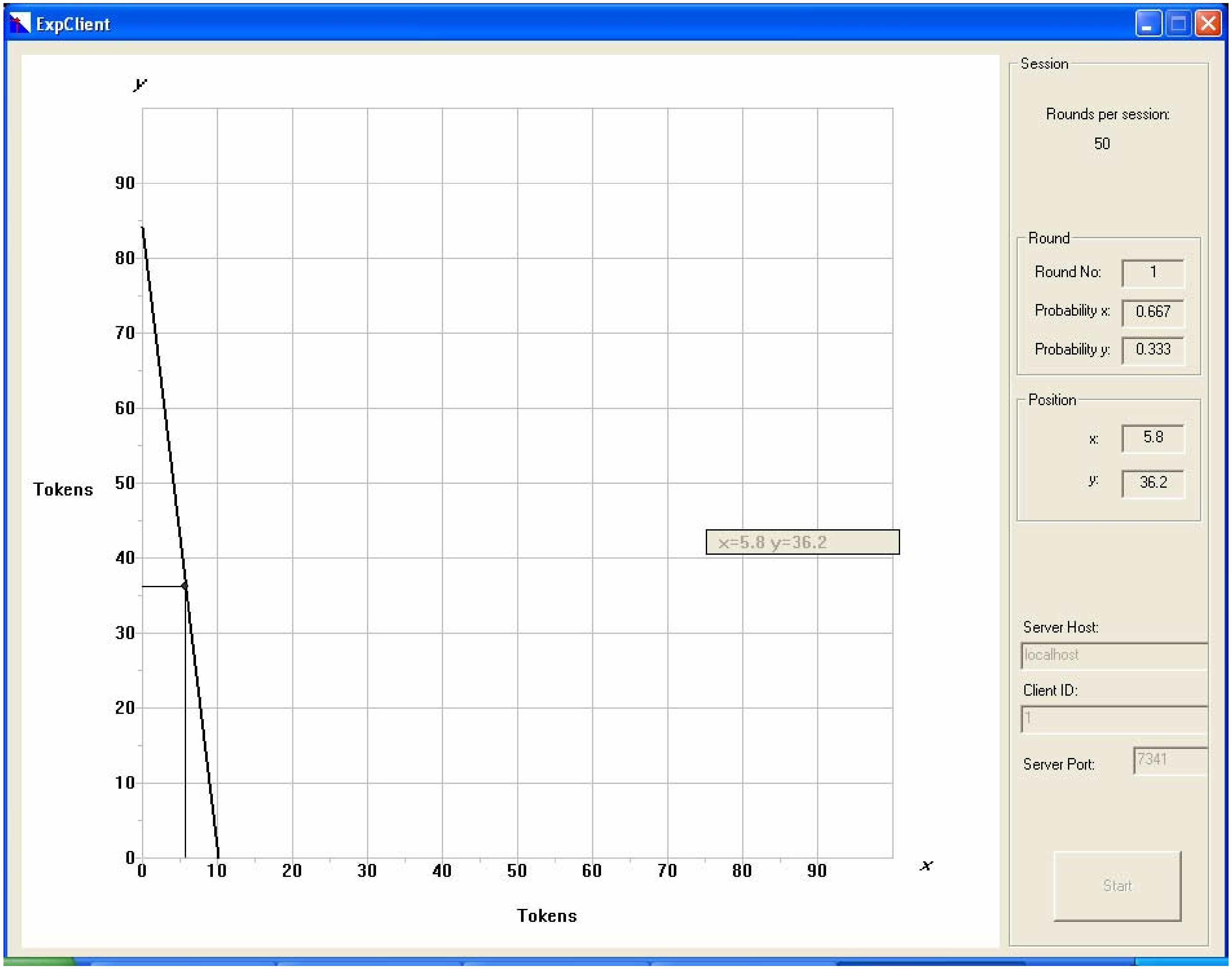



**Attachment 2**



# Attachment 3

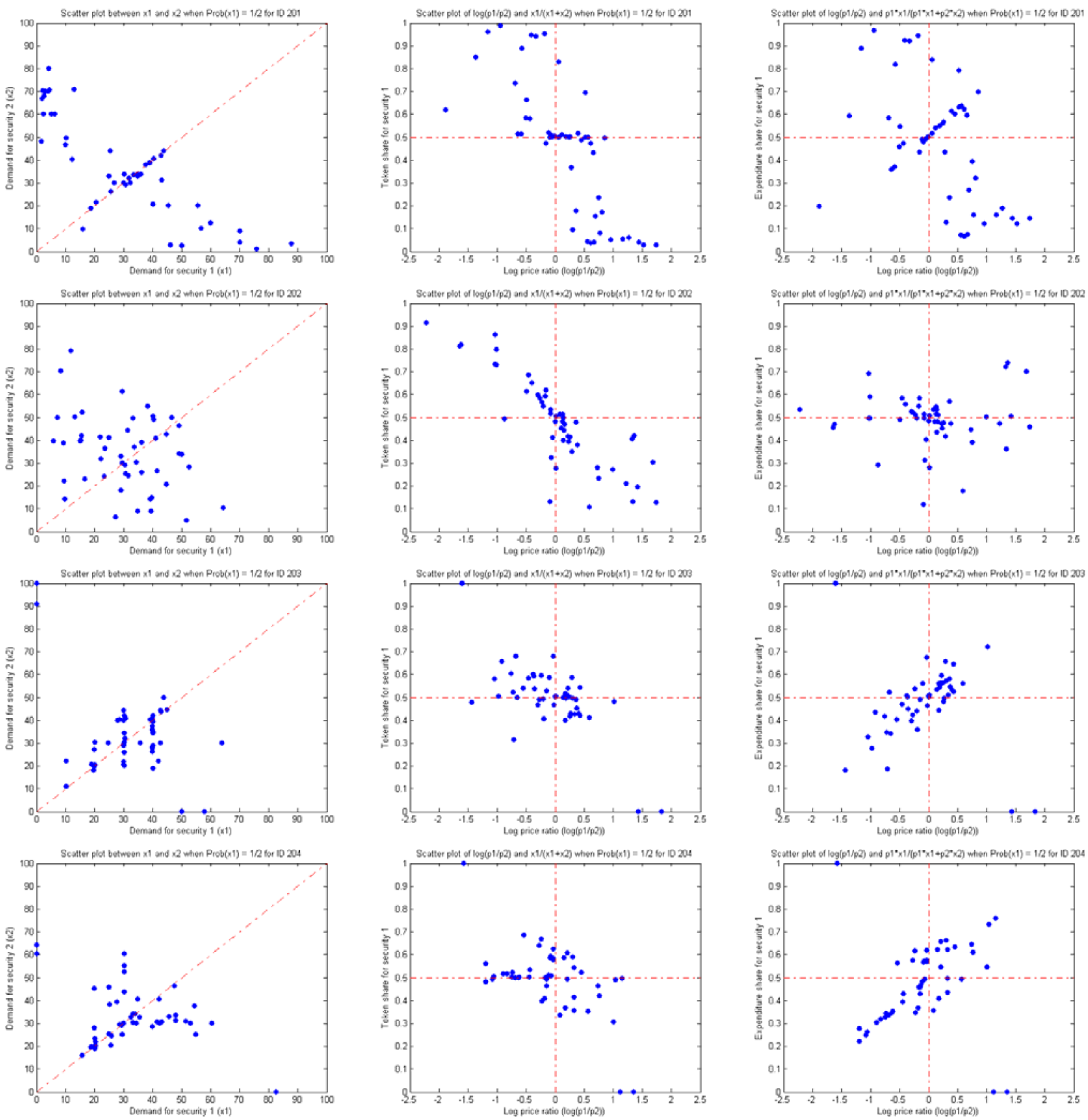


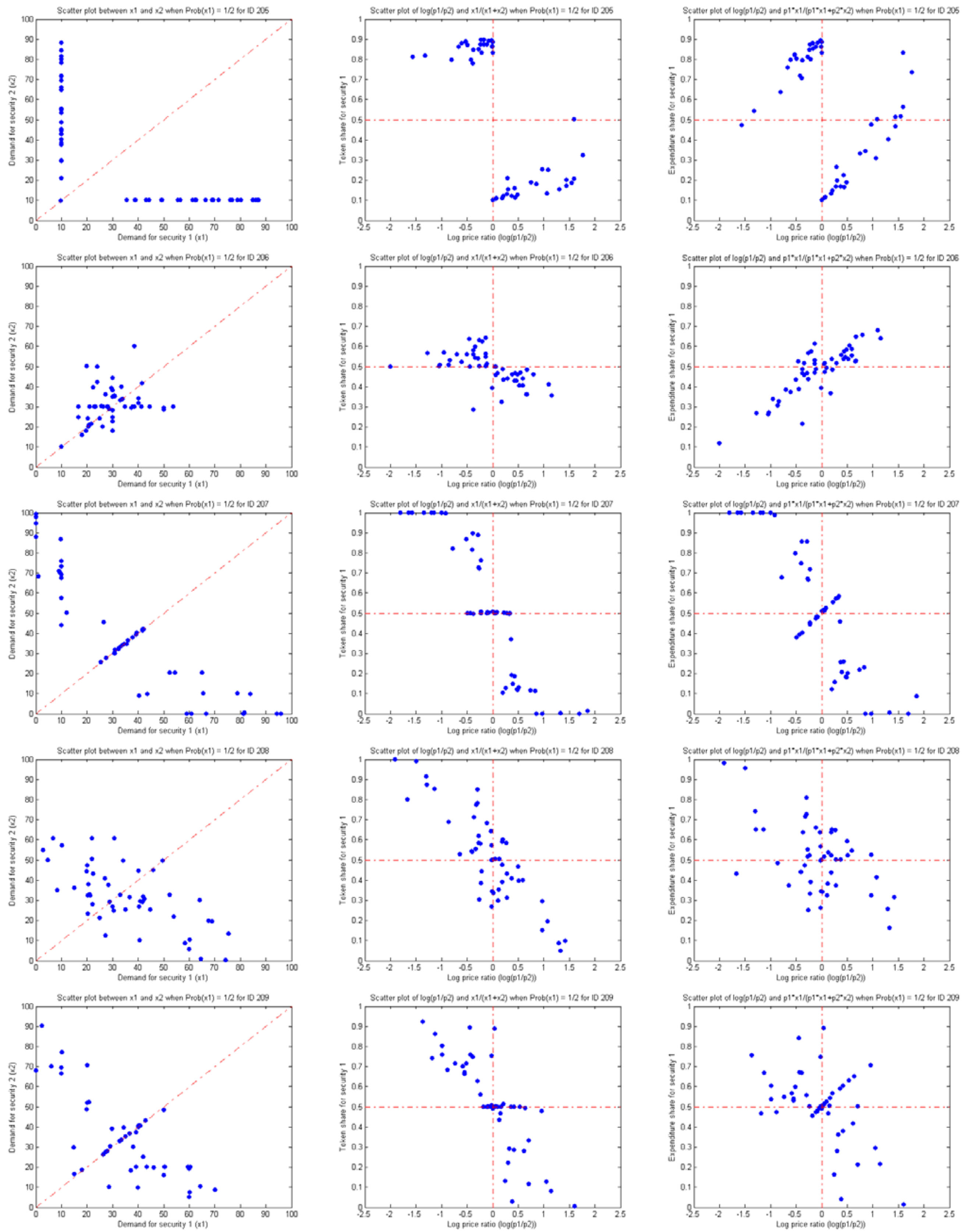
## Appendix II

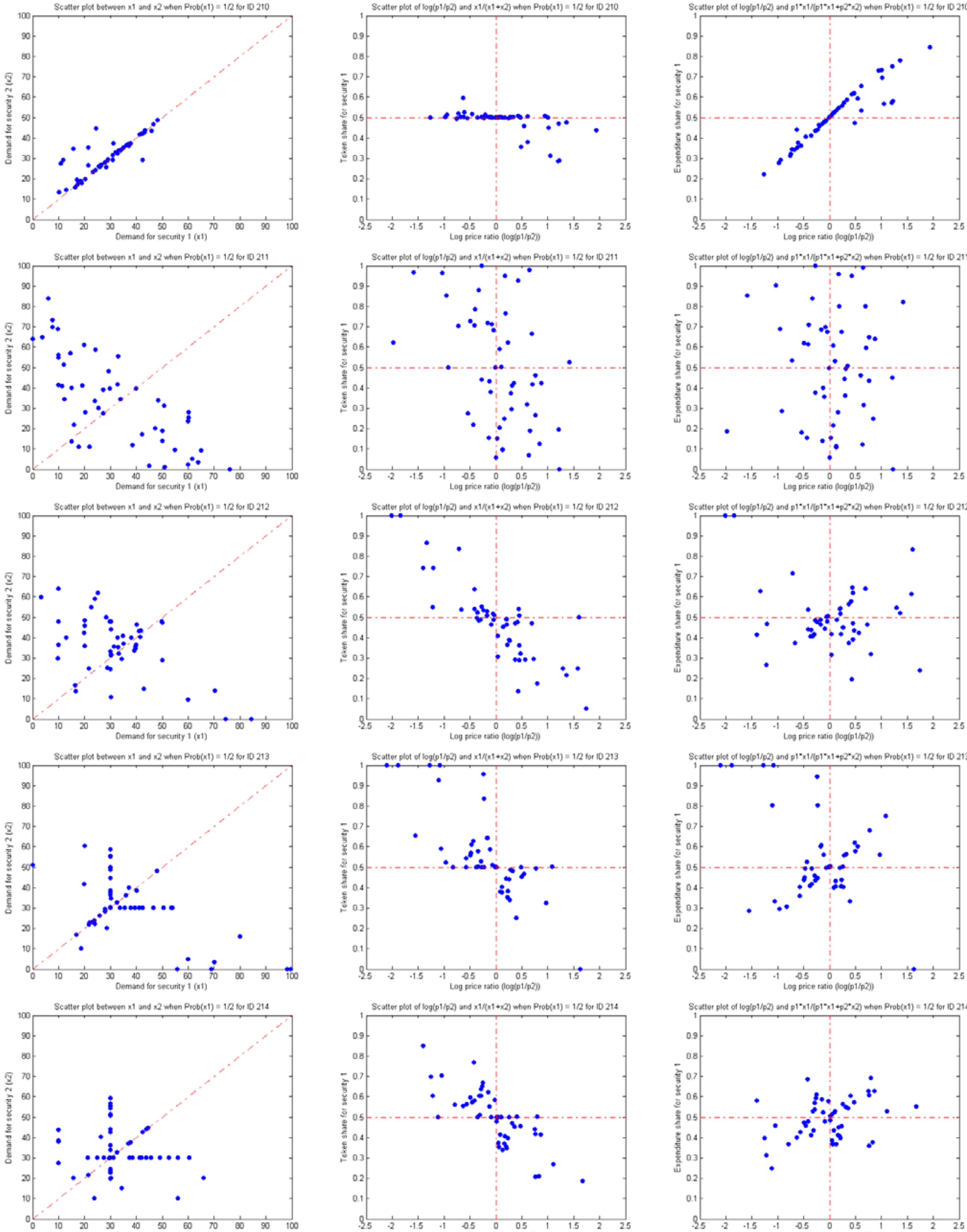
### Individual-level data

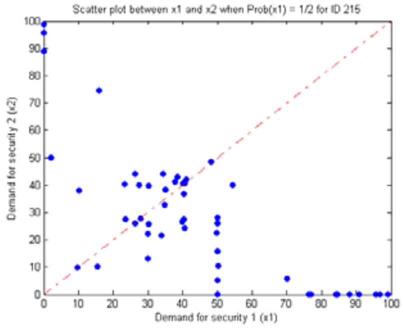
The portfolio choices $(x_1, x_2)$ as points in a scatterplot (left panel); the relationship between $\ln(p_1 / p_2)$ and $x_1 /(x_1 + x_2)$ (middle panel); and the relationship between $\ln(p_1 / p_2)$ and $p_1 x_1$ (left panel).

### Symmetric treatment ($\pi$=1/2)




Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 205
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 205
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 205
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 206
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 206
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 206
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 207
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 207
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 207
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 208
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 208
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 208
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 209
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 209
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 209
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1


Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 210
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 210
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 210
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 211
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 211
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 211
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 212
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 212
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 212
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 213
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 213
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 213
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 214
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 214
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 214
Expenditure share for security 1
Log price ratio (log(p1/p2))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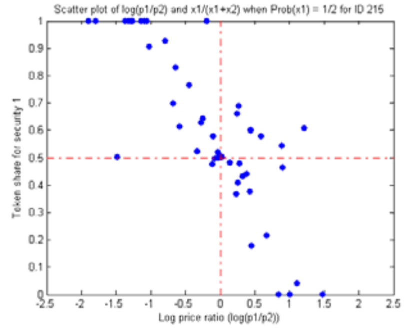
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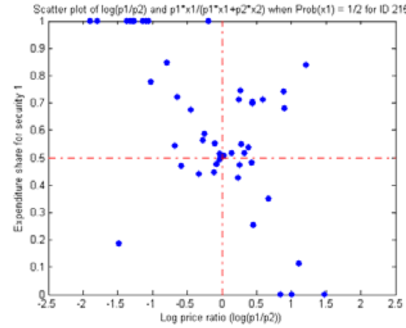
Log price ratio (log(p1/p2))

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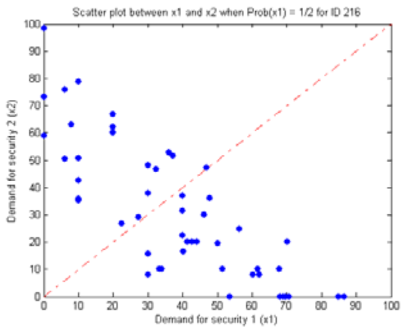
Log price ratio (log(p1/p2))

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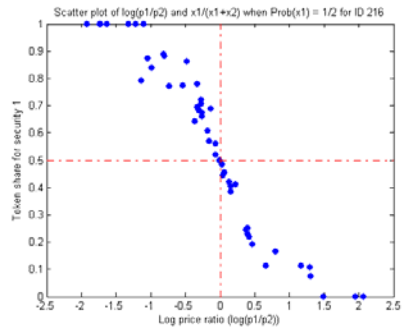
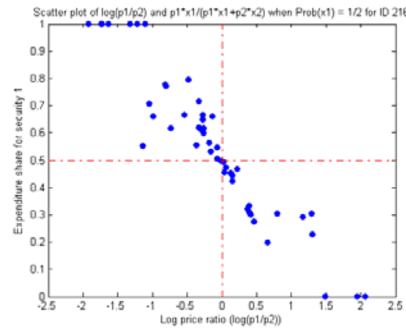
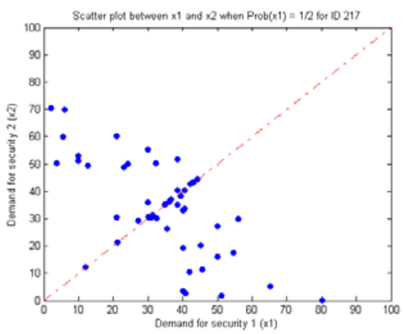

Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 216
Token share for security 1
Log price ratio (log(p1/p2))

Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 216
Expenditure share for security 1
Log price ratio (log(p1/p2))

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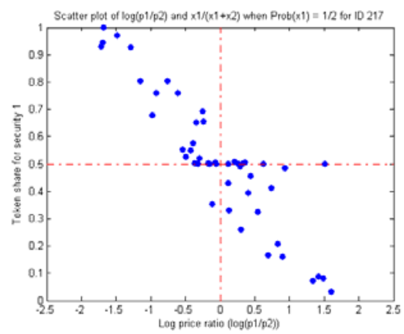
Demand for security 1 (x1)

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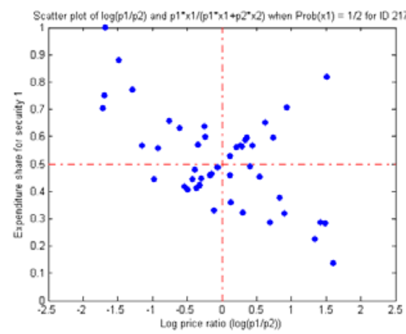
Token share for security 1
Log price ratio (log(p1/p2))

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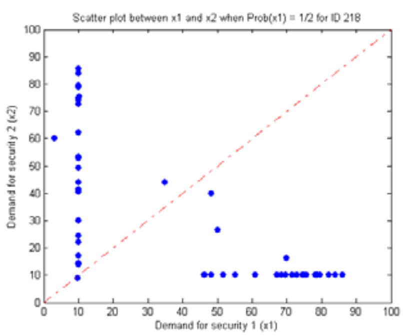
Expenditure share for security 1
Log price ratio (log(p1/p2))

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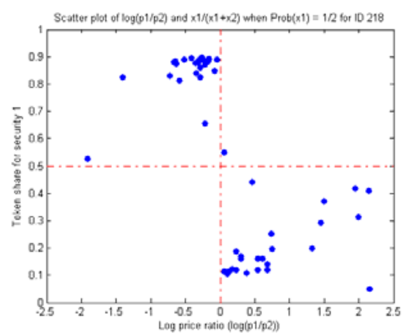
Demand for security 1 (x1)

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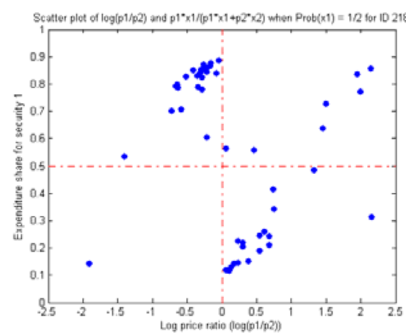
Log price ratio (log(p1/p2))

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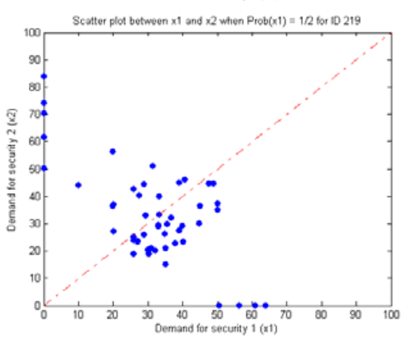
Log price ratio (log(p1/p2))

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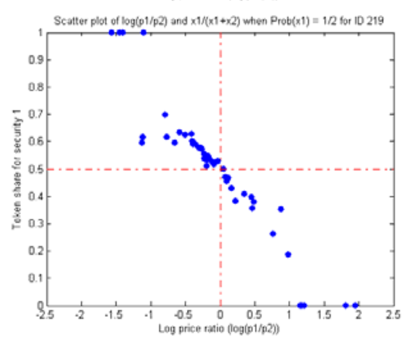
Demand for security 1 (x1)

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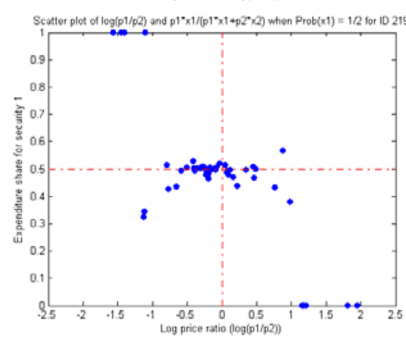
Log price ratio (log(p1/p2))

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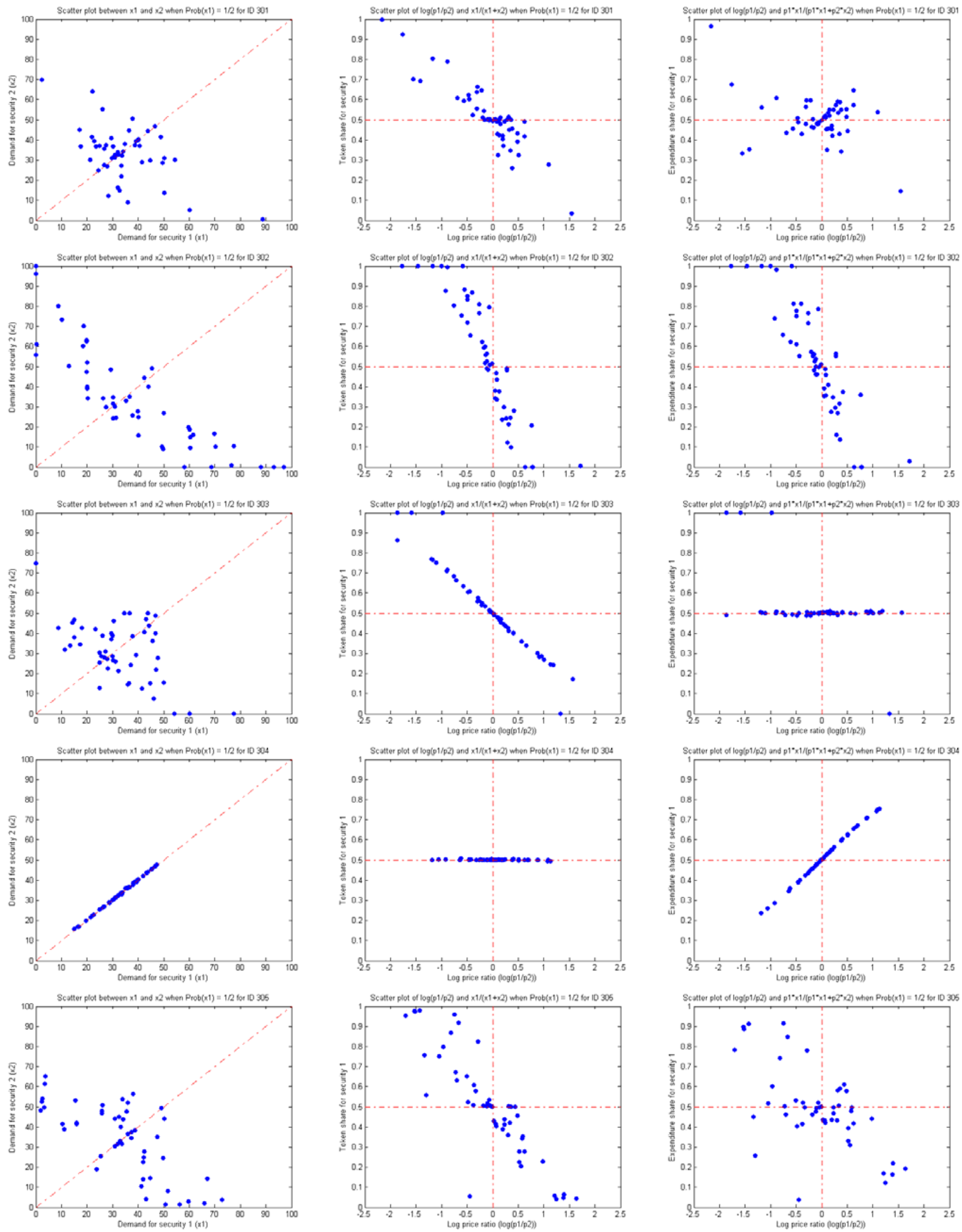
Expenditure share for security 1
Log price ratio (log(p1/p2))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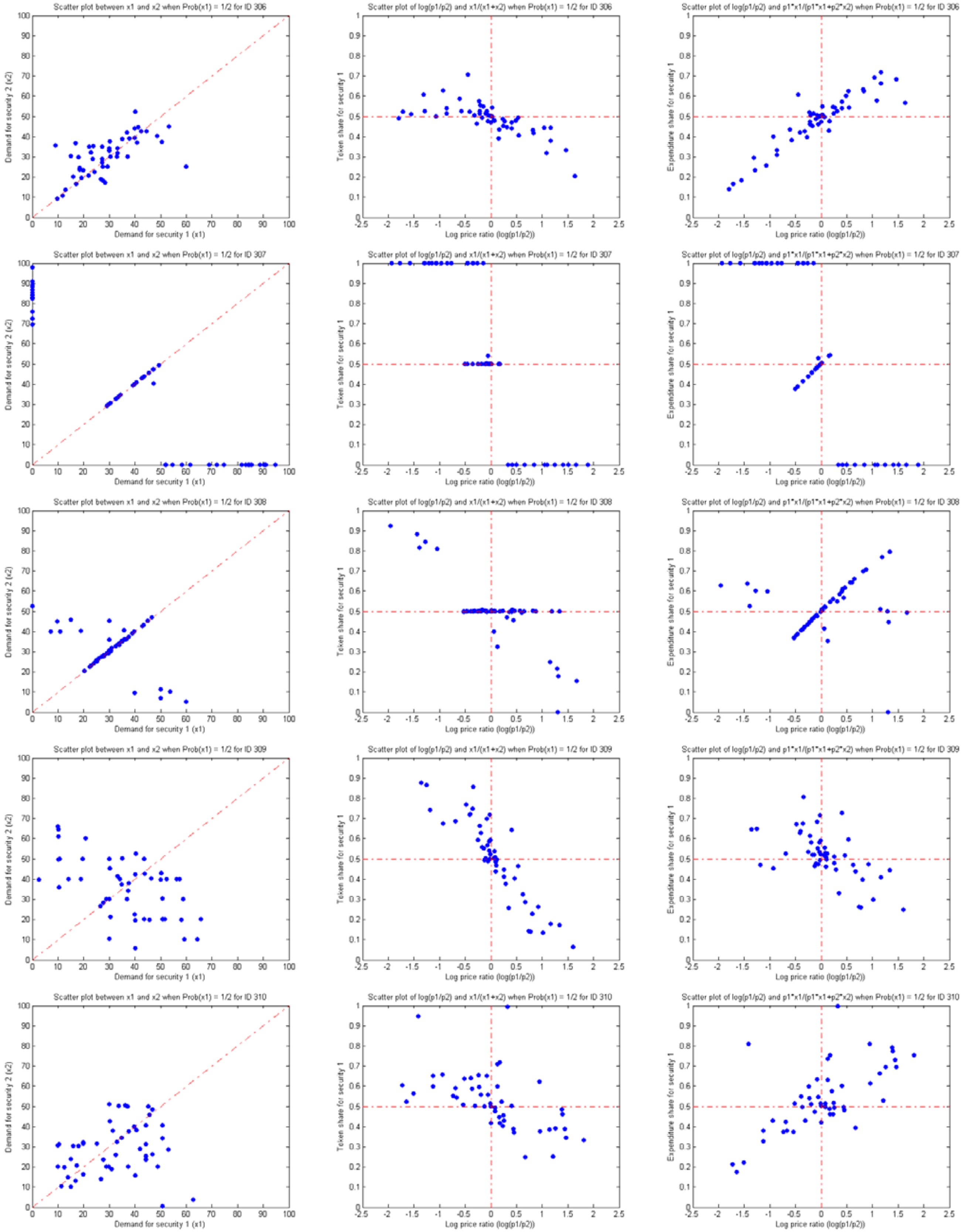
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 301
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 302
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 302
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 302
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 303
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 303
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 303
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 304
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 304
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 304
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 305
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 305
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 305
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1


Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 306
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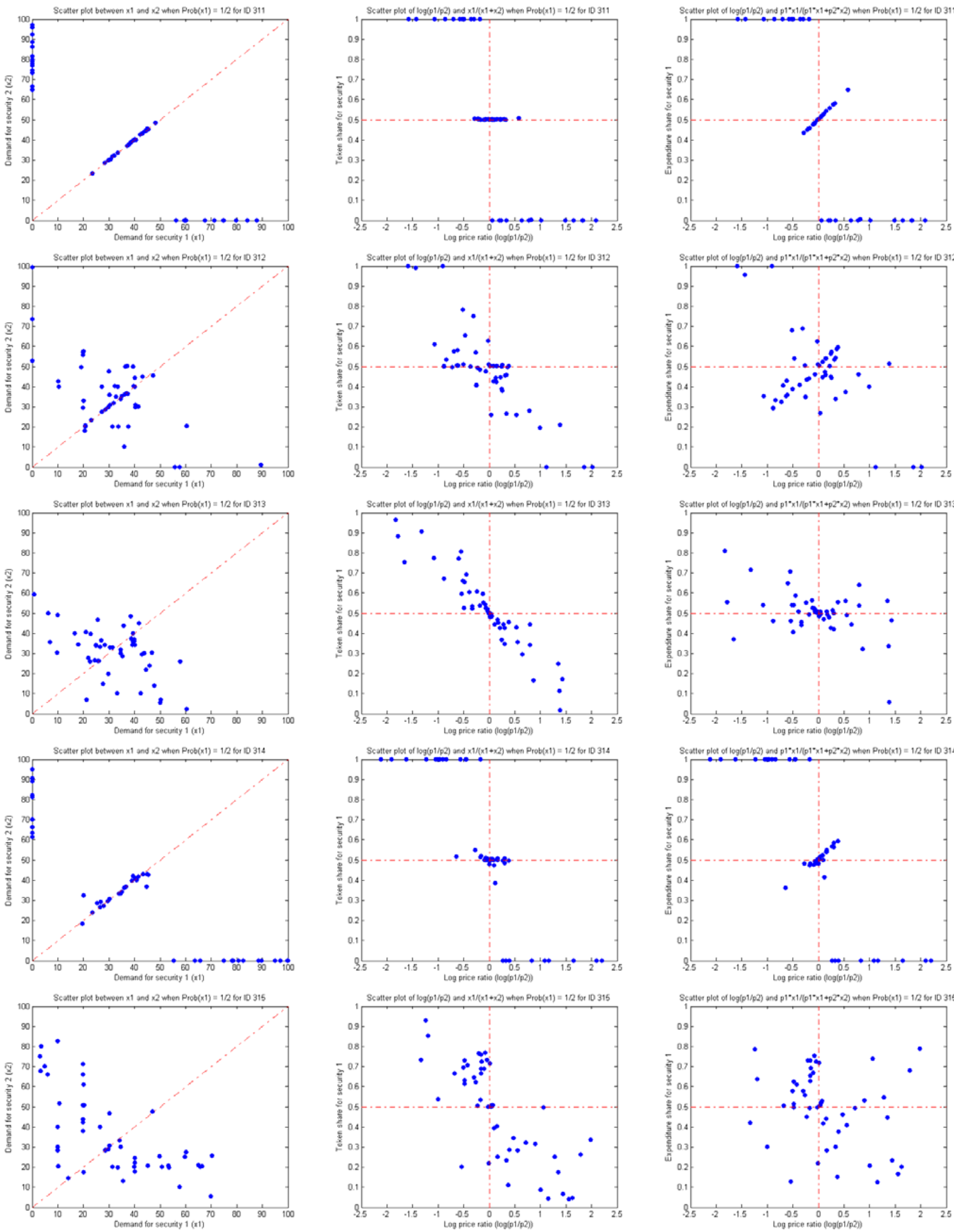
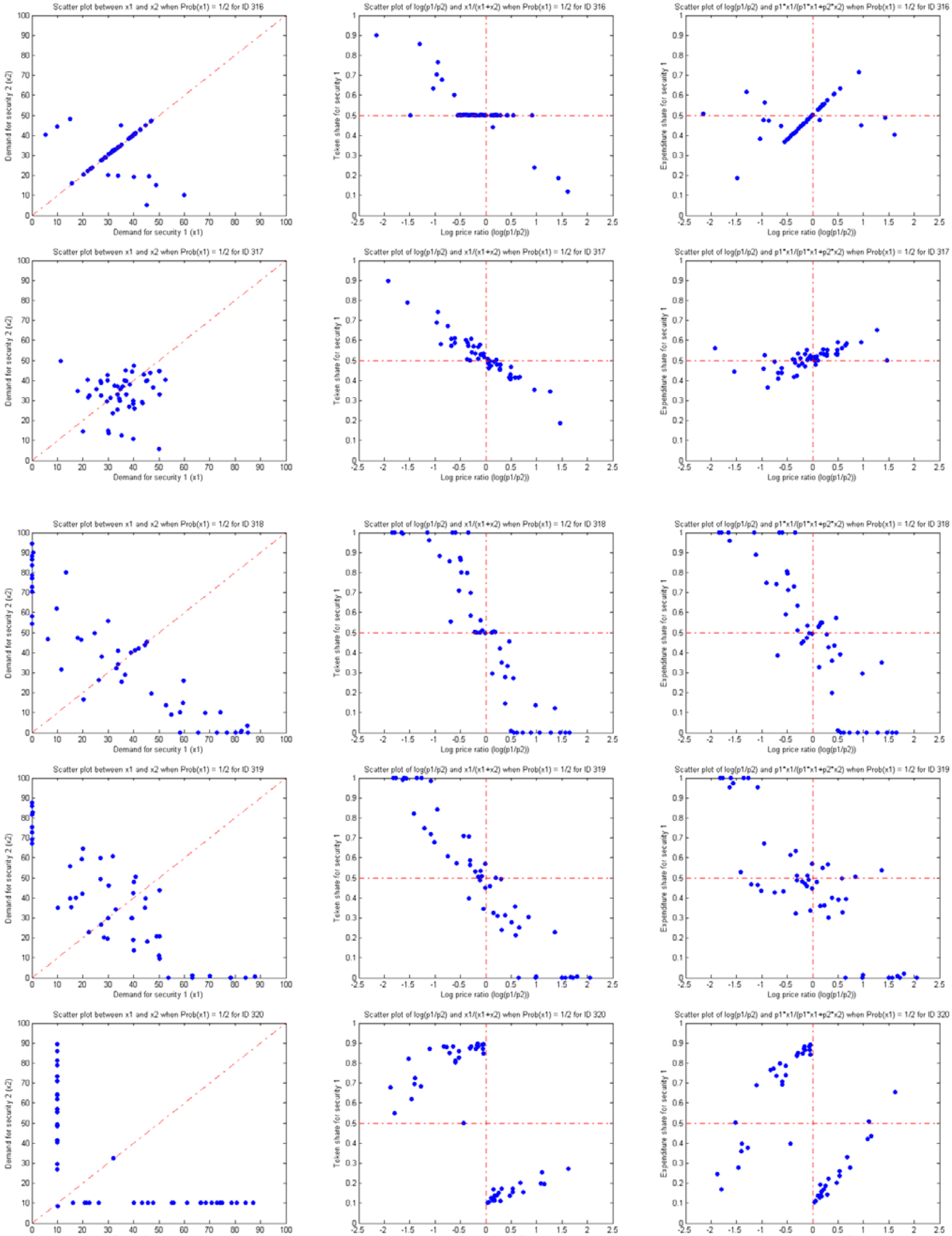
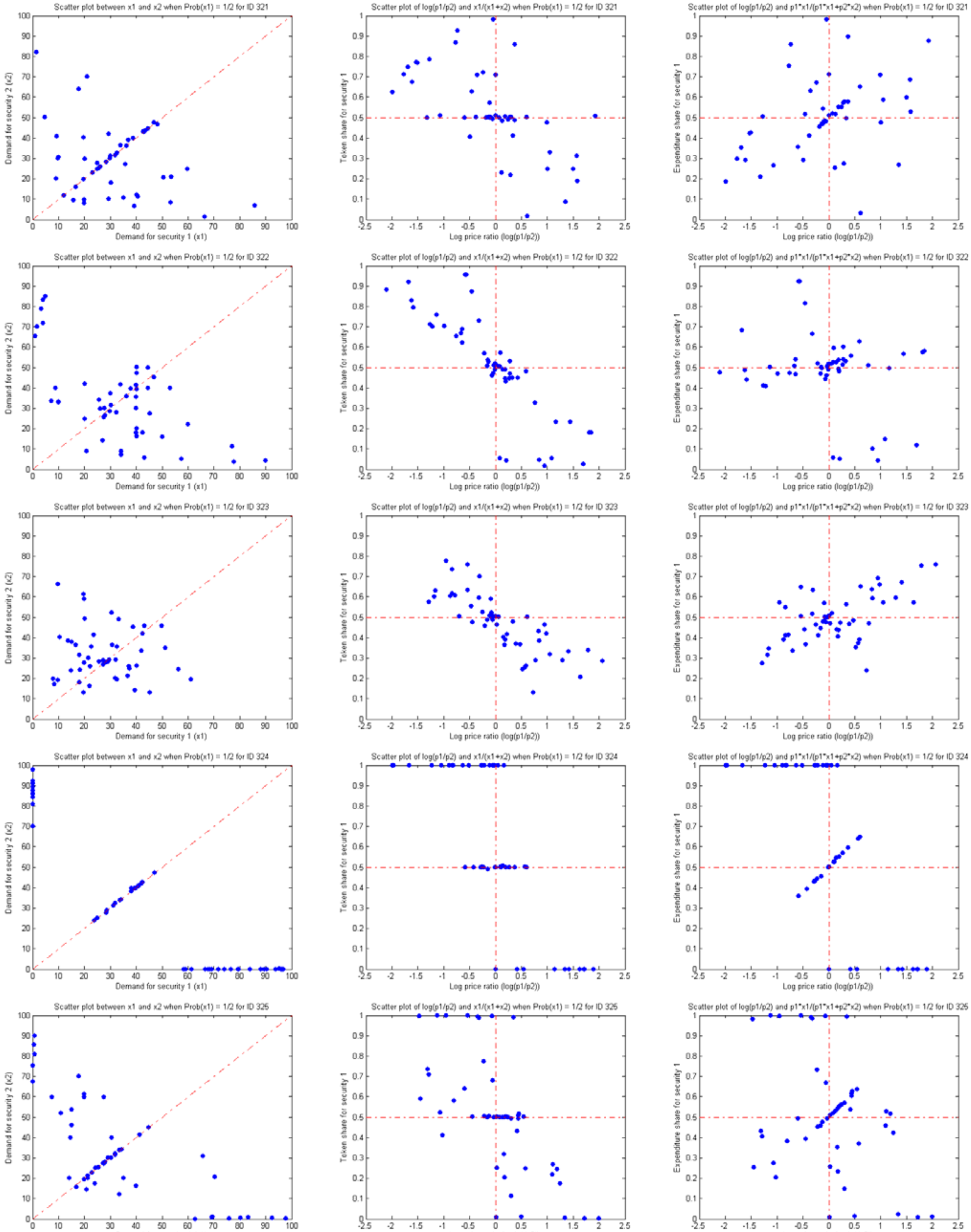
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 306
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 307
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 307
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 307
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 308
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 308
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 308
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 309
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 309
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 309
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 310
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 310
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 310
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1



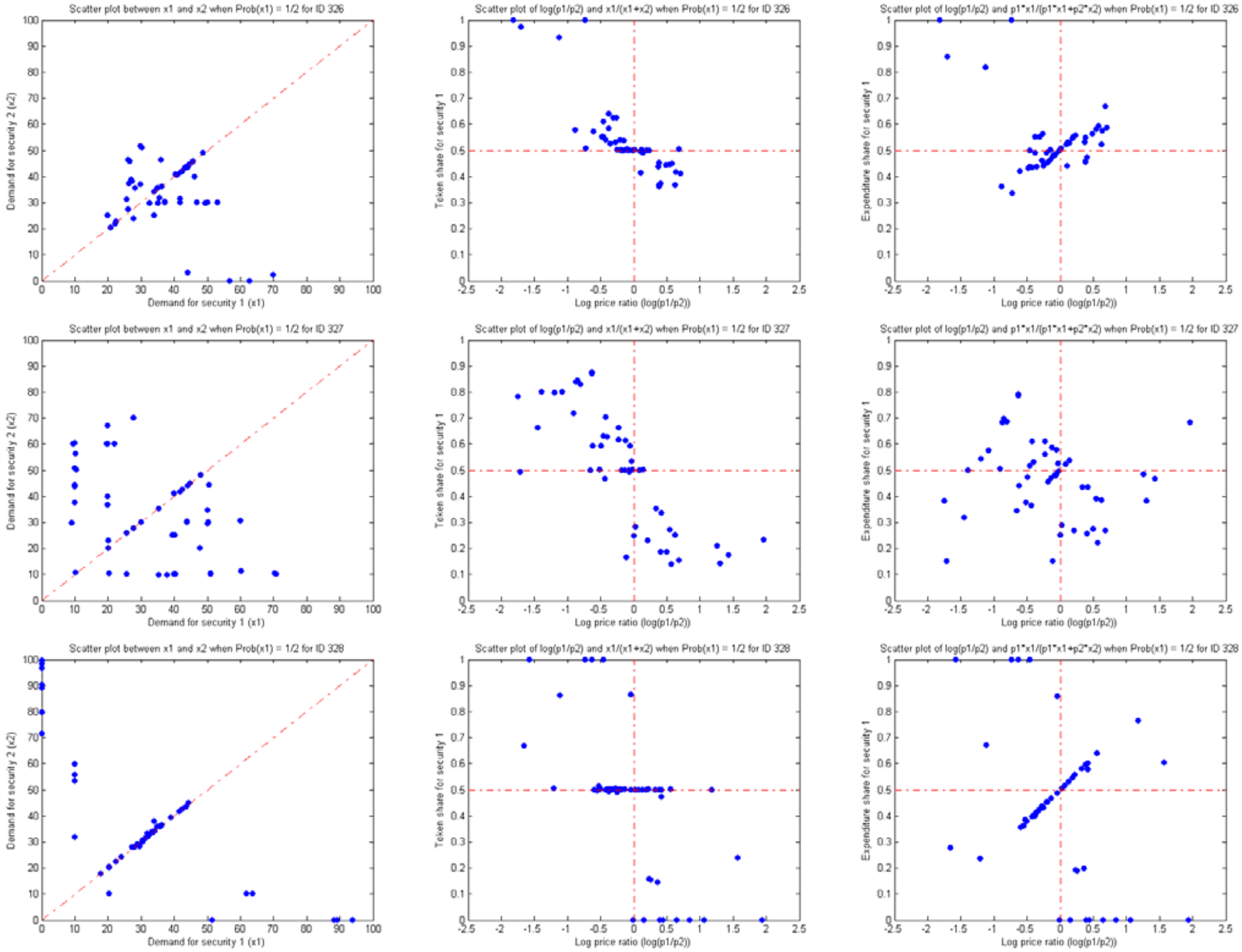
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 311
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 311
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 311
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 312
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 312
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 312
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 313
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 313
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 313
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 314
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 314
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 314
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 315
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 315
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 315
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1



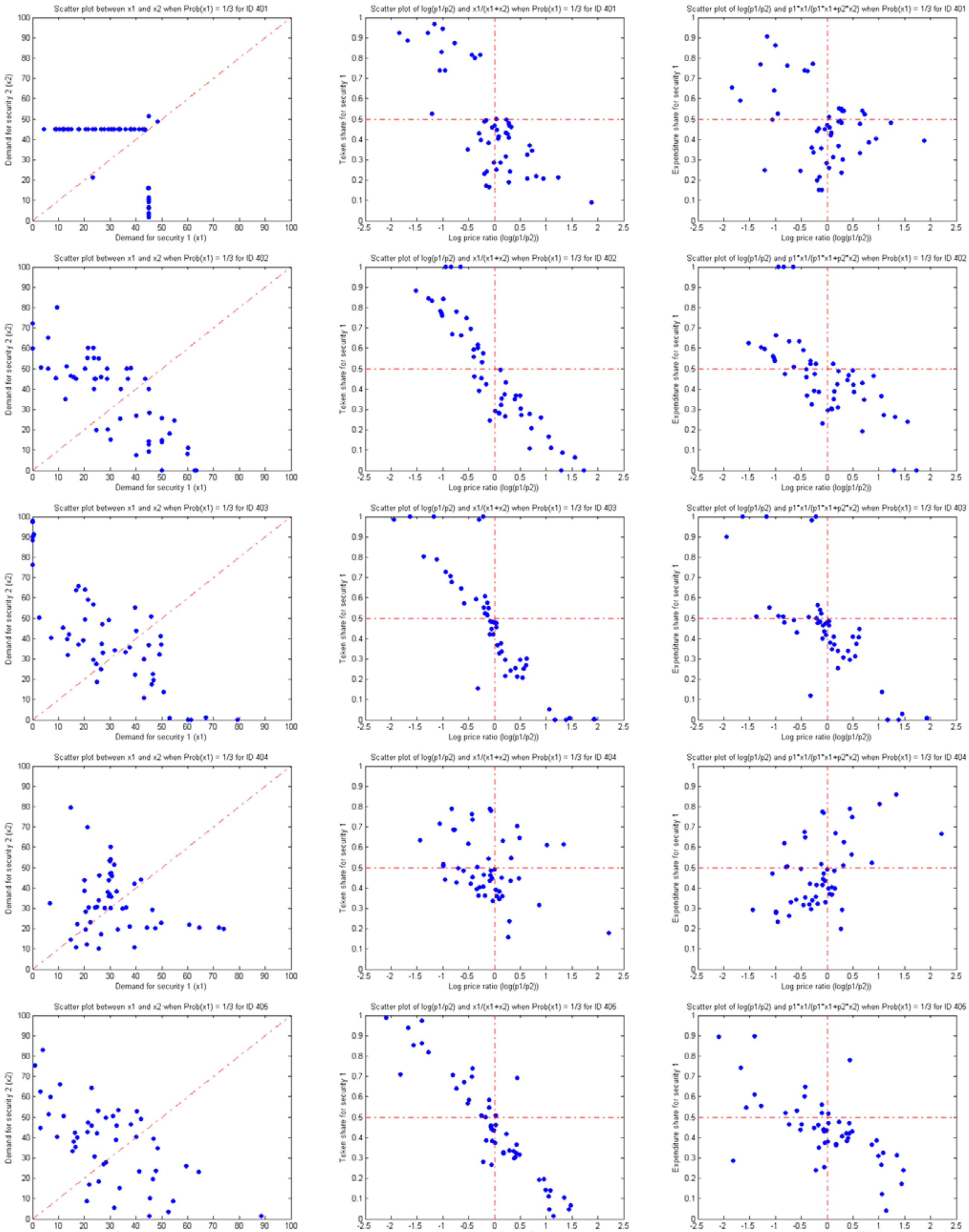
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 316
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 316
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 316
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 317
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 317
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 317
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 318
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 318
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 318
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 319
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 319
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 319
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 320
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 320
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 320
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1

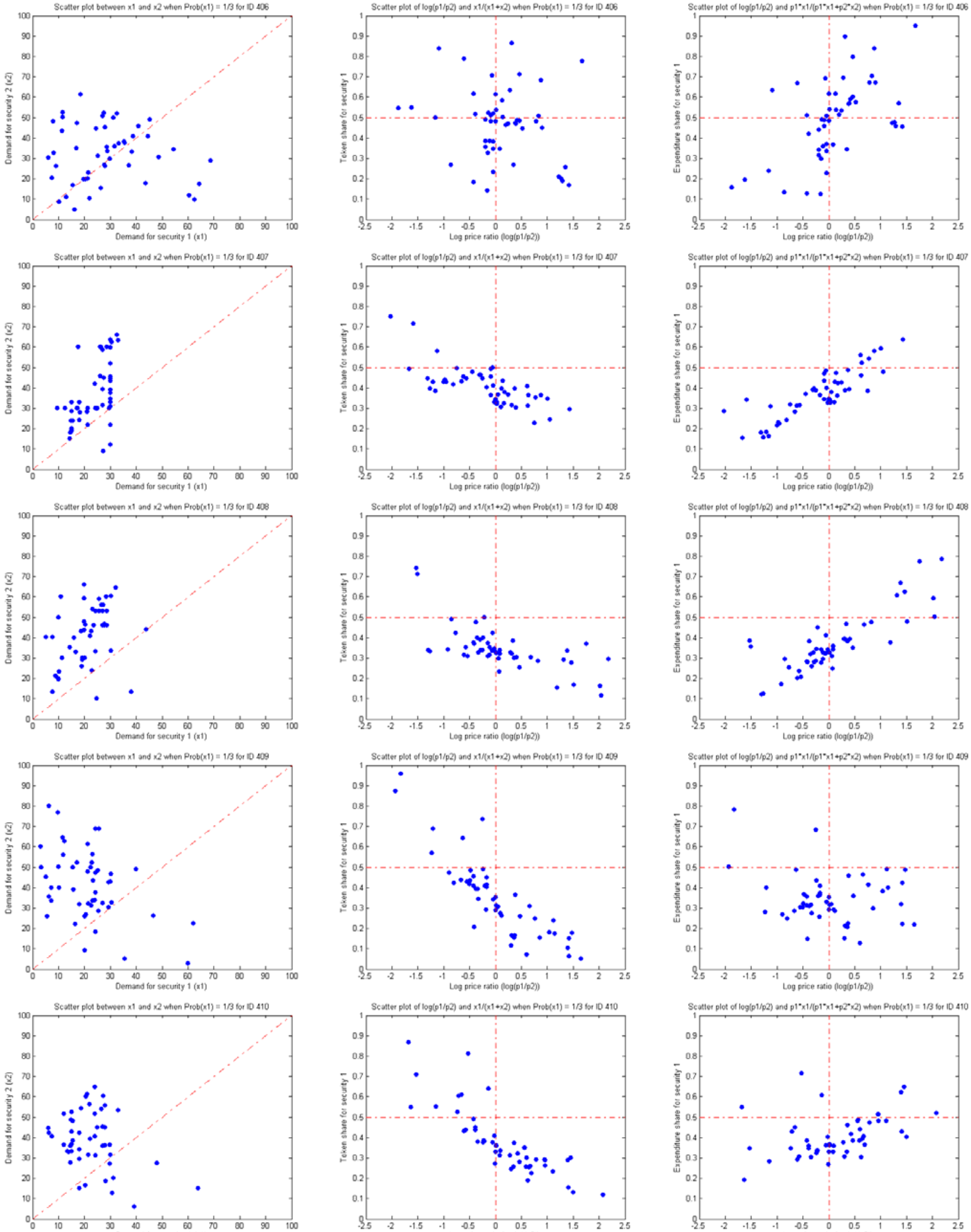


Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 321
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 321
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 321
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 322
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 322
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 322
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 323
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 323
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 323
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 324
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 324
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 324
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 325
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 325
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 325
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1

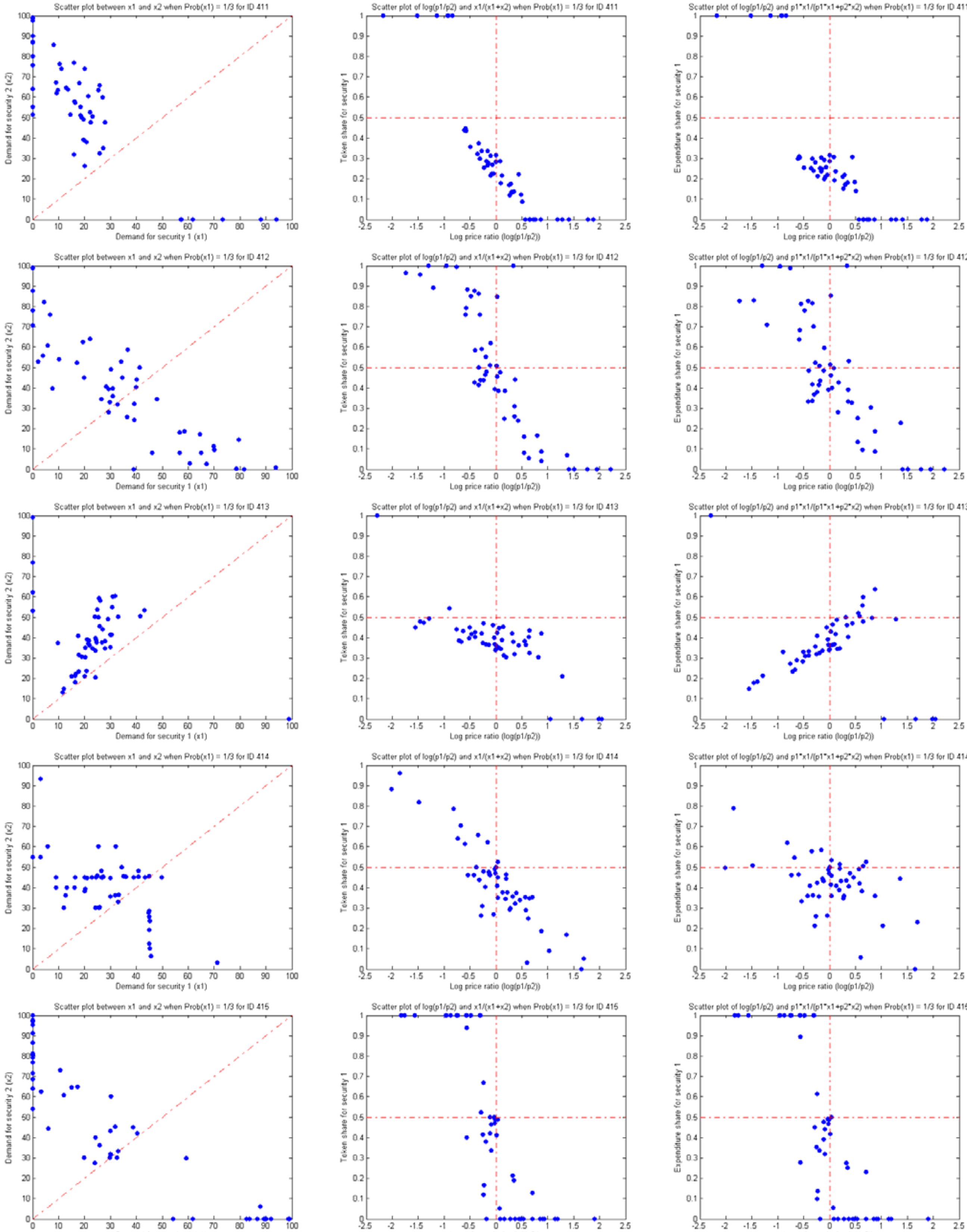

Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 326
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 326
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 326
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 327
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 327
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 327
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/2 for ID 328
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/2 for ID 328
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/2 for ID 328
Expenditure share for security 1
Log price ratio (log(p1/p2))

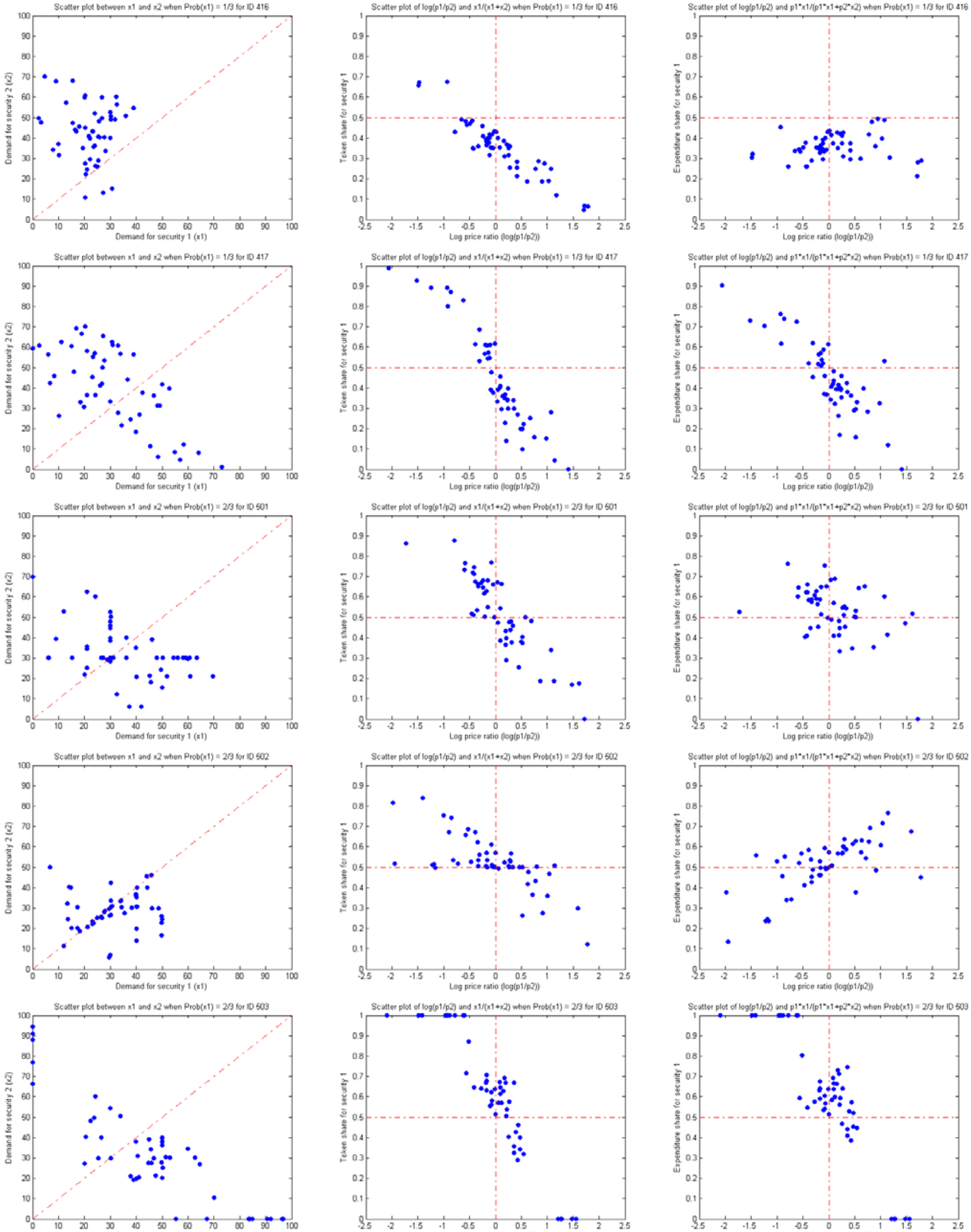
# Asymmetric treatments (π=1/3 and π=2/3)

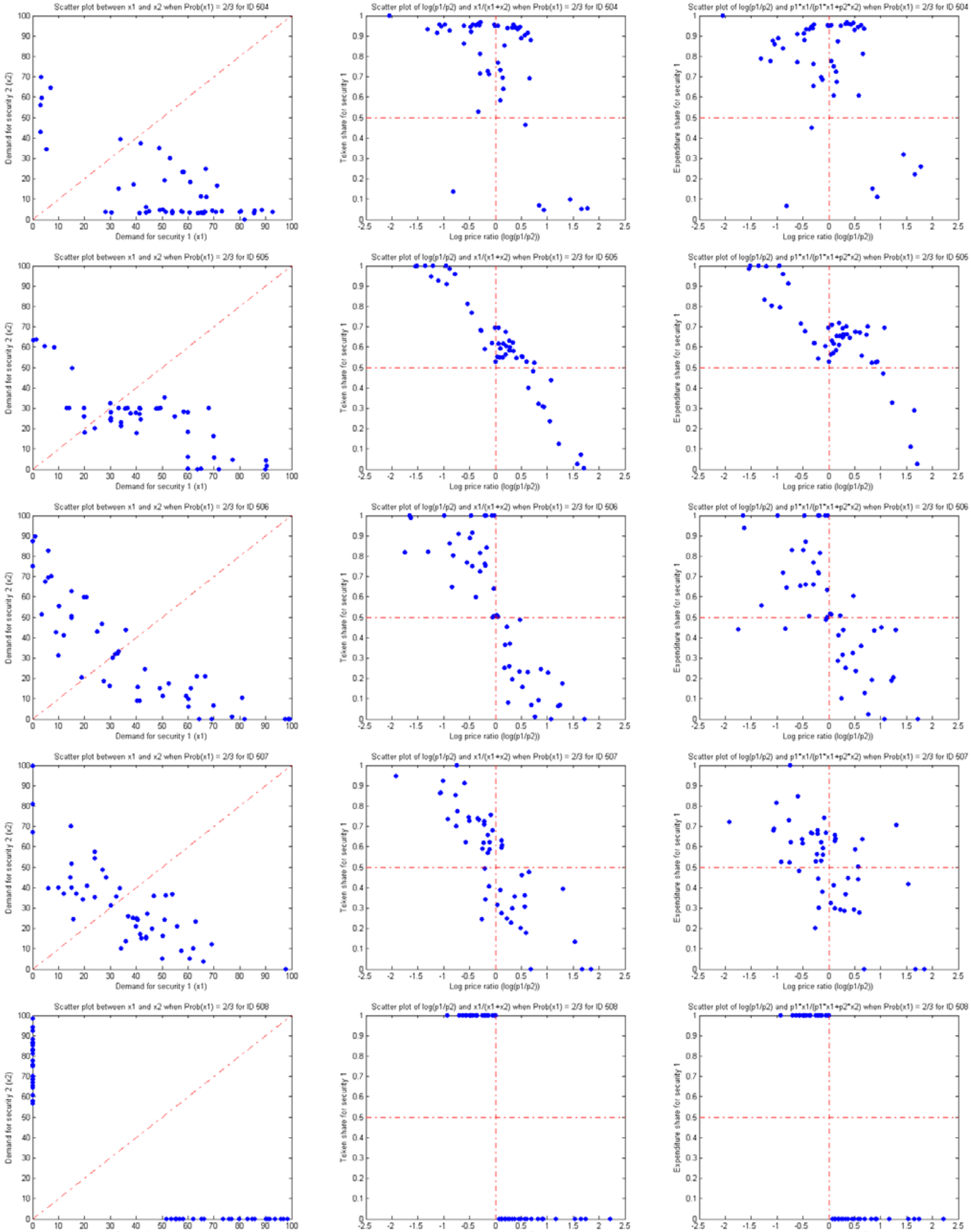




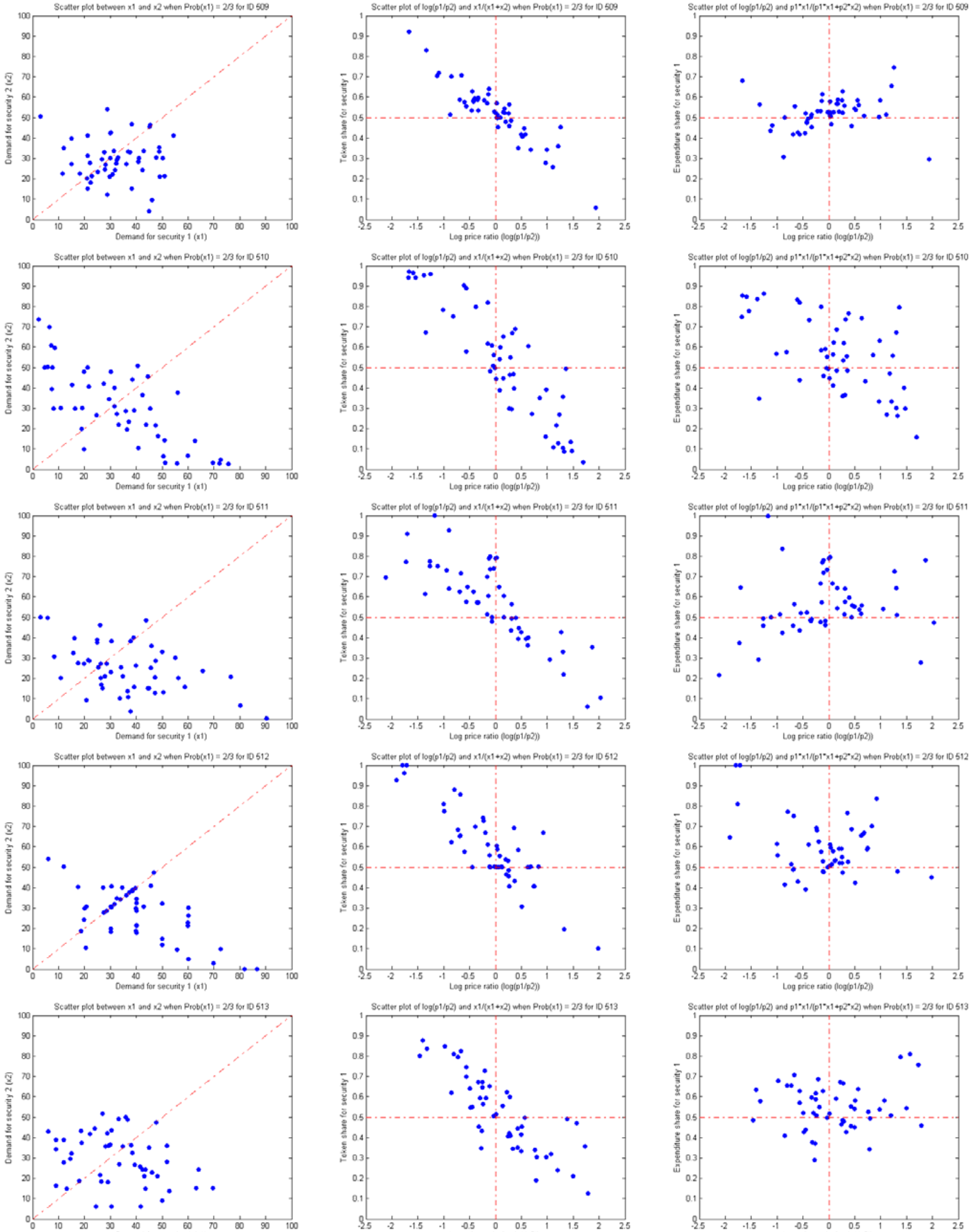
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 406
Demand for security 1 (x1)
Demand for security 2 (x2)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 406
Log price ratio (log(p1/p2))
Token share for security 1
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 406
Log price ratio (log(p1/p2))
Expenditure share for security 1
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 407
Demand for security 1 (x1)
Demand for security 2 (x2)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 407
Log price ratio (log(p1/p2))
Token share for security 1
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 407
Log price ratio (log(p1/p2))
Expenditure share for security 1
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 408
Demand for security 1 (x1)
Demand for security 2 (x2)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 408
Log price ratio (log(p1/p2))
Token share for security 1
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 408
Log price ratio (log(p1/p2))
Expenditure share for security 1
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 409
Demand for security 1 (x1)
Demand for security 2 (x2)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 409
Log price ratio (log(p1/p2))
Token share for security 1
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 409
Log price ratio (log(p1/p2))
Expenditure share for security 1
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 410
Demand for security 1 (x1)
Demand for security 2 (x2)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 410
Log price ratio (log(p1/p2))
Token share for security 1
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 410
Log price ratio (log(p1/p2))
Expenditure share for security 1


Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 411
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 411
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 411
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 412
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 412
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 412
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 413
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 413
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 413
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 414
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 414
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 414
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 415
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 415
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 415
Expenditure share for security 1
Log price ratio (log(p1/p2))

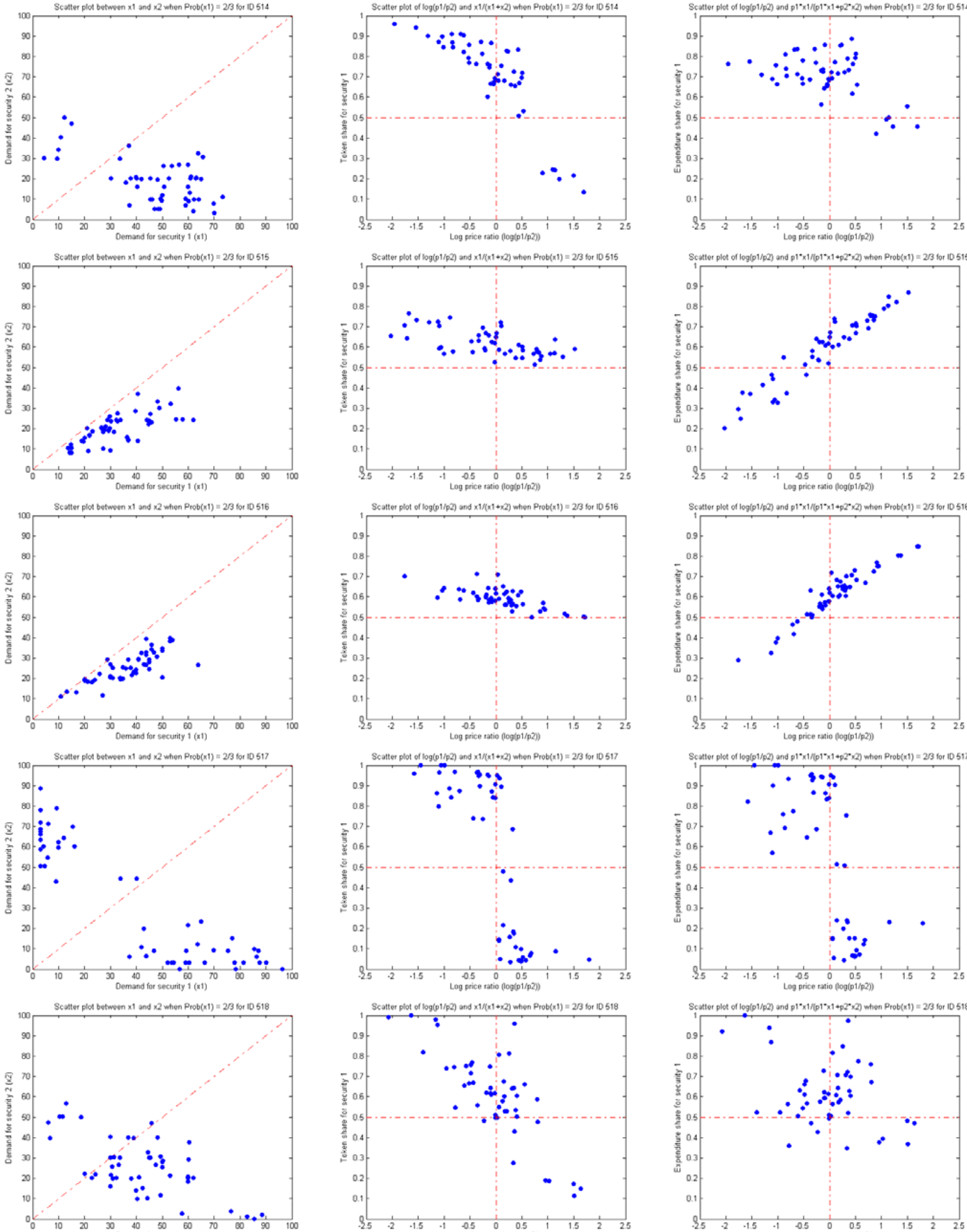

Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 416
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 416
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 416
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 1/3 for ID 417
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 1/3 for ID 417
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 1/3 for ID 417
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 501
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 501
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 501
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 502
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 502
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 502
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 503
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 503
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 503
Expenditure share for security 1
Log price ratio (log(p1/p2))



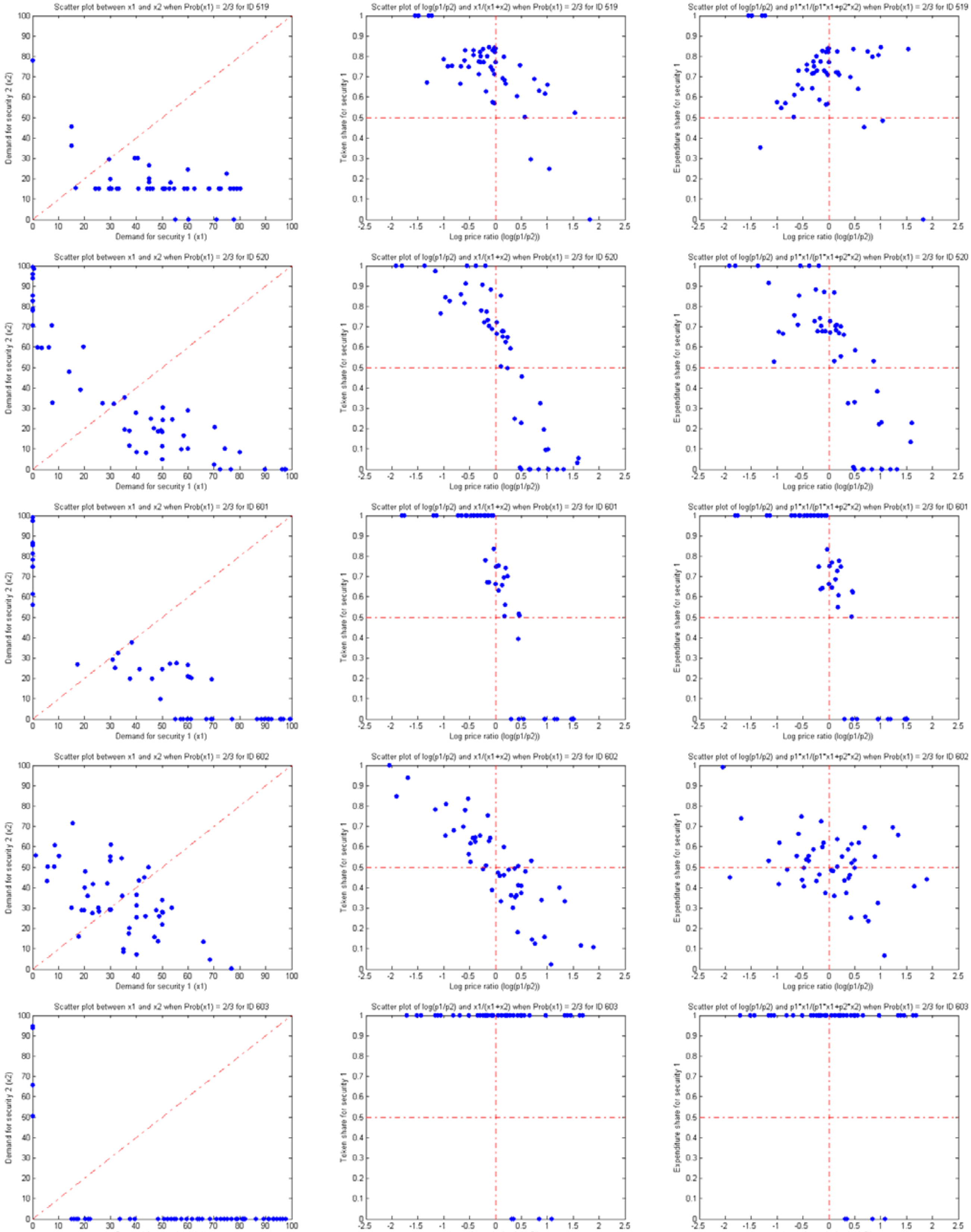
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 504
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 504
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 504
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 505
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 505
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 505
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 506
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 506
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 506
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 507
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 507
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 507
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 508
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 508
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 508
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1

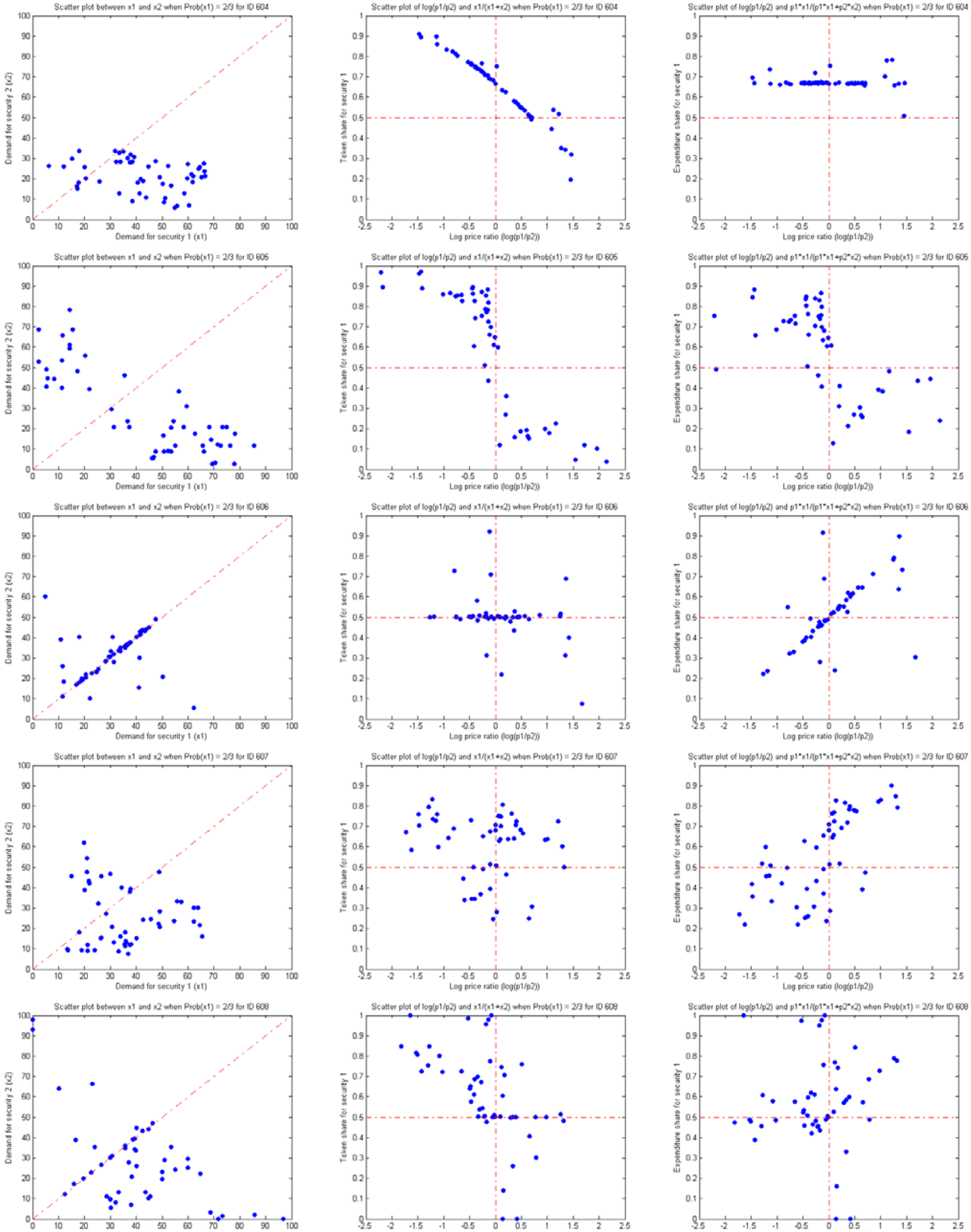


Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 509
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 509
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 509
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 510
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 510
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 510
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 511
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 511
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 511
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 512
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 512
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 512
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 513
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 513
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 513
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1

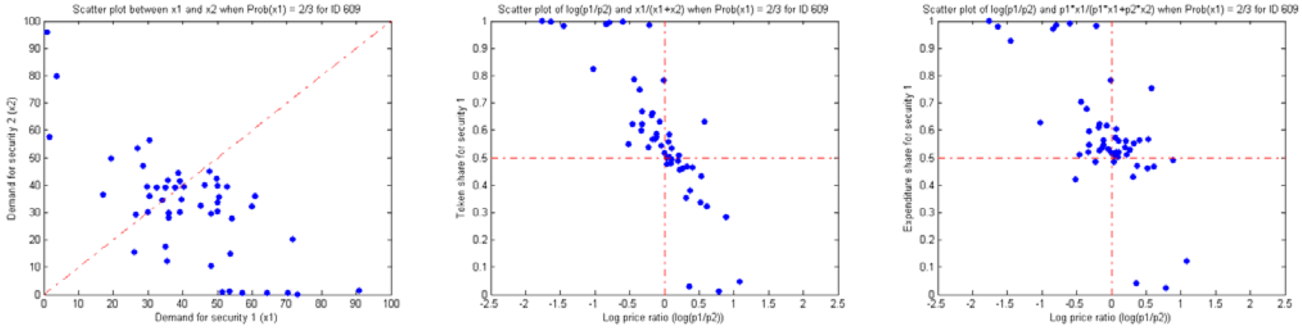


Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 514
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 514
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 514
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 515
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 515
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 515
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 516
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 516
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 516
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 517
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 517
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 517
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 518
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 518
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 518
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1


Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 519
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 519
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 519
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 520
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 520
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 520
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 601
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 601
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 601
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 602
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 602
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 602
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 603
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 603
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 603
Demand for security 1 (x1)
Demand for security 2 (x2)
Log price ratio (log(p1/p2))
Token share for security 1
Expenditure share for security 1



Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 604
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 604
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 604
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 605
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 605
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 605
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 606
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 606
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 606
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 607
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 607
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 607
Expenditure share for security 1
Log price ratio (log(p1/p2))
Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 608
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 608
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 608
Expenditure share for security 1
Log price ratio (log(p1/p2))



Scatter plot between x1 and x2 when Prob(x1) = 2/3 for ID 609
Demand for security 2 (x2)
Demand for security 1 (x1)
Scatter plot of log(p1/p2) and x1/(x1+x2) when Prob(x1) = 2/3 for ID 609
Token share for security 1
Log price ratio (log(p1/p2))
Scatter plot of log(p1/p2) and p1*x1/(p1*x1+p2*x2) when Prob(x1) = 2/3 for ID 609
Expenditure share for security 1
Log price ratio (log(p1/p2))

## Appendix III
## Testing rationality

Let $\{(p^i, x^i)\}_{i=1}^{50}$ be the data generated by some individual's choices, where $p^i$ denotes the $i$-th observation of the price vector and $x^i$ denotes the associated portfolio. A portfolio $x^i$ is *directly revealed preferred* to a portfolio $x^j$, denoted $x^i R^D x^j$, if $p^i \cdot x^i \geq p^i \cdot x^j$. A portfolio $x^i$ is *revealed preferred* to a portfolio $x^j$, denoted $x^i R x^j$, if there exists a sequence of portfolios $\{x^k\}_{k=1}^{K}$ with $x^1 = x^i$ and $x^K = x^j$, such that $x^k R^D x^{k+1}$ for every $k = 1, ..., K-1$. The Generalized Axiom of Revealed Preference (GARP). which requires that if $x^i R x^j$ then $p^j \cdot x^j \leq p^j \cdot x^i$ (i.e. if $x^i$ is revealed preferred to $x^j$, then $x^i$ must cost at least as much as $x^j$ at the prices prevailing when $x^j$ is chosen). It is clear that if the data are generated by a non-satiated utility function, then they must satisfy GARP. Conversely, the following result due to Afriat (1967) tells us that if a *finite* data set generated by an individual's choices satisfies GARP, then the data can be rationalized by a well-behaved utility function.

**Afriat's Theorem** If the data set $\{(p^i, x^i)\}$ satisfies GARP, then there exists a piecewise linear, continuous, increasing, concave utility function $u(x)$ such that for each observation $(p^i, x^i)$

$$u(x) \leq u(x^i) \text{ for any } x \text{ such that } p^i \cdot x \leq p^i \cdot x^i.$$

Hence, in order to show that the data are consistent with utility-maximizing behavior we must check whether it satisfies GARP. Since GARP offers an exact test, it is desirable to measure the *extent* of GARP violations. We report measures of GARP violations based on three indices: Afriat (1972), Varian (1991), and Houtman and Maks (1985).

**Afriat (1972)** Afriat's *critical cost efficiency index* (CCEI) measures the amount by which each budget constraint must be adjusted in order to remove all violations of GARP. For any number $0 \leq e \leq 1$, define the direct revealed preference relation $R^D(e)$ as $x^i R^D(e) x^j$ if $e p^i \cdot x^i \geq p^i \cdot x^j$, and define $R(e)$ to be the transitive closure of $R^D(e)$. Let $e^*$ be the largest value of $e$ such that the relation $R(e)$ satisfies GARP. Afriat's CCEI is the value of $e^*$ associated with the data set $\{(p^i, x^i)\}$. It is bounded between zero and one and can be interpreted as saying that the consumer is 'wasting' as much as $1 - e^*$ of his income by making inefficient choices. The closer the CCEI is to one, the smaller the perturbation of the budget constraints required to remove all violations and thus the closer the data are to satisfying GARP. Although the CCEI provides a summary statistic of the overall consistency of the data with GARP, it does not give any information about which of the observations $\left(p^i, x^i\right)$ are causing the most severe violations. A single large violation may lead to a small value of the index while a large number of small violations may result in a much larger efficiency index.

**Varian (1991)** Varian refined Afriat's CCEI to provide a measure that reflects the minimum adjustment required to eliminate the violations of GARP associated with each observation $(p^i, x^i)$. In particular, fix an observation $(p^i, x^i)$ and let $e^i$ be the largest value of $e$ such that $R(e)$ has no violations of GARP within the set of portfolios $x^j$ such that $x^i R(e) x^j$. The value $e^i$ measures the efficiency of the choices when compared to the portfolio $x^i$. Knowing the efficiencies $\left\{e^i\right\}$ for the entire set of observations $\left\{\left(p^i, x^i\right)\right\}$ allows us to say where the inefficiency is greatest or least. These numbers may still overstate the extent of inefficiency, however, because there may be several places in a cycle of observations where an adjustment of the budget constraint would remove a violation of GARP and the above procedure may not choose the 'least costly' adjustment. Varian (1991) provides an algorithm that will select the least costly method of removing all violations by changing each budget set by a different amount. When a single number is desired, as here, one can use $e^* = \min\left\{e^i\right\}$. Thus, Varian's (1991) index is a lower bound on the Afriat's CCEI.

**Houtman and Maks (1985) (HM)** HM find the largest subset of choices that is consistent with GARP. This method has a couple of drawbacks. First, some observations may be discarded even if the associated GARP violations could be removed by small perturbations of the budget constraint. Further, since the algorithm is computationally very intensive, we were unable to compute the HM index for a small number of subjects (ID 211, 324, 325, 406, 504 and 608) with a large number of GARP violations. In those few cases we report upper bounds on the consistent set.

Table AIII1 lists, by subject, the number of violations of the Weak Axiom of Revealed Preference (WARP) and GARP, and also reports the values of the three indices. Subjects are ranked according to (descending) CCEI scores. We allow for small mistakes resulting from the imprecision of a subject's handling of the mouse. The results presented in Table AIII1 allow for a narrow confidence interval of one token (i.e. for any $i$ and $j \neq i$, if $d(x^i, x^j) \leq 1$ then $x^i$ and $x^j$ are treated as the same portfolio).

*[Table AIII1 here]*

Figure AIII1 compares the distributions of the Varian efficiency index generated by the sample of hypothetical subjects (gray) and the distributions of the scores for the actual subjects (black). The horizontal axis shows the value of the index and the vertical axis measures the percentage of subjects corresponding to each interval. The histograms show that actual subject behavior has high consistency measures compared to the behavior of the hypothetical random subjects. Figure AIII2 shows the distribution of the HM index. Note that we cannot generate a distribution of this index for random subjects because of the computational load.

*[Figure AIII1 here]*
*[Figure AIII2 here]*

Table AIII1: WARP and GARP violations and the three indices by subject (sorted according to descending CCEI)

| ID | WARP | GARP | Afriat | Varian | HM |
|---|---|---|---|---|---|
| 205 | 0 | 0 | 1.000 | 1.000 | 50 |
| 213 | 0 | 0 | 1.000 | 1.000 | 50 |
| 215 | 0 | 0 | 1.000 | 1.000 | 50 |
| 216 | 0 | 0 | 1.000 | 1.000 | 50 |
| 219 | 0 | 0 | 1.000 | 1.000 | 50 |
| 303 | 0 | 0 | 1.000 | 1.000 | 50 |
| 304 | 0 | 0 | 1.000 | 1.000 | 50 |
| 306 | 0 | 0 | 1.000 | 1.000 | 50 |
| 314 | 0 | 0 | 1.000 | 1.000 | 50 |
| 316 | 0 | 0 | 1.000 | 1.000 | 50 |
| 317 | 0 | 0 | 1.000 | 1.000 | 50 |
| 320 | 0 | 0 | 1.000 | 1.000 | 50 |
| 326 | 0 | 0 | 1.000 | 1.000 | 50 |
| 508 | 0 | 0 | 1.000 | 1.000 | 50 |
| 509 | 0 | 0 | 1.000 | 1.000 | 50 |
| 604 | 0 | 0 | 1.000 | 1.000 | 50 |
| 411 | 2 | 4 | 0.999 | 0.978 | 48 |
| 416 | 1 | 1 | 0.999 | 0.979 | 49 |
| 405 | 2 | 2 | 0.999 | 0.933 | 48 |
| 417 | 1 | 1 | 0.998 | 0.996 | 49 |
| 301 | 3 | 11 | 0.997 | 0.951 | 48 |
| 505 | 1 | 1 | 0.996 | 0.995 | 49 |
| 501 | 2 | 2 | 0.995 | 0.985 | 48 |
| 605 | 5 | 5 | 0.992 | 0.982 | 45 |
| 323 | 3 | 3 | 0.991 | 0.978 | 47 |
| 302 | 2 | 7 | 0.990 | 0.943 | 48 |
| 414 | 1 | 1 | 0.990 | 0.951 | 49 |
| 413 | 5 | 7 | 0.989 | 0.979 | 47 |
| 210 | 1 | 1 | 0.988 | 0.967 | 49 |
| 408 | 1 | 1 | 0.987 | 0.986 | 49 |
| 415 | 4 | 5 | 0.987 | 0.934 | 47 |
| 402 | 5 | 7 | 0.987 | 0.834 | 47 |
| 311 | 3 | 3 | 0.986 | 0.804 | 48 |
| 313 | 2 | 2 | 0.986 | 0.970 | 48 |
| 217 | 7 | 14 | 0.986 | 0.935 | 46 |
| 410 | 4 | 4 | 0.984 | 0.954 | 47 |
| 515 | 5 | 6 | 0.984 | 0.973 | 46 |

| ID | WARP | GARP | Afriat | Varian | HM |
|---|---|---|---|---|---|
| 407 | 3 | 3 | 0.984 | 0.972 | 48 |
| 503 | 2 | 5 | 0.982 | 0.961 | 49 |
| 512 | 8 | 8 | 0.982 | 0.960 | 43 |
| 207 | 3 | 15 | 0.981 | 0.941 | 47 |
| 601 | 1 | 1 | 0.981 | 0.981 | 49 |
| 516 | 4 | 4 | 0.981 | 0.975 | 46 |
| 520 | 8 | 9 | 0.979 | 0.907 | 46 |
| 412 | 7 | 12 | 0.976 | 0.928 | 46 |
| 514 | 2 | 3 | 0.975 | 0.952 | 49 |
| 204 | 4 | 10 | 0.973 | 0.970 | 47 |
| 318 | 4 | 6 | 0.972 | 0.809 | 48 |
| 502 | 5 | 17 | 0.971 | 0.880 | 47 |
| 609 | 3 | 5 | 0.969 | 0.880 | 47 |
| 202 | 6 | 12 | 0.968 | 0.944 | 46 |
| 203 | 4 | 14 | 0.966 | 0.946 | 48 |
| 319 | 3 | 20 | 0.966 | 0.727 | 48 |
| 327 | 2 | 5 | 0.965 | 0.915 | 49 |
| 519 | 4 | 5 | 0.963 | 0.944 | 47 |
| 315 | 10 | 33 | 0.959 | 0.795 | 45 |
| 312 | 4 | 13 | 0.957 | 0.952 | 47 |
| 513 | 10 | 37 | 0.957 | 0.822 | 45 |
| 309 | 4 | 17 | 0.952 | 0.890 | 48 |
| 218 | 5 | 10 | 0.951 | 0.907 | 48 |
| 214 | 8 | 21 | 0.949 | 0.916 | 45 |
| 206 | 9 | 147 | 0.948 | 0.855 | 47 |
| 602 | 6 | 11 | 0.947 | 0.861 | 45 |
| 510 | 8 | 13 | 0.946 | 0.914 | 45 |
| 409 | 6 | 15 | 0.943 | 0.935 | 46 |
| 208 | 8 | 14 | 0.942 | 0.912 | 45 |
| 308 | 2 | 6 | 0.938 | 0.930 | 49 |
| 511 | 16 | 231 | 0.936 | 0.472 | 42 |
| 507 | 16 | 39 | 0.929 | 0.843 | 44 |
| 209 | 15 | 94 | 0.929 | 0.825 | 46 |
| 307 | 5 | 12 | 0.916 | 0.914 | 46 |
| 403 | 8 | 27 | 0.916 | 0.724 | 46 |
| 404 | 26 | 117 | 0.915 | 0.729 | 42 |
| 517 | 13 | 32 | 0.911 | 0.845 | 43 |
| 322 | 8 | 96 | 0.905 | 0.768 | 47 |
| 506 | 5 | 294 | 0.892 | 0.568 | 48 |
| 401 | 3 | 3 | 0.874 | 0.838 | 49 |

| ID | WARP | GARP | Afriat | Varian | HM |
|---|---|---|---|---|---|
| 607 | 37 | 179 | 0.870 | 0.712 | 37 |
| 212 | 5 | 111 | 0.866 | 0.697 | 47 |
| 305 | 17 | 182 | 0.852 | 0.695 | 45 |
| 608 | 23 | 549 | 0.847 | 0.570 | 29 |
| 324 | 18 | 453 | 0.840 | 0.657 | 29 |
| 606 | 18 | 241 | 0.839 | 0.470 | 44 |
| 518 | 26 | 121 | 0.816 | 0.732 | 43 |
| 201 | 16 | 147 | 0.797 | 0.526 | 42 |
| 321 | 27 | 375 | 0.757 | 0.356 | 44 |
| 325 | 27 | 702 | 0.739 | 0.398 | 32 |
| 328 | 21 | 559 | 0.705 | 0.401 | 33 |
| 504 | 29 | 794 | 0.697 | 0.355 | 33 |
| 310 | 22 | 241 | 0.690 | 0.366 | 43 |
| 603 | 12 | 322 | 0.686 | 0.229 | 47 |
| 406 | 39 | 881 | 0.653 | 0.225 | 30 |
| 211 | 83 | 669 | 0.611 | 0.361 | 34 |

Figure AIII1: The distributions of GARP violations Varian (1991)

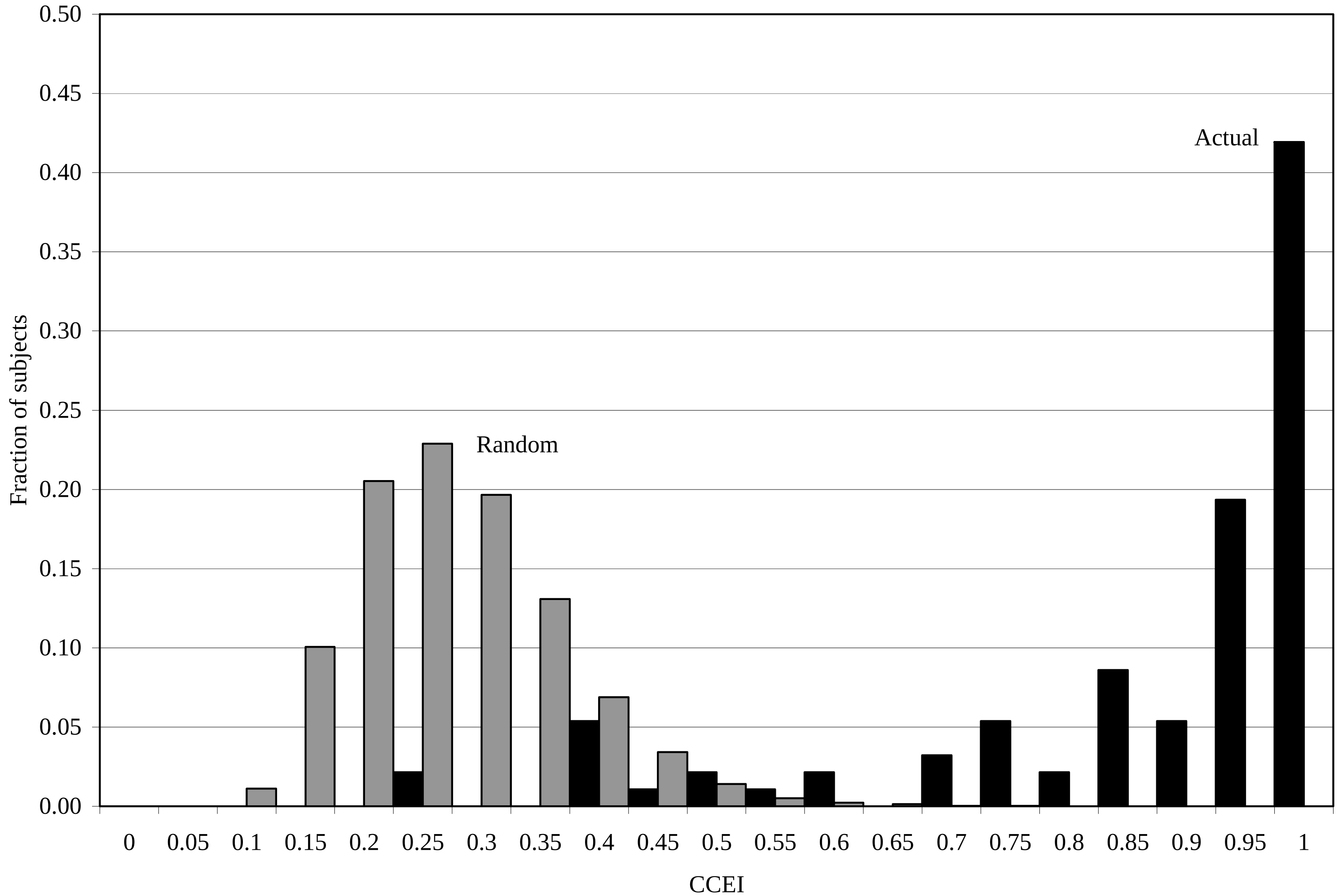
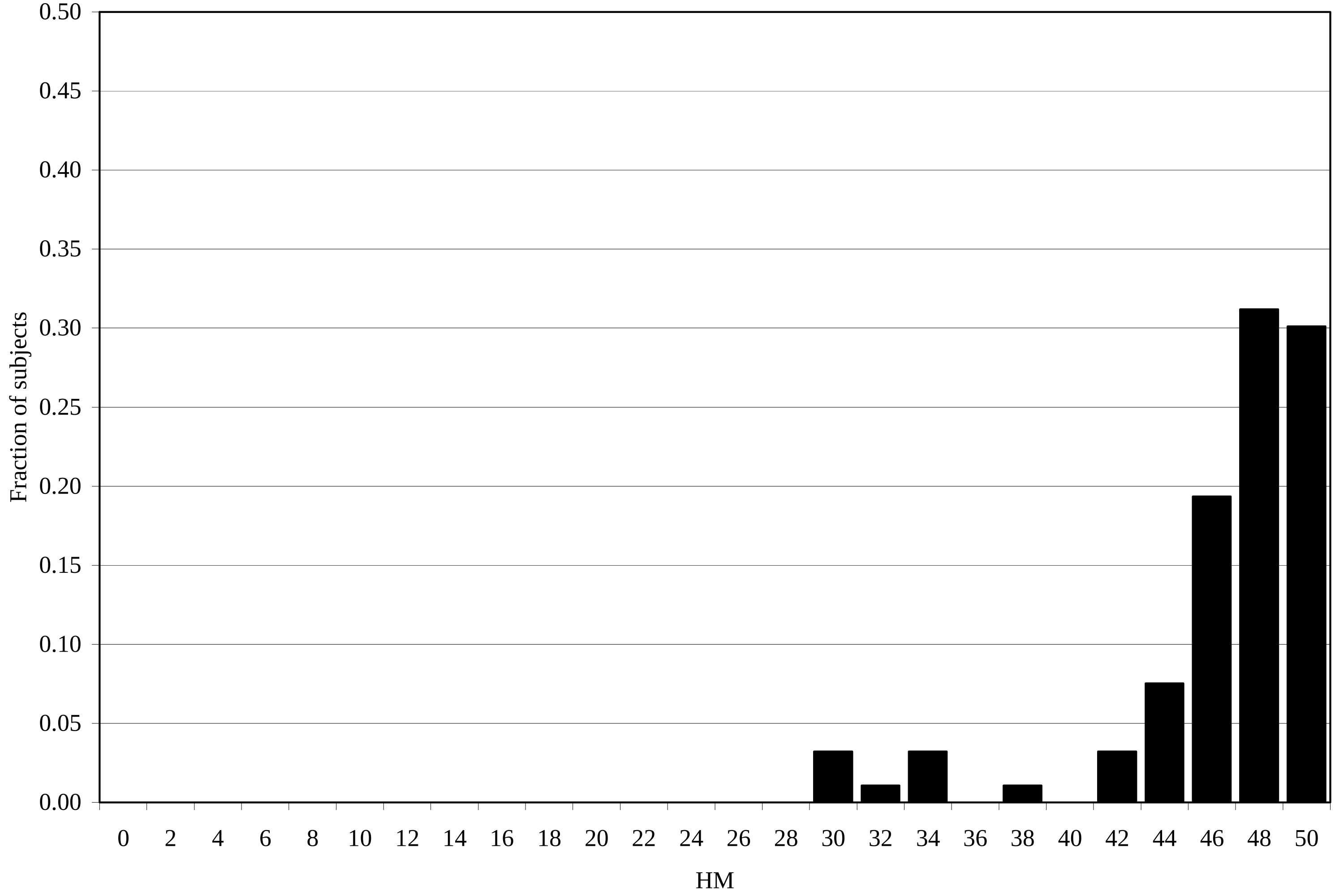


Figure AIII2:  The distributions of GARP violations Houtman and Maks (1985)



## Appendix IV

## Constant relative risk aversion (CRRA)

| ID | $\alpha$ | Std($\alpha$) | $\rho$ | Std($\rho$) | $R^2$ |
|---|---|---|---|---|---|
| 201 | 1.000 | 0.044 | 0.522 | 0.082 | 0.589 |
| 202 | 1.000 | 0.036 | 1.033 | 0.105 | 0.700 |
| 203 | 3.551 | 0.704 | 0.048 | 5.690 | 0.848 |
| 204 | 2.858 | 0.683 | 0.058 | 1.415 | 0.625 |
| 205 | 1.003 | 0.010 | 0.000 | 0.003 | 0.911 |
| 206 | 1.000 | 0.002 | 3.741 | 1.148 | 0.258 |
| 207 | 1.244 | 0.137 | 0.142 | 0.030 | 0.913 |
| 208 | 1.238 | 0.417 | 0.446 | 0.147 | 0.765 |
| 209 | 1.044 | 0.204 | 0.521 | 0.134 | 0.625 |
| 210 | 1.179 | 0.318 | 3.871 | 2.367 | 0.340 |
| 211 | 1.000 | 0.341 | 0.810 | 8.121E+14 | 0.161 |
| 212 | 1.382 | 1.416 | 0.466 | 0.339 | 0.615 |
| 213 | 2.106 | 0.687 | 0.165 | 0.166 | 0.681 |
| 214 | 1.000 | 0.000 | 1.304 | 0.210 | 0.609 |
| 215 | 1.437 | 0.326 | 0.179 | 0.075 | 0.681 |
| 216 | 1.126 | 0.081 | 0.259 | 0.029 | 0.892 |
| 217 | 1.460 | 0.333 | 0.403 | 0.144 | 0.754 |
| 218 | 1.013 | 0.020 | 0.002 | 0.009 | 0.849 |
| 219 | 2.876 | 0.355 | 0.019 | 0.029 | 0.894 |
| 301 | 1.302 | 0.705 | 0.542 | 0.275 | 0.773 |
| 302 | 1.121 | 0.077 | 0.159 | 0.039 | 0.813 |
| 303 | 1.641 | 0.476 | 0.284 | 0.169 | 0.615 |
| 304 | 1.477 | 0.476 | 66.632 | 1.279E+21 | 0.252 |
| 305 | 1.282 | 0.181 | 0.430 | 0.079 | 0.759 |
| 306 | 1.000 | 0.073 | 3.382 | 1.006 | 0.444 |
| 307 | 1.043 | 0.088 | 0.076 | 0.030 | 0.875 |
| 308 | 1.821 | 0.354 | 0.451 | 0.121 | 0.521 |
| 309 | 1.000 | 0.025 | 0.686 | 0.048 | 0.812 |
| 310 | 1.387 | 0.188 | 1.770 | 0.720 | 0.141 |
| 311 | 1.050 | 0.084 | 0.070 | 0.031 | 0.788 |
| 312 | 1.885 | 0.583 | 0.170 | 0.081 | 0.727 |
| 313 | 1.044 | 0.091 | 0.712 | 0.126 | 0.808 |
| 314 | 1.047 | 0.126 | 0.103 | 0.041 | 0.850 |
| 315 | 1.000 | 0.001 | 0.794 | 0.128 | 0.598 |
| 316 | 1.535 | 0.139 | 0.772 | 0.183 | 0.802 |
| 317 | 1.179 | 0.106 | 1.009 | 0.217 | 0.899 |

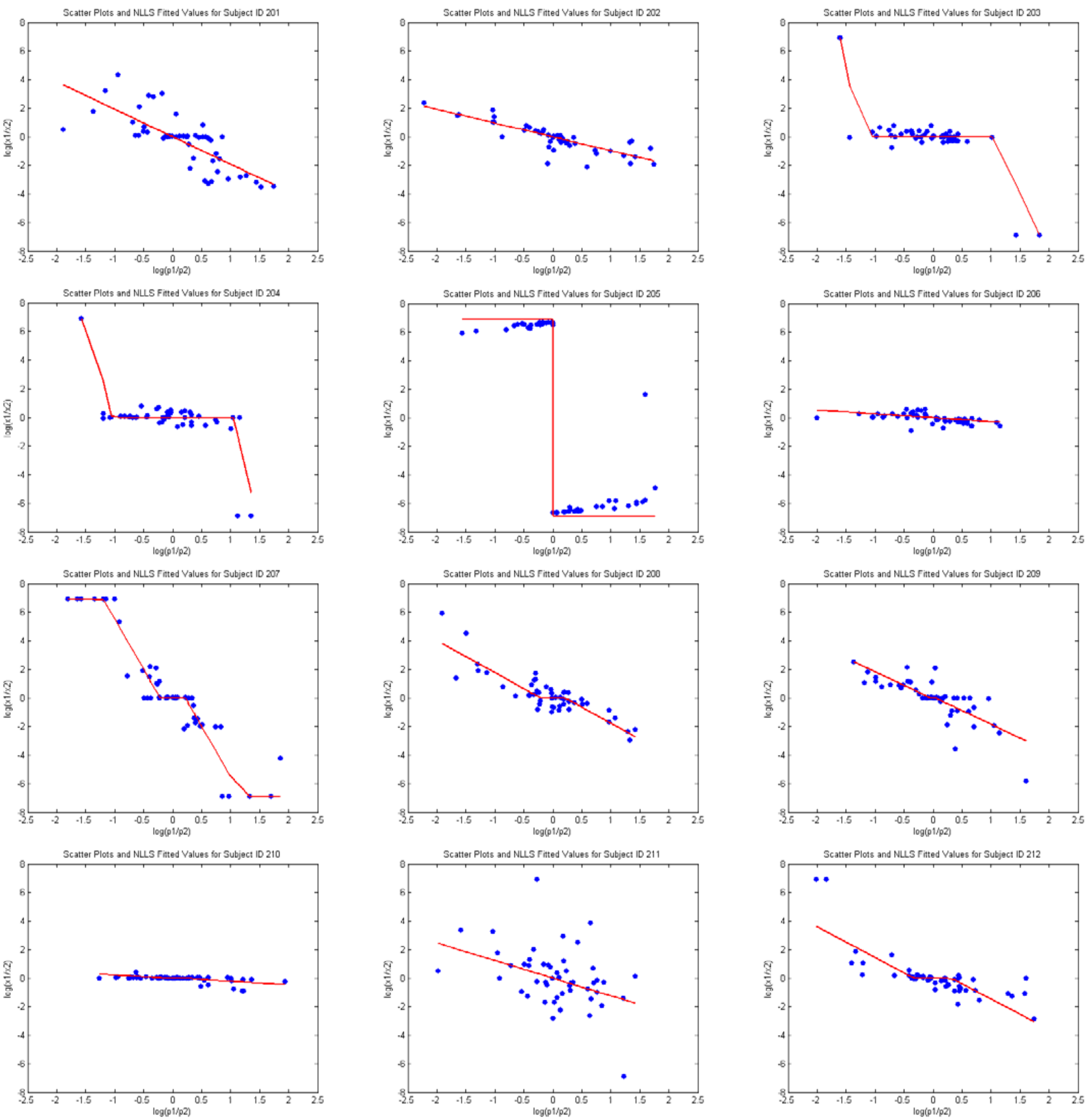
| ID | $\alpha$ | Std($\alpha$) | $\rho$ | Std($\rho$) | $R^2$ |
|---|---|---|---|---|---|
| 318 | 1.056 | 0.124 | 0.173 | 0.059 | 0.761 |
| 319 | 1.281 | 0.297 | 0.239 | 0.041 | 0.824 |
| 320 | 1.013 | 0.002 | 0.002 | 0.001 | 0.943 |
| 321 | 1.000 | 0.045 | 1.485 | 0.298 | 0.267 |
| 322 | 1.000 | 0.009 | 0.760 | 0.092 | 0.562 |
| 323 | 1.000 | 0.000 | 1.555 | 0.187 | 0.609 |
| 324 | 1.000 | 0.130 | 0.145 | 0.032 | 0.595 |
| 325 | 1.000 | 0.276 | 0.417 | 0.109 | 0.397 |
| 326 | 1.541 | 0.701 | 0.252 | 0.244 | 0.620 |
| 327 | 1.000 | 0.012 | 0.965 | 0.136 | 0.580 |
| 328 | 1.000 | 0.130 | 0.340 | 0.140 | 0.339 |
| 401 | 1.120 | 0.078 | 0.638 | 0.088 | 0.616 |
| 402 | 1.085 | 0.151 | 0.375 | 0.088 | 0.583 |
| 403 | 1.027 | 0.423 | 0.302 | 0.084 | 0.710 |
| 404 | 1.000 | 0.591 | 2.716 | 2.046E+15 | 0.121 |
| 405 | 1.087 | 0.087 | 0.560 | 0.079 | 0.804 |
| 406 | 1.531 | 0.419 | 1.936 | 4.663E+15 | 0.088 |
| 407 | 1.000 | 0.260 | 3.865 | 1.279E+21 | 0.127 |
| 408 | 2.506 | 0.794 | 0.764 | 8.812E+14 | 0.330 |
| 409 | 1.206 | 0.330 | 0.701 | 0.167 | 0.547 |
| 410 | 1.000 | 0.066 | 1.145 | 0.146 | 0.603 |
| 411 | 1.605 | 0.231 | 0.037 | 0.036 | 0.882 |
| 412 | 1.265 | 0.124 | 0.236 | 0.054 | 0.746 |
| 413 | 2.347 | 1.428 | 0.209 | 4.277 | 0.634 |
| 414 | 1.195 | 0.155 | 0.495 | 0.145 | 0.666 |
| 415 | 1.009 | 0.112 | 0.109 | 0.037 | 0.737 |
| 416 | 1.211 | 0.254 | 0.717 | 0.173 | 0.625 |
| 417 | 1.000 | 0.016 | 0.432 | 0.057 | 0.810 |
| 501 | 1.035 | 0.361 | 0.596 | 0.205 | 0.628 |
| 502 | 1.029 | 0.217 | 1.826 | 0.567 | 0.527 |
| 503 | 1.729 | 0.064 | 0.006 | 0.015 | 0.982 |
| 504 | 1.778 | 0.337 | 0.266 | 0.232 | 0.321 |
| 505 | 1.543 | 0.248 | 0.230 | 0.052 | 0.724 |
| 506 | 1.000 | 0.002 | 0.336 | 0.048 | 0.470 |
| 507 | 1.004 | 0.101 | 0.409 | 0.091 | 0.593 |
| 508 | 1.000 | 0.004 | 0.004 | 0.003 | 0.948 |
| 509 | 1.297 | 0.220 | 0.792 | 0.250 | 0.809 |
| 510 | 1.120 | 0.261 | 0.609 | 0.116 | 0.767 |
| 511 | 1.000 | 0.036 | 0.990 | 0.204 | 0.450 |

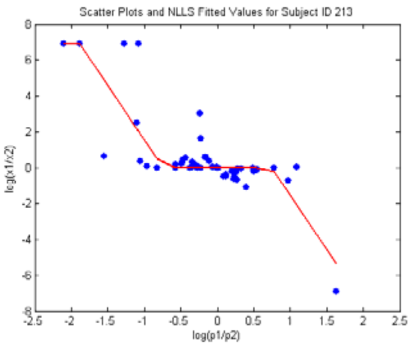
| ID | $\alpha$ | Std($\alpha$) | $\rho$ | Std($\rho$) | $R^2$ |
|---|---|---|---|---|---|
| 512 | 1.745 | 0.465 | 0.321 | 0.179 | 0.681 |
| 513 | 1.000 | 0.041 | 1.126 | 0.170 | 0.652 |
| 514 | 1.239 | 0.198 | 0.557 | 0.116 | 0.530 |
| 515 | 1.110 | 0.844 | 3.693 | 1.279E+21 | 0.148 |
| 516 | 1.302 | 0.788 | 5.672 | 3.806E+21 | 0.047 |
| 517 | 1.000 | 0.004 | 0.290 | 0.047 | 0.617 |
| 518 | 1.453 | 0.300 | 0.390 | 0.120 | 0.621 |
| 519 | 2.333 | 0.791 | 0.131 | 0.298 | 0.560 |
| 520 | 1.000 | 0.042 | 0.250 | 0.054 | 0.633 |
| 601 | 1.000 | 0.029 | 0.080 | 0.021 | 0.751 |
| 602 | 1.068 | 0.158 | 0.633 | 0.168 | 0.685 |
| 603 | 1.000 | 0.176 | 4.630 | 1.629E+17 | 0.001 |
| 604 | 1.000 | 0.065 | 1.076 | 0.204 | 0.454 |
| 605 | 1.000 | 0.000 | 0.585 | 0.048 | 0.759 |
| 606 | 1.000 | 1.209 | 3.515 | 1.807E+21 | 0.095 |
| 607 | 1.656 | 0.373 | 1.465 | 1.807E+21 | 0.141 |
| 608 | 1.000 | 0.114 | 0.741 | 0.202 | 0.192 |
| 609 | 1.081 | 0.111 | 0.288 | 0.047 | 0.699 |

# Appendix V

The relationship between $\ln(p_1 / p_2)$ and $\ln(\hat{x}_1 / \hat{x}_2)$

## Symmetric treatment (*π*=1/2)

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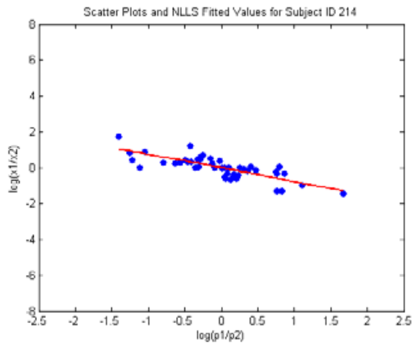
log(p1/p2)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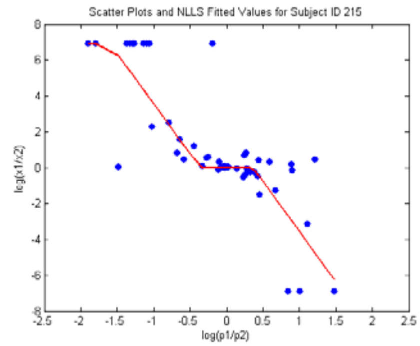
log(p1/p2)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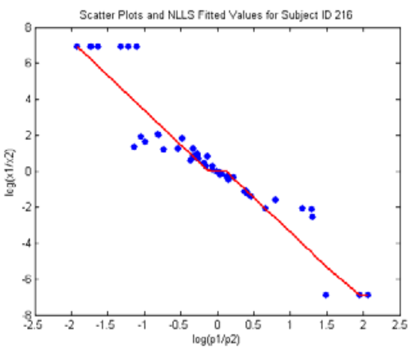
log(p1/p2)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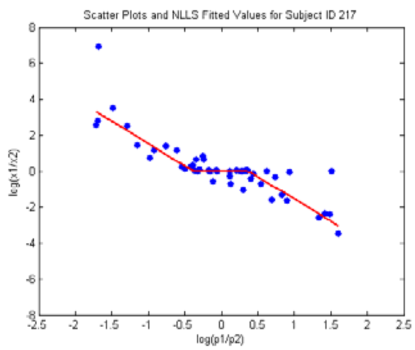
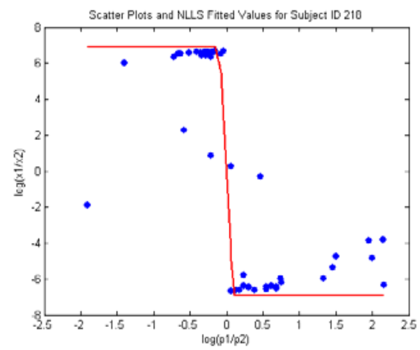
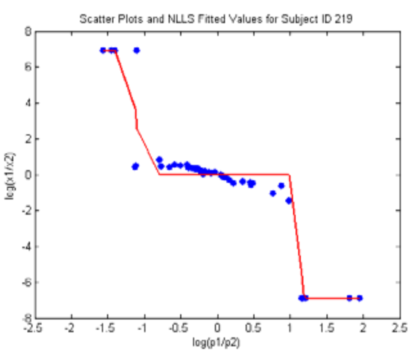
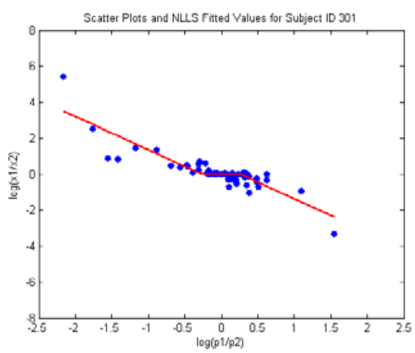
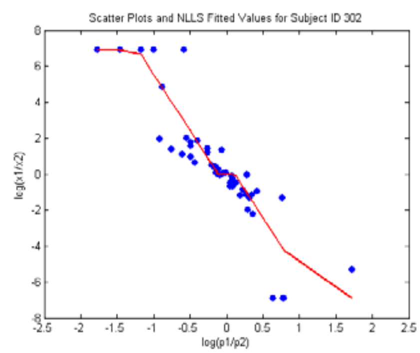
log(p1/p2)

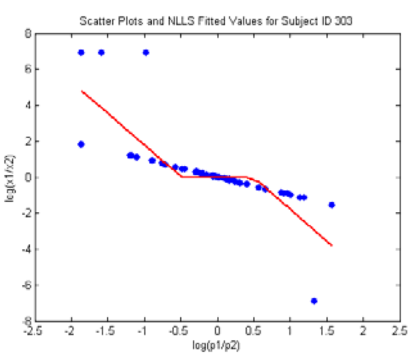

Scatter Plots and NLLS Fitted Values for Subject ID 217
log(x1/x2)
log(p1/p2)

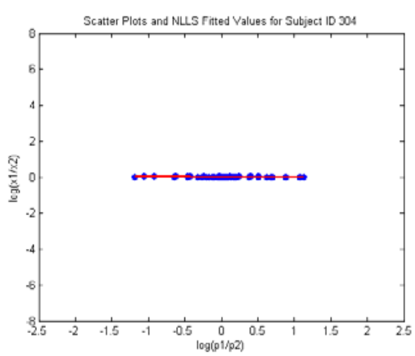

Scatter Plots and NLLS Fitted Values for Subject ID 218
log(x1/x2)
log(p1/p2)

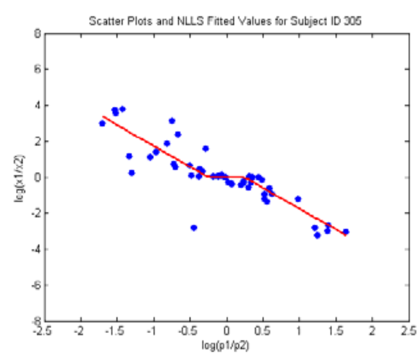

Scatter Plots and NLLS Fitted Values for Subject ID 219
log(x1/x2)
log(p1/p2)

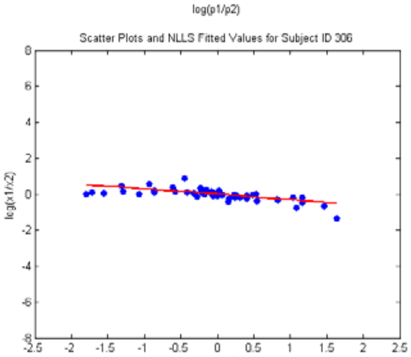

Scatter Plots and NLLS Fitted Values for Subject ID 301
log(x1/x2)
log(p1/p2)

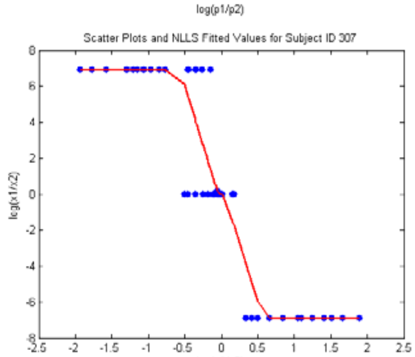

Scatter Plots and NLLS Fitted Values for Subject ID 302
log(x1/x2)
log(p1/p2)

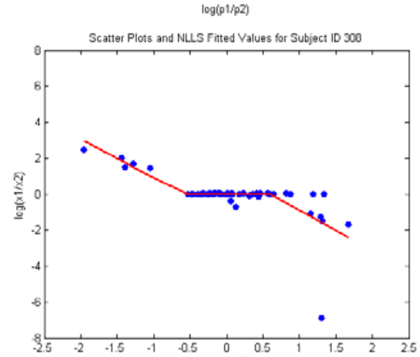

Scatter Plots and NLLS Fitted Values for Subject ID 303
log(x1/x2)
log(p1/p2)

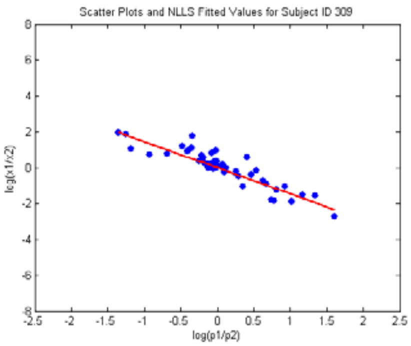

Scatter Plots and NLLS Fitted Values for Subject ID 304
log(x1/x2)
log(p1/p2)

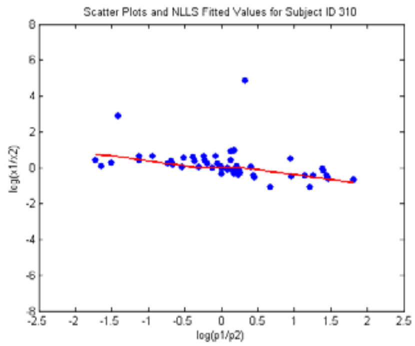

Scatter Plots and NLLS Fitted Values for Subject ID 305
log(x1/x2)
log(p1/p2)


Scatter Plots and NLLS Fitted Values for Subject ID 306
log(x1/x2)
log(p1/p2)


Scatter Plots and NLLS Fitted Values for Subject ID 307
log(x1/x2)
log(p1/p2)


Scatter Plots and NLLS Fitted Values for Subject ID 308
log(x1/x2)
log(p1/p2)


Scatter Plots and NLLS Fitted Values for Subject ID 309
log(x1/x2)
log(p1/p2)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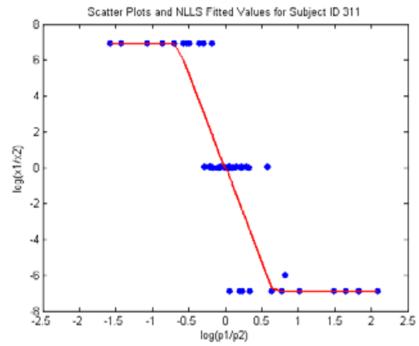
log(x1/x2)
log(p1/p2)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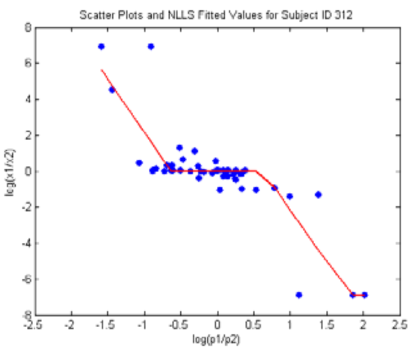
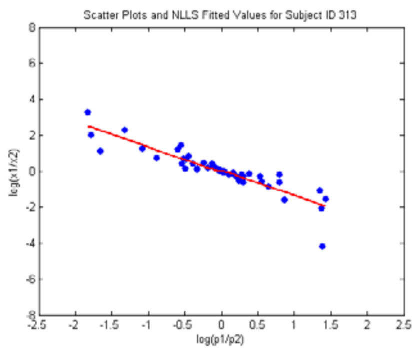
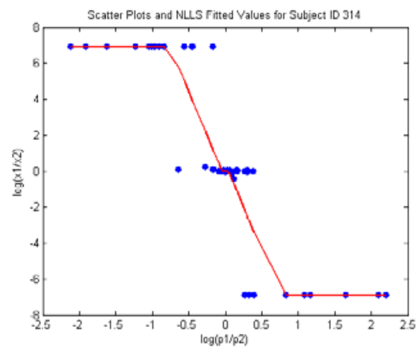
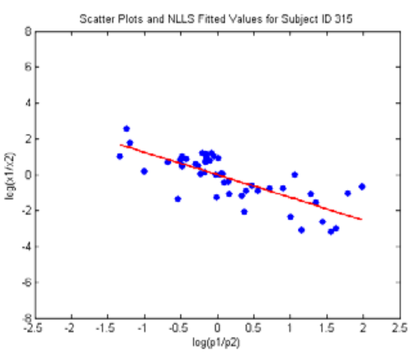
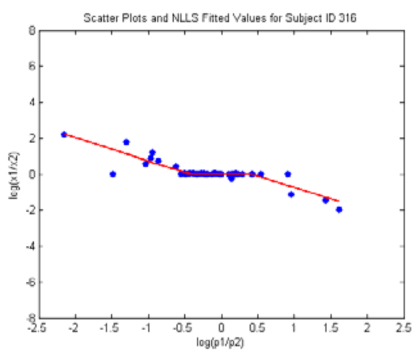
log(x1/x2)
log(p1/p2)

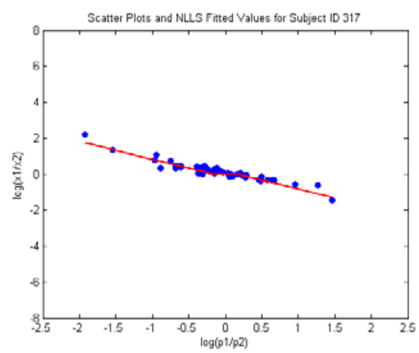

Scatter Plots and NLLS Fitted Values for Subject ID 312
log(x1/x2)
log(p1/p2)

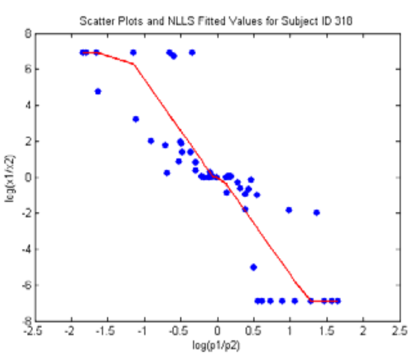

Scatter Plots and NLLS Fitted Values for Subject ID 313
log(x1/x2)
log(p1/p2)

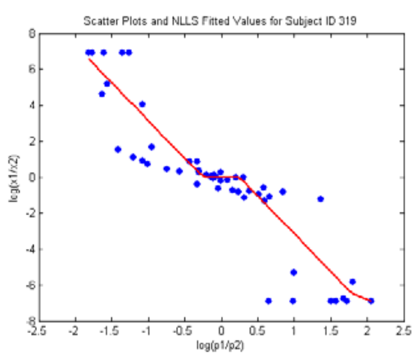

Scatter Plots and NLLS Fitted Values for Subject ID 314
log(x1/x2)
log(p1/p2)

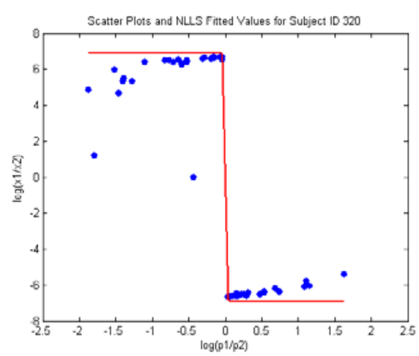

Scatter Plots and NLLS Fitted Values for Subject ID 315
log(x1/x2)
log(p1/p2)

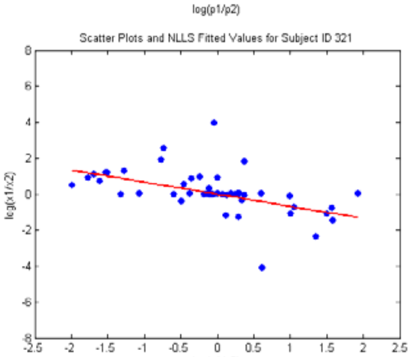

Scatter Plots and NLLS Fitted Values for Subject ID 316
log(x1/x2)
log(p1/p2)

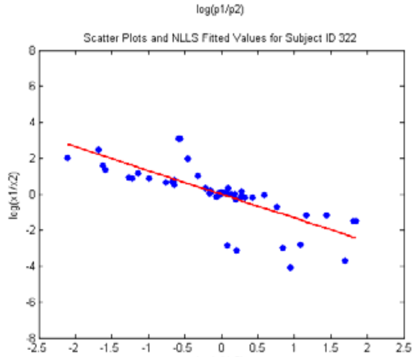

Scatter Plots and NLLS Fitted Values for Subject ID 317
log(x1/x2)
log(p1/p2)

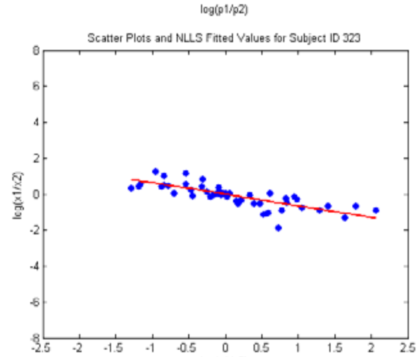

Scatter Plots and NLLS Fitted Values for Subject ID 318
log(x1/x2)
log(p1/p2)

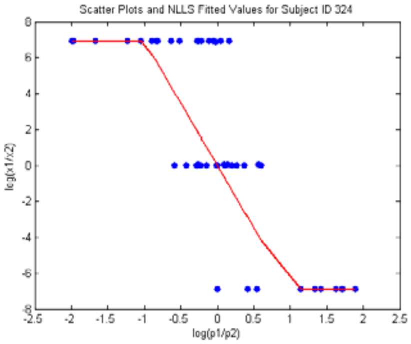

Scatter Plots and NLLS Fitted Values for Subject ID 319
log(x1/x2)
log(p1/p2)

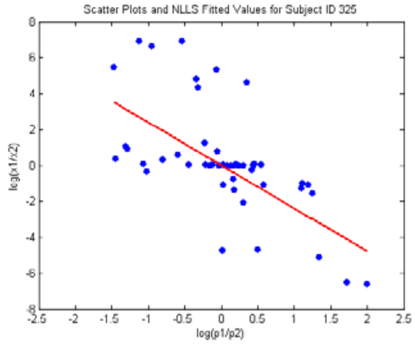

Scatter Plots and NLLS Fitted Values for Subject ID 320
log(x1/x2)
log(p1/p2)

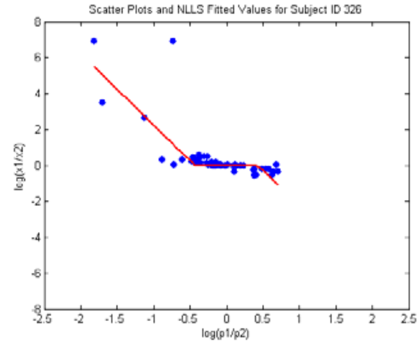

Scatter Plots and NLLS Fitted Values for Subject ID 321
log(x1/x2)
log(p1/p2)

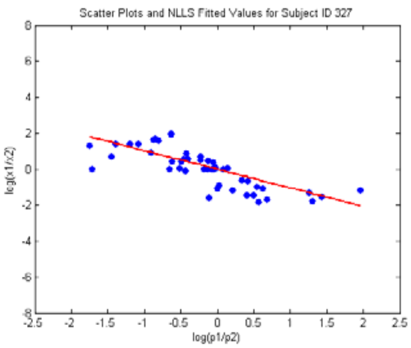

Scatter Plots and NLLS Fitted Values for Subject ID 322
log(x1/x2)
log(p1/p2)

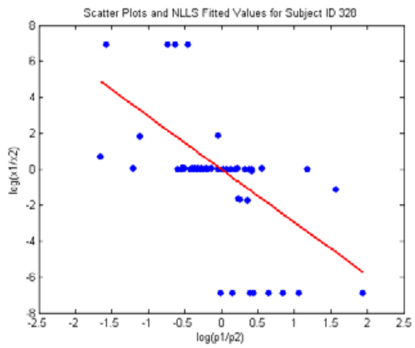

Scatter Plots and NLLS Fitted Values for Subject ID 323
log(x1/x2)
log(p1/p2)


Scatter Plots and NLLS Fitted Values for Subject ID 324
log(x1/x2)
log(p1/p2)

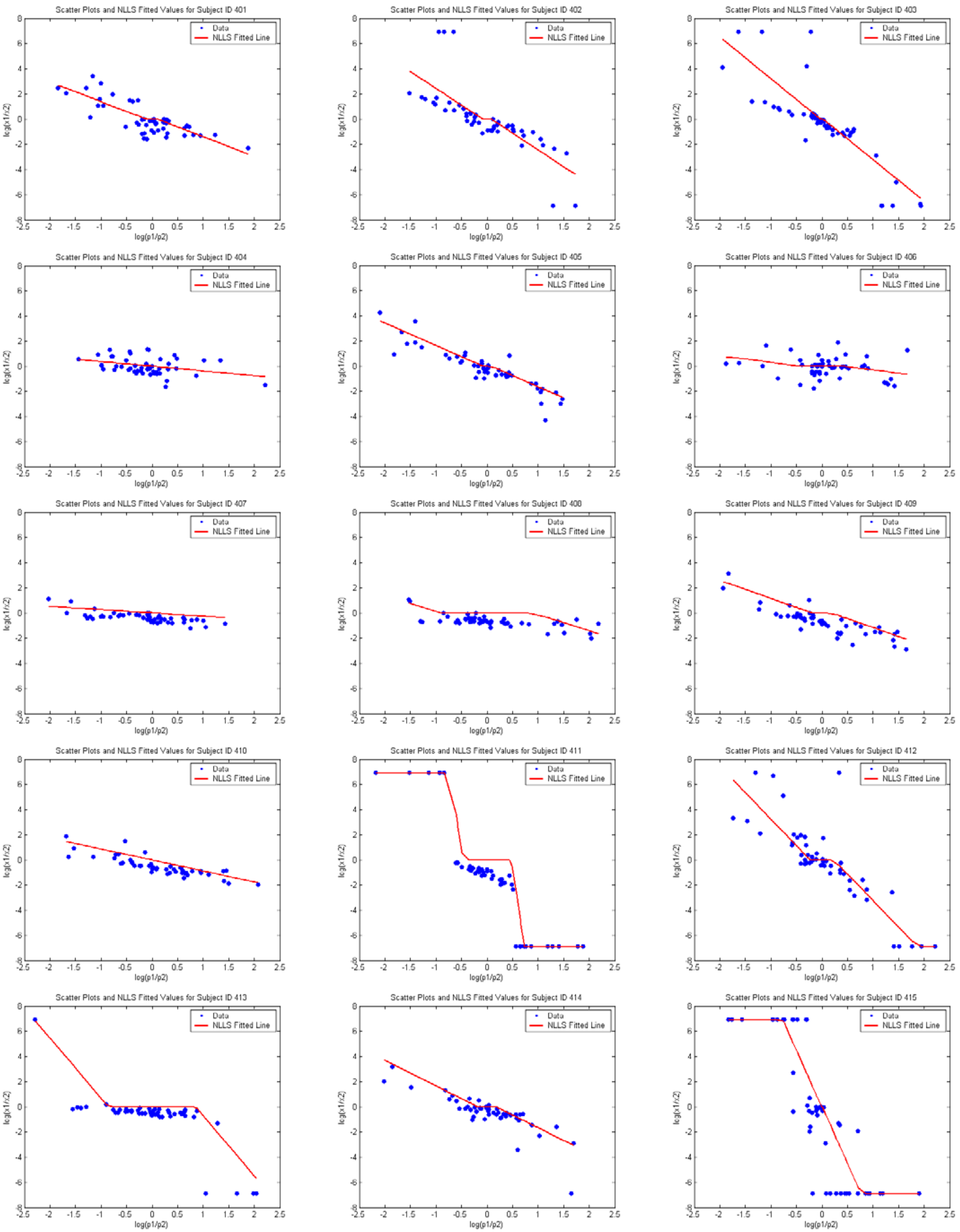

Scatter Plots and NLLS Fitted Values for Subject ID 325
log(x1/x2)
log(p1/p2)

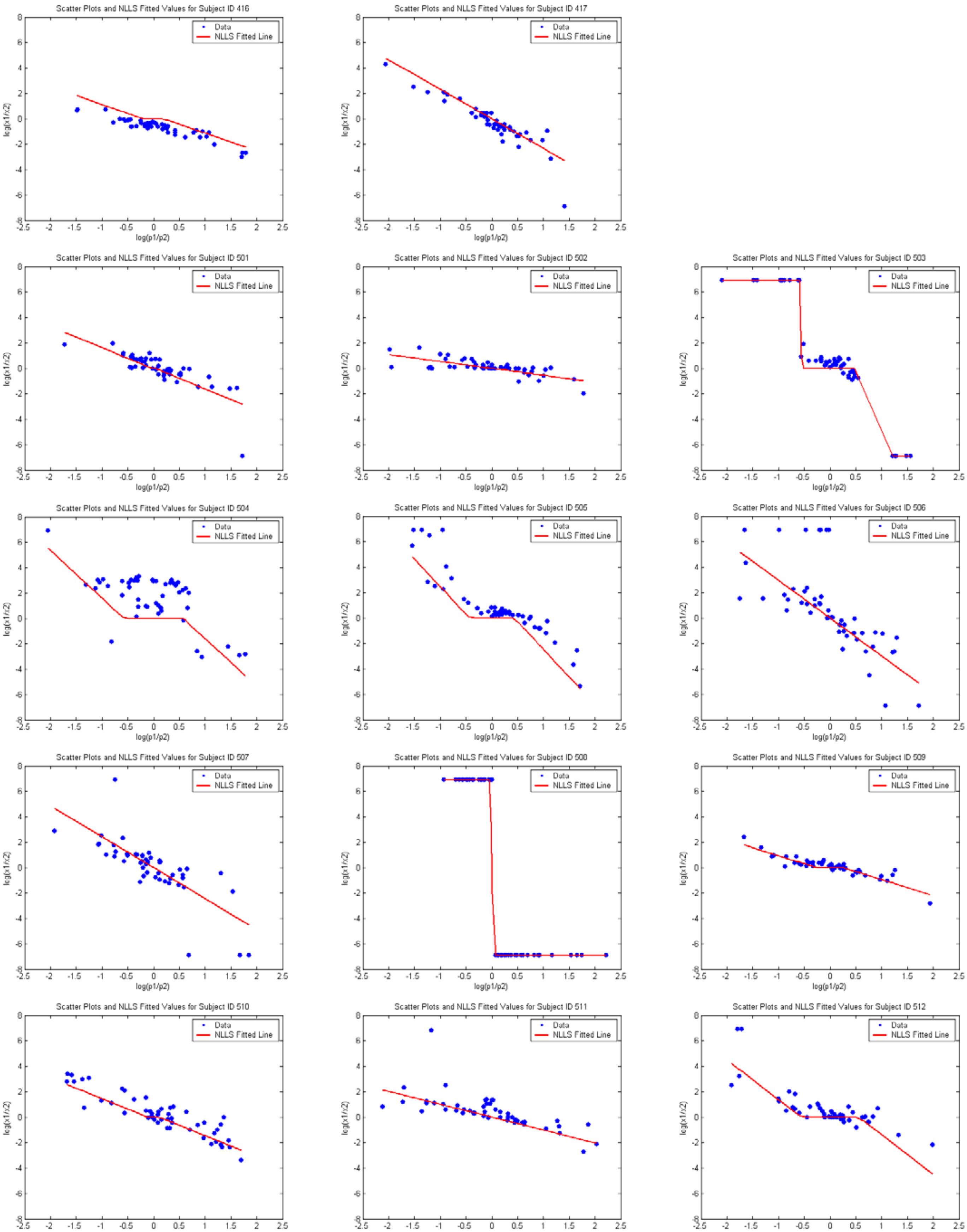

Scatter Plots and NLLS Fitted Values for Subject ID 326
log(x1/x2)
log(p1/p2)

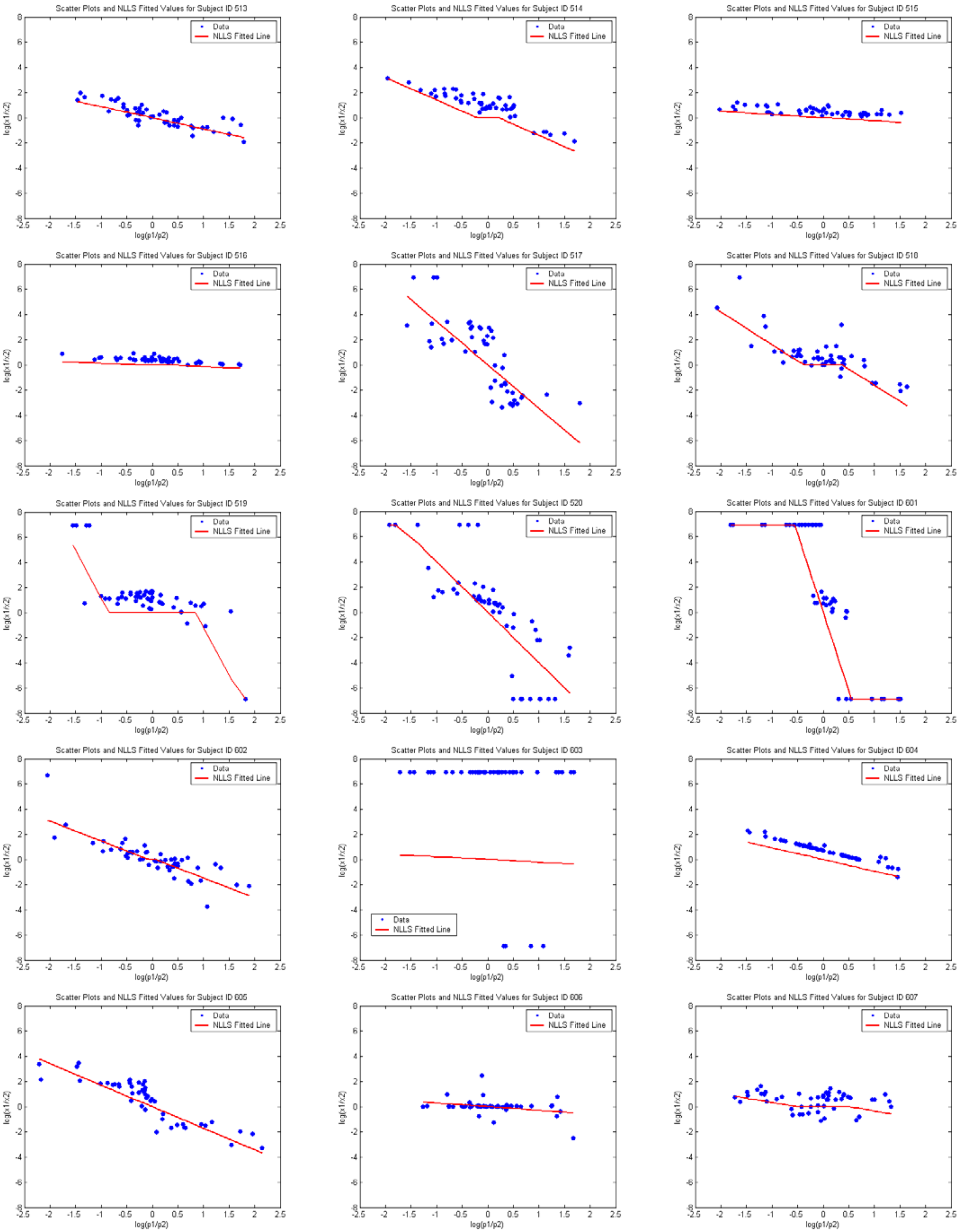

Scatter Plots and NLLS Fitted Values for Subject ID 327
log(x1/x2)
log(p1/p2)

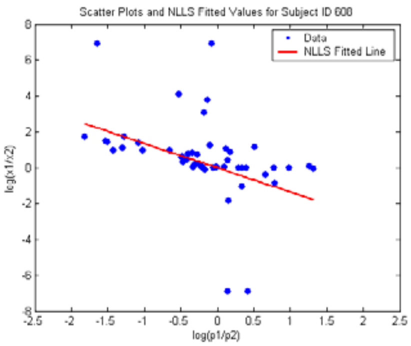

Scatter Plots and NLLS Fitted Values for Subject ID 328
log(x1/x2)
log(p1/p2)

## Asymmetric treatments ($\pi$=1/3 and $\pi$=2/3)

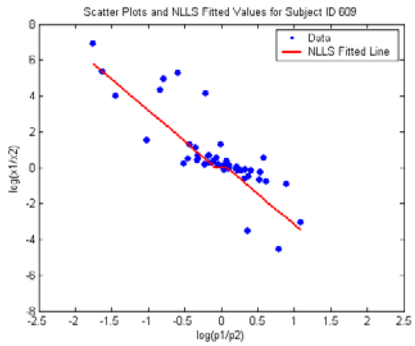



Scatter Plots and NLLS Fitted Values for Subject ID 416
Scatter Plots and NLLS Fitted Values for Subject ID 417
Scatter Plots and NLLS Fitted Values for Subject ID 501
Scatter Plots and NLLS Fitted Values for Subject ID 502
Scatter Plots and NLLS Fitted Values for Subject ID 503
Scatter Plots and NLLS Fitted Values for Subject ID 504
Scatter Plots and NLLS Fitted Values for Subject ID 505
Scatter Plots and NLLS Fitted Values for Subject ID 506
Scatter Plots and NLLS Fitted Values for Subject ID 507
Scatter Plots and NLLS Fitted Values for Subject ID 508
Scatter Plots and NLLS Fitted Values for Subject ID 509
Scatter Plots and NLLS Fitted Values for Subject ID 510
Scatter Plots and NLLS Fitted Values for Subject ID 511
Scatter Plots and NLLS Fitted Values for Subject ID 512
Data
NLLS Fitted Line
log(x1/x2)
log(p1/p2)


Scatter Plots and NLLS Fitted Values for Subject ID 513
Scatter Plots and NLLS Fitted Values for Subject ID 514
Scatter Plots and NLLS Fitted Values for Subject ID 515
Scatter Plots and NLLS Fitted Values for Subject ID 516
Scatter Plots and NLLS Fitted Values for Subject ID 517
Scatter Plots and NLLS Fitted Values for Subject ID 518
Scatter Plots and NLLS Fitted Values for Subject ID 519
Scatter Plots and NLLS Fitted Values for Subject ID 520
Scatter Plots and NLLS Fitted Values for Subject ID 601
Scatter Plots and NLLS Fitted Values for Subject ID 602
Scatter Plots and NLLS Fitted Values for Subject ID 603
Scatter Plots and NLLS Fitted Values for Subject ID 604
Scatter Plots and NLLS Fitted Values for Subject ID 605
Scatter Plots and NLLS Fitted Values for Subject ID 606
Scatter Plots and NLLS Fitted Values for Subject ID 607
Data
NLLS Fitted Line
log(x1/x2)
log(p1/p2)



Scatter Plots and NLLS Fitted Values for Subject ID 608
Data
NLLS Fitted Line
log(x1/x2)
log(p1/p2)

Scatter Plots and NLLS Fitted Values for Subject ID 609
Data
NLLS Fitted Line
log(x1/x2)
log(p1/p2)

## Appendix VI

## Risk measures and OLS expected-utility model

| ID | $r(1)$ | $\rho$ (OLS) | α | Std($\alpha$) | $\beta$ | Std($\beta$) | $R^2$ | #obs. |
|---|---|---|---|---|---|---|---|---|
| 202 | 0.516 | 1.038 | 0.071 | 0.075 | 0.963 | 0.091 | 0.701 | 50 |
| 203 | 0.577 | 4.799 | -0.019 | 0.044 | 0.208 | 0.088 | 0.112 | 46 |
| 204 | 0.504 | 5.348 | 0.011 | 0.052 | 0.187 | 0.090 | 0.087 | 47 |
| 205 | 0.001 | 0.651 | -0.466 | 0.198 | 1.535 | 0.258 | 0.425 | 50 |
| 206 | 1.870 | 3.596 | 0.062 | 0.040 | 0.278 | 0.064 | 0.280 | 50 |
| 207 | 0.179 | 0.375 | 0.098 | 0.118 | 2.666 | 0.315 | 0.672 | 37 |
| 208 | 0.327 | 0.715 | 0.035 | 0.084 | 1.398 | 0.131 | 0.714 | 48 |
| 209 | 0.282 | 0.656 | -0.019 | 0.110 | 1.523 | 0.192 | 0.573 | 49 |
| 210 | 2.005 | 5.034 | 0.053 | 0.029 | 0.199 | 0.042 | 0.316 | 50 |
| 212 | 0.387 | 1.132 | 0.122 | 0.075 | 0.883 | 0.105 | 0.606 | 48 |
| 213 | 0.428 | 1.533 | -0.058 | 0.099 | 0.653 | 0.184 | 0.226 | 45 |
| 214 | 0.652 | 1.301 | 0.035 | 0.054 | 0.769 | 0.088 | 0.612 | 50 |
| 215 | 0.266 | 1.019 | -0.208 | 0.130 | 0.982 | 0.227 | 0.348 | 37 |
| 216 | 0.188 | 0.489 | 0.005 | 0.058 | 2.045 | 0.101 | 0.916 | 40 |
| 217 | 0.381 | 0.700 | -0.018 | 0.088 | 1.429 | 0.110 | 0.782 | 49 |
| 218 | 0.008 | 0.807 | -0.372 | 0.204 | 1.239 | 0.240 | 0.358 | 50 |
| 219 | 0.491 | 1.124 | 0.065 | 0.030 | 0.890 | 0.063 | 0.837 | 41 |
| 301 | 0.397 | 0.904 | 0.036 | 0.057 | 1.107 | 0.094 | 0.745 | 49 |
| 302 | 0.136 | 0.370 | 0.081 | 0.086 | 2.701 | 0.243 | 0.765 | 40 |
| 303 | 0.376 | 1.011 | 0.004 | 0.003 | 0.989 | 0.005 | 0.999 | 46 |
| 304 | 32.275 | 132.740 | -0.001 | 0.001 | 0.008 | 0.002 | 0.219 | 50 |
| 305 | 0.335 | 0.562 | 0.082 | 0.122 | 1.779 | 0.151 | 0.744 | 50 |
| 306 | 1.691 | 3.318 | 0.076 | 0.035 | 0.301 | 0.046 | 0.476 | 50 |
| 308 | 0.497 | 1.231 | -0.087 | 0.061 | 0.812 | 0.083 | 0.673 | 49 |
| 309 | 0.343 | 0.674 | -0.112 | 0.060 | 1.483 | 0.099 | 0.825 | 50 |
| 312 | 0.384 | 1.434 | 0.158 | 0.062 | 0.697 | 0.120 | 0.446 | 44 |
| 313 | 0.377 | 0.827 | -0.040 | 0.050 | 1.210 | 0.070 | 0.864 | 49 |
| 314 | 0.074 | 5.448 | 0.004 | 0.021 | 0.184 | 0.103 | 0.122 | 25 |
| 315 | 0.397 | 0.795 | 0.004 | 0.121 | 1.258 | 0.153 | 0.586 | 50 |
| 316 | 0.580 | 1.285 | 0.063 | 0.050 | 0.779 | 0.075 | 0.692 | 50 |
| 317 | 0.583 | 1.249 | -0.050 | 0.025 | 0.801 | 0.040 | 0.895 | 50 |
| 318 | 0.114 | 0.492 | -0.112 | 0.093 | 2.034 | 0.177 | 0.819 | 31 |
| 319 | 0.241 | 0.742 | 0.089 | 0.108 | 1.348 | 0.170 | 0.662 | 34 |
| 320 | 0.008 | 0.797 | 0.047 | 0.209 | 1.255 | 0.268 | 0.314 | 50 |
| 322 | 0.380 | 0.756 | 0.121 | 0.146 | 1.322 | 0.167 | 0.568 | 50 |
| 323 | 0.777 | 1.588 | 0.066 | 0.059 | 0.630 | 0.074 | 0.599 | 50 |

| ID | $r(1)$ | $\rho$ (OLS) | α | Std($\alpha$) | $\beta$ | Std($\beta$) | $R^2$ | #obs. |
|---|---|---|---|---|---|---|---|---|
| 326 | 0.334 | 0.895 | -0.050 | 0.061 | 1.118 | 0.127 | 0.627 | 48 |
| 327 | 0.483 | 0.924 | 0.178 | 0.097 | 1.083 | 0.126 | 0.607 | 50 |
| 401 | 0.375 | 0.706 | 0.180 | 0.113 | 1.417 | 0.158 | 0.626 | 50 |
| 402 | 0.228 | 0.660 | 0.290 | 0.056 | 1.515 | 0.079 | 0.896 | 45 |
| 403 | 0.164 | 0.579 | 0.362 | 0.076 | 1.726 | 0.130 | 0.824 | 40 |
| 404 | 1.358 | 2.601 | 0.059 | 0.093 | 0.384 | 0.145 | 0.128 | 50 |
| 405 | 0.321 | 0.630 | 0.242 | 0.083 | 1.588 | 0.099 | 0.846 | 49 |
| 407 | 1.933 | 2.479 | 0.461 | 0.042 | 0.403 | 0.053 | 0.543 | 50 |
| 408 | 0.741 | 2.544 | 0.634 | 0.054 | 0.393 | 0.060 | 0.469 | 50 |
| 409 | 0.441 | 0.875 | 0.682 | 0.079 | 1.143 | 0.099 | 0.737 | 50 |
| 410 | 0.573 | 1.294 | 0.431 | 0.058 | 0.773 | 0.071 | 0.710 | 50 |
| 411 | 0.250 | 0.633 | 1.194 | 0.042 | 1.579 | 0.134 | 0.823 | 32 |
| 412 | 0.233 | 0.439 | 0.199 | 0.109 | 2.277 | 0.182 | 0.801 | 41 |
| 413 | 0.490 | 3.707 | 0.464 | 0.031 | 0.270 | 0.049 | 0.412 | 45 |
| 414 | 0.334 | 0.732 | 0.331 | 0.077 | 1.365 | 0.113 | 0.757 | 49 |
| 415 | 0.059 | 0.458 | 0.638 | 0.212 | 2.181 | 0.749 | 0.298 | 22 |
| 416 | 0.451 | 1.018 | 0.600 | 0.040 | 0.983 | 0.057 | 0.862 | 50 |
| 417 | 0.216 | 0.505 | 0.199 | 0.062 | 1.981 | 0.117 | 0.862 | 48 |
| 501 | 0.315 | 0.822 | -0.189 | 0.060 | 1.216 | 0.103 | 0.749 | 49 |
| 502 | 0.927 | 1.896 | -0.060 | 0.059 | 0.528 | 0.072 | 0.527 | 50 |
| 503 | 0.270 | 0.620 | -0.411 | 0.068 | 1.614 | 0.231 | 0.596 | 35 |
| 505 | 0.323 | 0.531 | -0.772 | 0.084 | 1.884 | 0.123 | 0.849 | 44 |
| 506 | 0.168 | 0.547 | 0.002 | 0.131 | 1.828 | 0.194 | 0.707 | 39 |
| 507 | 0.207 | 0.683 | -0.121 | 0.097 | 1.465 | 0.156 | 0.667 | 46 |
| 509 | 0.519 | 1.090 | -0.084 | 0.047 | 0.918 | 0.068 | 0.790 | 50 |
| 510 | 0.360 | 0.648 | -0.363 | 0.099 | 1.544 | 0.106 | 0.814 | 50 |
| 511 | 0.495 | 1.202 | -0.255 | 0.084 | 0.832 | 0.093 | 0.631 | 49 |
| 512 | 0.420 | 0.944 | -0.329 | 0.068 | 1.059 | 0.097 | 0.723 | 48 |
| 513 | 0.563 | 1.088 | -0.200 | 0.069 | 0.919 | 0.087 | 0.699 | 50 |
| 514 | 0.382 | 0.764 | -0.900 | 0.069 | 1.308 | 0.092 | 0.807 | 50 |
| 515 | 1.894 | 5.158 | -0.478 | 0.032 | 0.194 | 0.036 | 0.382 | 50 |
| 516 | 2.919 | 4.672 | -0.391 | 0.022 | 0.214 | 0.031 | 0.492 | 50 |
| 517 | 0.145 | 0.345 | -0.149 | 0.246 | 2.897 | 0.401 | 0.537 | 47 |
| 518 | 0.373 | 0.829 | -0.504 | 0.113 | 1.207 | 0.172 | 0.518 | 48 |
| 519 | 0.455 | 1.725 | -0.923 | 0.077 | 0.580 | 0.133 | 0.306 | 45 |
| 520 | 0.125 | 0.477 | -0.611 | 0.113 | 2.098 | 0.171 | 0.820 | 35 |
| 601 | 0.040 | 0.542 | -0.877 | 0.111 | 1.846 | 0.482 | 0.495 | 17 |
| 602 | 0.349 | 0.815 | -0.010 | 0.091 | 1.227 | 0.118 | 0.696 | 49 |
| 604 | 0.538 | 0.991 | -0.730 | 0.025 | 1.009 | 0.034 | 0.949 | 50 |

| ID | $r(1)$ | $\rho$ (OLS) | $\alpha$ | Std($\alpha$) | $\beta$ | Std($\beta$) | $R^2$ | #obs. |
|---|---|---|---|---|---|---|---|---|
| 605 | 0.293 | 0.597 | -0.328 | 0.115 | 1.674 | 0.129 | 0.778 | 50 |
| 606 | 1.758 | 3.455 | -0.020 | 0.083 | 0.289 | 0.128 | 0.096 | 50 |
| 607 | 0.935 | 5.569 | -0.394 | 0.100 | 0.180 | 0.128 | 0.039 | 50 |
| 608 | 0.371 | 1.426 | -0.473 | 0.148 | 0.701 | 0.202 | 0.215 | 46 |
| 609 | 0.183 | 0.498 | -0.204 | 0.117 | 2.007 | 0.288 | 0.543 | 43 |

## Appendix VII

### Constant absolute risk aversion (CARA)

| ID | $\alpha$ | Std($\alpha$) | $A$ | Std($A$) | $R^2$ | $RRA$ | Mean $x$ |
|---|---|---|---|---|---|---|---|
| 201 | 1.067 | 0.091 | 0.019 | 0.005 | 0.608 | 0.576 | 30.518 |
| 202 | 1.000 | 0.030 | 0.046 | 0.006 | 0.517 | 1.415 | 30.450 |
| 203 | 2.772 | 0.895 | 0.003 | 0.020 | 0.730 | 0.093 | 32.834 |
| 204 | 1.000 | 0.870 | 0.056 | 0.047 | 0.288 | 1.846 | 33.022 |
| 205 | 1.002 | 0.001 | 0.000 | 0.016 | 0.582 | 0.001 | 38.530 |
| 206 | 1.000 | 0.000 | 0.129 | 0.036 | 0.195 | 3.839 | 29.798 |
| 207 | 1.029 | 0.050 | 0.010 | 0.001 | 0.858 | 0.390 | 37.216 |
| 208 | 1.000 | 0.073 | 0.029 | 0.003 | 0.642 | 1.020 | 35.542 |
| 209 | 1.000 | 0.017 | 0.024 | 0.003 | 0.586 | 0.821 | 34.720 |
| 210 | 1.000 | 0.219 | 0.221 | 0.099 | 0.274 | 6.390 | 28.864 |
| 211 | 1.000 | 0.140 | 0.043 | 1.666E-02 | 0.157 | 1.367 | 31.478 |
| 212 | 1.000 | 0.111 | 0.037 | 0.006 | 0.627 | 1.217 | 32.830 |
| 213 | 1.000 | 0.259 | 0.030 | 0.008 | 0.566 | 1.140 | 37.560 |
| 214 | 1.000 | 0.000 | 0.051 | 0.008 | 0.449 | 1.700 | 33.130 |
| 215 | 1.443 | 0.324 | 0.009 | 0.005 | 0.705 | 0.388 | 42.890 |
| 216 | 1.000 | 0.000 | 0.016 | 0.002 | 0.927 | 0.612 | 37.686 |
| 217 | 1.083 | 0.100 | 0.028 | 0.005 | 0.762 | 0.958 | 33.920 |
| 218 | 1.000 | 0.005 | 0.034 | 0.018 | 0.227 | 1.331 | 39.150 |
| 219 | 1.051 | 0.080 | 0.025 | 0.004 | 0.875 | 0.798 | 31.668 |
| 301 | 1.000 | 0.044 | 0.034 | 0.006 | 0.764 | 1.171 | 34.684 |
| 302 | 1.000 | 0.010 | 0.011 | 0.001 | 0.863 | 0.419 | 39.238 |
| 303 | 1.000 | 0.058 | 0.033 | 0.004 | 0.886 | 1.082 | 33.180 |
| 304 | 1.299 | 0.355 | 4.159 | 8.121E+14 | 0.124 | 141.050 | 33.912 |
| 305 | 1.000 | 0.124 | 0.029 | 0.004 | 0.743 | 0.121 | 33.780 |
| 306 | 1.000 | 0.003 | 0.144 | 0.039 | 0.335 | 1.144 | 29.278 |
| 307 | 1.066 | 0.089 | 0.006 | 0.002 | 0.890 | 0.110 | 45.100 |
| 308 | 1.929 | 0.291 | 0.023 | 0.009 | 0.776 | 0.283 | 31.368 |
| 309 | 1.000 | 0.002 | 0.026 | 0.003 | 0.682 | 0.119 | 36.470 |
| 310 | 1.000 | 0.103 | 0.114 | 0.035 | 0.194 | 1.124 | 32.268 |
| 311 | 1.049 | 0.089 | 0.006 | 0.002 | 0.800 | 0.084 | 35.176 |
| 312 | 1.261 | 0.481 | 0.023 | 0.009 | 0.696 | 0.282 | 31.806 |
| 313 | 1.000 | 0.007 | 0.036 | 0.004 | 0.847 | 0.120 | 31.968 |
| 314 | 1.152 | 0.129 | 0.004 | 0.003 | 0.885 | 0.106 | 42.018 |
| 315 | 1.000 | 0.000 | 0.032 | 0.006 | 0.475 | 0.176 | 31.932 |
| 316 | 1.415 | 0.139 | 0.038 | 0.020 | 0.723 | 0.675 | 33.786 |
| 317 | 1.000 | 0.005 | 0.050 | 0.004 | 0.877 | 0.125 | 35.594 |

| ID | $\alpha$ | Std($\alpha$) | $A$ | Std($A$) | $R^2$ | $RRA$ | Mean $x$ |
|---|---|---|---|---|---|---|---|
| 318 | 1.077 | 0.087 | 0.009 | 0.003 | 0.874 | 0.308 | 36.008 |
| 319 | 1.024 | 0.058 | 0.021 | 0.002 | 0.870 | 0.707 | 33.332 |
| 320 | 1.000 | 0.003 | 0.032 | 0.018 | 0.219 | 1.186 | 36.626 |
| 321 | 1.000 | 0.002 | 0.071 | 0.016 | 0.230 | 2.227 | 31.404 |
| 322 | 1.000 | 0.002 | 0.035 | 0.005 | 0.488 | 1.172 | 33.422 |
| 323 | 1.000 | 0.000 | 0.064 | 0.011 | 0.432 | 1.812 | 28.276 |
| 324 | 1.000 | 0.114 | 0.013 | 0.003 | 0.614 | 0.600 | 47.072 |
| 325 | 1.000 | 0.106 | 0.028 | 0.005 | 0.390 | 0.914 | 33.128 |
| 326 | 1.140 | 0.082 | 0.028 | 0.007 | 0.757 | 1.049 | 37.804 |
| 327 | 1.000 | 0.004 | 0.039 | 0.007 | 0.464 | 1.272 | 32.988 |
| 328 | 1.000 | 0.142 | 0.024 | 0.009 | 0.372 | 0.737 | 30.232 |
| 401 | 1.005 | 0.071 | 0.037 | 0.004 | 0.530 | 1.111 | 30.428 |
| 402 | 1.000 | 0.031 | 0.024 | 0.002 | 0.774 | 0.760 | 31.394 |
| 403 | 1.000 | 0.026 | 0.019 | 0.002 | 0.818 | 0.581 | 29.940 |
| 404 | 1.000 | 0.232 | 0.112 | 8.121E+14 | 0.063 | 3.569 | 31.974 |
| 405 | 1.036 | 0.067 | 0.028 | 0.005 | 0.737 | 0.809 | 29.282 |
| 406 | 1.375 | 0.339 | 0.085 | 1.809E+15 | 0.079 | 2.446 | 28.716 |
| 407 | 1.000 | 0.061 | 0.159 | 1.147E+15 | 0.072 | 3.762 | 23.684 |
| 408 | 1.787 | 0.562 | 0.055 | 3.034E-02 | 0.161 | 1.167 | 21.298 |
| 409 | 1.000 | 0.173 | 0.042 | 0.007 | 0.352 | 0.911 | 21.522 |
| 410 | 1.000 | 0.033 | 0.049 | 0.006 | 0.431 | 1.119 | 22.628 |
| 411 | 1.197 | 0.142 | 0.008 | 0.003 | 0.643 | 0.176 | 21.564 |
| 412 | 1.315 | 0.140 | 0.005 | 0.004 | 0.827 | 0.188 | 35.378 |
| 413 | 4.771 | 1.625 | 0.002 | 0.046 | 0.634 | 0.039 | 23.530 |
| 414 | 1.000 | 0.062 | 0.032 | 0.004 | 0.634 | 0.918 | 29.044 |
| 415 | 1.332 | 0.132 | 0.000 | 0.003 | 0.802 | 0.000 | 35.004 |
| 416 | 1.123 | 0.172 | 0.036 | 0.007 | 0.440 | 0.790 | 22.058 |
| 417 | 1.000 | 0.001 | 0.015 | 0.003 | 0.788 | 0.475 | 31.122 |
| 501 | 1.000 | 0.003 | 0.034 | 0.006 | 0.522 | 1.219 | 35.726 |
| 502 | 1.000 | 0.071 | 0.085 | 0.020 | 0.441 | 2.665 | 31.354 |
| 503 | 1.472 | 0.145 | 0.003 | 0.002 | 0.886 | 0.141 | 46.664 |
| 504 | 1.193 | 0.433 | 0.024 | 0.009 | 0.225 | 1.255 | 52.670 |
| 505 | 1.428 | 0.232 | 0.014 | 0.004 | 0.691 | 0.593 | 42.060 |
| 506 | 1.000 | 0.009 | 0.010 | 0.005 | 0.596 | 0.398 | 39.532 |
| 507 | 1.000 | 0.037 | 0.022 | 0.005 | 0.639 | 0.773 | 35.802 |
| 508 | 1.003 | 0.003 | 0.000 | 0.000 | 0.961 | 0.001 | 35.892 |
| 509 | 1.000 | 0.057 | 0.050 | 0.006 | 0.722 | 1.619 | 32.442 |
| 510 | 1.000 | 0.198 | 0.031 | 0.005 | 0.710 | 1.041 | 33.694 |
| 511 | 1.000 | 0.017 | 0.050 | 0.008 | 0.414 | 1.827 | 36.214 |

| ID | $\alpha$ | Std($\alpha$) | $A$ | Std($A$) | $R^2$ | *RRA* | Mean $x$ |
|---|---|---|---|---|---|---|---|
| 512 | 1.096 | 0.267 | 0.029 | 0.006 | 0.669 | 1.181 | 40.214 |
| 513 | 1.000 | 0.011 | 0.051 | 0.009 | 0.482 | 1.678 | 33.022 |
| 514 | 1.000 | 0.196 | 0.029 | 0.006 | 0.387 | 1.403 | 47.722 |
| 515 | 1.060 | 0.428 | 0.196 | 8.121E+14 | 0.076 | 6.447 | 32.932 |
| 516 | 1.047 | 0.487 | 0.305 | 3.386E+15 | 0.024 | 11.358 | 37.258 |
| 517 | 1.000 | 0.037 | 0.007 | 0.002 | 0.666 | 0.271 | 41.264 |
| 518 | 1.346 | 0.164 | 0.022 | 0.005 | 0.556 | 0.917 | 42.064 |
| 519 | 1.000 | 0.021 | 0.031 | 0.007 | 0.318 | 1.514 | 48.892 |
| 520 | 1.110 | 0.095 | 0.006 | 0.004 | 0.701 | 0.226 | 39.314 |
| 601 | 1.000 | 0.048 | 0.004 | 0.002 | 0.692 | 0.230 | 51.758 |
| 602 | 1.000 | 0.006 | 0.034 | 0.004 | 0.671 | 1.136 | 33.444 |
| 603 | 1.000 | 0.231 | 0.040 | 1.147E+15 | 0.084 | 2.338 | 58.358 |
| 604 | 1.000 | 0.003 | 0.043 | 0.007 | 0.333 | 1.861 | 42.784 |
| 605 | 1.000 | 0.000 | 0.009 | 0.006 | 0.632 | 0.403 | 43.414 |
| 606 | 1.000 | 1.051 | 0.153 | 2.672E+15 | 0.092 | 4.689 | 30.668 |
| 607 | 1.506 | 0.270 | 0.080 | 2.545E+15 | 0.073 | 2.846 | 35.574 |
| 608 | 1.000 | 0.010 | 0.043 | 0.008 | 0.212 | 1.716 | 39.786 |
| 609 | 1.016 | 0.068 | 0.016 | 0.003 | 0.712 | 0.670 | 41.794 |

## Appendix VIII
## Maximum likelihood estimation (ML)

**Constant relative risk aversion (CRRA)** In order to have a well defined likelihood function, we need to define the error structure. To this end, we assume the power form $u(x) = x^{1-\rho}/(1-\rho)$ and consider the following stochastic utility function,

$$\min\left\{\alpha\frac{x_1^{1-\rho}}{1-\rho}e^{\varepsilon_1}+\frac{x_2^{1-\rho}}{1-\rho}e^{\varepsilon_2},\frac{x_1^{1-\rho}}{1-\rho}e^{\varepsilon_1}+\alpha\frac{x_2^{1-\rho}}{1-\rho}e^{\varepsilon_2}\right\}.$$

Recall that the data generated by an individual's choices are $\left\{\left(\bar{x}_1^i, \bar{x}_2^i, x_1^i, x_2^i\right)\right\}_{i=1}^{50}$, where $\left(x_1^i, x_2^i\right)$ are the coordinates of the choice made by the subject and $\left(\bar{x}_1^i, \bar{x}_2^i\right)$ are the endpoints of the budget constraint, (so we can calculate the relative prices $p_1^i/p_2^i = \bar{x}_2^i/\bar{x}_1^i$ for each observation $i$). The first-order conditions that must be satisfied at each observation $\left(\bar{x}_1^i, \bar{x}_2^i, x_1^i, x_2^i\right)$ can thus be written as follows:

$$\begin{aligned}
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &\geq \ln\alpha+\rho\ln\left(\frac{1}{\omega}\right)+\varepsilon^i \text{ for } \frac{x_1^i}{x_2^i}=\omega, \\
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &= \ln\alpha+\rho\ln\left(\frac{x_2^i}{x_1^i}\right)+\varepsilon^i \text{ for } \omega<\frac{x_1^i}{x_2^i}<1, \\
-\ln\alpha+\rho\ln\left(\frac{x_2^i}{x_1^i}\right)+\varepsilon^i &\leq \ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right)\leq\ln\alpha+\rho\ln\left(\frac{x_2^i}{x_1^i}\right)+\varepsilon^i \text{ for } \frac{x_1^i}{x_2^i}=1, \\
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &= -\ln\alpha+\rho\ln\left(\frac{x_2^i}{x_1^i}\right)+\varepsilon^i \text{ for } 1<\frac{x_1^i}{x_2^i}<\frac{1}{\omega}, \\
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &\leq -\ln\alpha+\rho\ln(\omega)+\varepsilon^i \text{ for } \frac{x_1^i}{x_2^i}=\frac{1}{\omega},
\end{aligned}$$

where $\varepsilon^i \equiv \varepsilon_2^i - \varepsilon_1^i$. When the first order condition is an equation, it defines a unique value of $\varepsilon^i$ that satisfies the expression and hence the likelihood $\varphi\left(\varepsilon^i\right)$ is well defined, where $\varphi\left(\cdot\right)$ is the p.d.f. of $\varepsilon^i$. When the first order condition is an inequality, there is an interval of values of $\left[\underline{\varepsilon}^i, \bar{\varepsilon}^i\right]$ that satisfy the first order condition and the probability $\Phi\left(\bar{\varepsilon}^i\right) - \Phi\left(\underline{\varepsilon}^i\right)$ is well defined, where $\Phi\left(\cdot\right)$ is the c.d.f. of $\varepsilon^i$. Further, we assume that $\varepsilon^i$ is distributed normally with mean zero and variance $\sigma^2$.

With these terms we can define the likelihood function:

$$\begin{aligned}
\mathcal{L}\left(\left\{\left(\bar{x}_1^i, \bar{x}_2^i, x_1^i, x_2^i\right)\right\}_{i=1}^{50}; a, \rho\right) &= \prod_{\frac{x_1^i}{x_2^i}=\omega} \Phi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) - \ln\alpha - \rho\ln\left(\frac{1}{\omega}\right)\right] \\
&\times \prod_{\omega<\frac{x_1^i}{x_2^i}<1} \varphi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) - \ln\alpha - \rho\ln\left(\frac{x_2^i}{x_1^i}\right)\right] \\
&\times \prod_{\frac{x_1^i}{x_2^i}=1} \left[\Phi\left[\ln\alpha + \rho\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right)\right] - \Phi\left[-\ln\alpha + \rho\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right)\right]\right] \\
&\times \prod_{1<\frac{x_1^i}{x_2^i}<\frac{1}{\omega}} \varphi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) + \ln\alpha - \rho\ln\left(\frac{x_2^i}{x_1^i}\right)\right] \\
&\times \prod_{\frac{x_1^i}{x_2^i}=\frac{1}{\omega}} 1 - \Phi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) + \ln\alpha - \rho\ln(\omega)\right].
\end{aligned}$$

We incorporate the boundary observations $(\bar{x}_1, 0)$ or $(0, \bar{x}_2)$ into our estimation using strictly positive portfolios where the zero component is replaced by a small consumption level such that the demand ratio $x_1/x_2$ is either $1/\omega$ or $\omega$, respectively. The minimum ratio is chosen to be $\omega = 10^{-3}$. Table AVIII1 presents the CRRA results of the ML estimation for the full set of subjects. Table AVIII2 displays summary statistics, and compares the results of the ML and nonlinear least squares (NLLS) estimations.

*[Table AVIII1 here]*
*[Table AVIII2 here]*

**Constant absolute risk aversion (CARA)** We assume the exponential form $u(x) = -e^{-Ax}$ and consider the following stochastic utility function,

$$U(x_1, x_2; a, A) = \min\{-ae^{-Ax_1-\varepsilon_1} - e^{-Ax_2-\varepsilon_2}, -e^{-Ax_1-\varepsilon_1} - ae^{-Ax_2-\varepsilon_2}\}.$$

The first-order conditions that must be satisfied at each observation $\left(\bar{x}_1^i, \bar{x}_2^i, x_1^i, x_2^i\right)$ can be written as follows:

$$\begin{aligned}
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &\geq \ln a + A\bar{x}_2^i + \varepsilon^i \text{ for } 0 = x_1^i < x_2^i, \\
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &= \ln a + A\left(x_2^i - x_1^i\right) + \varepsilon^i \text{ for } 0 < x_1^i < x_2^i, \\
-\ln a + \varepsilon^i &\leq \ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) \leq \ln a + \varepsilon^i \text{ if } x_1^i = x_2^i, \\
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &= -\ln a + A\left(x_2^i - x_1^i\right) + \varepsilon^i \text{ for } x_1^i > x_2^i > 0, \\
\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) &\leq -\ln a - A\bar{x}_1^i + \varepsilon^i \text{ for } x_1^i > x_2^i = 0.
\end{aligned}$$

With these terms we can define the likelihood function:

$$\begin{aligned}
\mathcal{L}\left(\left\{\left(\bar{x}_1^i, \bar{x}_2^i, x_1^i, x_2^i\right)\right\}_{i=1}^{50}; a, A\right) &= \prod_{0=x_1^i<x_2^i} \Phi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) - \ln a - A\bar{x}_2^i\right] \\
&\times \prod_{0<x_1^i<x_2^i} \varphi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) - \ln a - A\left(x_2^i - x_1^i\right)\right] \\
&\times \prod_{x_1^i=x_2^i} \left[\Phi\left[\ln\alpha + \ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right)\right] - \Phi\left[-\ln\alpha + \ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right)\right]\right] \\
&\times \prod_{x_1^i>x_2^i>0} \varphi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) + \ln a - A\left(x_2^i - x_1^i\right)\right] \\
&\times \prod_{x_1^i>x_2^i=0} 1 - \Phi\left[\ln\left(\frac{\bar{x}_2^i}{\bar{x}_1^i}\right) + \ln a + A\bar{x}_1^i\right].
\end{aligned}$$

Table AVIII3 presents the CARA results of the ML estimation for the full set of subjects. Table AVIII4 displays summary statistics, and compares the results of the ML and NLLS estimations.

*[Table AVIII3 here]*
*[Table AVIII4 here]*

Table AVIII1: CRRA ML estimation

| ID | $\alpha$ | Std($\alpha$) | $\rho$ | Std($\rho$) | $\sigma$ | Log_lik |
|---|---|---|---|---|---|---|
| 201 | 1.737 | 0.198 | 0.102 | 0.050 | 0.471 | -33.298 |
| 202 | 1.267 | 0.131 | 0.540 | 0.139 | 0.454 | -33.810 |
| 203 | 1.496 | 0.103 | 0.000 | 0.015 | 0.469 | -34.210 |
| 204 | 1.596 | 0.142 | 0.000 | 0.000 | 0.569 | -43.318 |
| 205 | 1.000 | 0.000 | 0.000 | 0.000 | 0.004 | -2.161 |
| 206 | 1.746 | 0.131 | 0.000 | 0.025 | 0.429 | -31.145 |
| 207 | 1.672 | 0.145 | 0.022 | 0.033 | 0.310 | -13.525 |
| 208 | 1.209 | 0.073 | 0.341 | 0.042 | 0.364 | -24.471 |
| 209 | 1.700 | 0.114 | 0.066 | 0.064 | 0.358 | -20.335 |
| 210 | 2.924 | 0.370 | 0.000 | 0.041 | 0.500 | -20.776 |
| 211 | 1.377 | 0.132 | 0.000 | 2.5E-02 | 0.608 | -46.537 |
| 212 | 1.300 | 0.119 | 0.364 | 0.090 | 0.451 | -33.128 |
| 213 | 1.697 | 0.101 | 0.000 | 0.028 | 0.367 | -21.944 |
| 214 | 1.535 | 0.118 | 0.279 | 0.133 | 0.377 | -25.523 |
| 215 | 1.419 | 0.117 | 0.000 | 0.031 | 0.539 | -35.061 |
| 216 | 1.186 | 0.067 | 0.255 | 0.034 | 0.230 | -2.717 |
| 217 | 1.633 | 0.174 | 0.285 | 0.062 | 0.351 | -22.599 |
| 218 | 1.854 | 0.156 | 0.000 | 0.029 | 0.599 | -45.895 |
| 219 | 1.390 | 0.065 | 0.137 | 0.031 | 0.261 | -5.842 |
| 301 | 1.398 | 0.081 | 0.387 | 0.062 | 0.299 | -16.397 |
| 302 | 1.192 | 0.044 | 0.103 | 0.025 | 0.188 | 6.232 |
| 303 | 1.499 | 0.093 | 0.246 | 0.079 | 0.345 | -20.486 |
| 304 | 7.2E+03 | 1.7E+09 | 0.370 | 6.6E-02 | 0.771 | 0.000 |
| 305 | 1.520 | 0.126 | 0.243 | 0.059 | 0.378 | -24.368 |
| 306 | 1.703 | 0.235 | 0.472 | 0.281 | 0.540 | -42.207 |
| 307 | 1.355 | 0.067 | 0.000 | 0.000 | 0.166 | -12.881 |
| 308 | 3.414 | 0.515 | 0.000 | 0.102 | 0.509 | -16.593 |
| 309 | 1.147 | 0.058 | 0.453 | 0.065 | 0.280 | -13.710 |
| 310 | 1.929 | 0.193 | 0.000 | 0.092 | 0.662 | -49.812 |
| 311 | 1.391 | 0.080 | 0.000 | 0.000 | 0.182 | -17.148 |
| 312 | 1.644 | 0.141 | 0.063 | 0.057 | 0.432 | -29.981 |
| 313 | 1.263 | 0.071 | 0.466 | 0.102 | 0.286 | -10.664 |
| 314 | 1.287 | 0.058 | 0.000 | 0.000 | 0.179 | -8.202 |
| 315 | 1.595 | 0.204 | 0.195 | 0.086 | 0.513 | -38.510 |
| 316 | 2.749 | 0.618 | 0.223 | 0.166 | 0.376 | -10.254 |
| 317 | 1.177 | 0.042 | 0.901 | 0.069 | 0.191 | 5.470 |

| ID | $\alpha$ | Std($\alpha$) | $\rho$ | Std($\rho$) | $\sigma$ | Log_lik |
|---|---|---|---|---|---|---|
| 318 | 1.612 | 0.099 | 0.000 | 0.009 | 0.291 | -11.953 |
| 319 | 1.5271 | 0.1224 | 0.0762 | 0.0456 | 0.3931 | -19.821 |
| 320 | 1.022 | 0.023 | 0.000 | 0.001 | 0.202 | -12.417 |
| 321 | 2.564 | 0.308 | 0.000 | 0.032 | 0.686 | -43.976 |
| 322 | 1.485 | 0.131 | 0.254 | 0.083 | 0.524 | -39.095 |
| 323 | 1.629 | 0.198 | 0.383 | 0.155 | 0.478 | -34.686 |
| 324 | 1.455 | 0.124 | 0.000 | 0.000 | 0.445 | -31.919 |
| 325 | 1.872 | 0.161 | 0.000 | 0.000 | 0.569 | -36.295 |
| 326 | 1.566 | 0.083 | 0.158 | 0.108 | 0.239 | -7.804 |
| 327 | 1.901 | 0.251 | 0.082 | 0.104 | 0.526 | -37.594 |
| 328 | 2.169 | 0.258 | 0.000 | 0.000 | 0.557 | -32.030 |
| 401 | 1.108 | 0.073 | 0.376 | 0.074 | 0.452 | -32.856 |
| 402 | 1.346 | 0.134 | 0.188 | 0.086 | 0.408 | -27.310 |
| 403 | 1.255 | 0.091 | 0.135 | 0.067 | 0.390 | -22.482 |
| 404 | 1.172 | 0.092 | 0.145 | 0.153 | 0.632 | -51.468 |
| 405 | 1.202 | 0.088 | 0.397 | 0.050 | 0.386 | -26.395 |
| 406 | 1.437 | 0.127 | 0.000 | 0.047 | 0.695 | -54.193 |
| 407 | 1.239 | 0.143 | 0.176 | 0.199 | 0.784 | -62.199 |
| 408 | 1.155 | 0.118 | 0.380 | 0.176 | 0.800 | -62.311 |
| 409 | 1.000 | 0.000 | 0.457 | 0.062 | 0.547 | -40.756 |
| 410 | 1.000 | 0.053 | 0.691 | 0.080 | 0.516 | -37.868 |
| 411 | 1.000 | 0.000 | 0.047 | 0.026 | 0.296 | -7.482 |
| 412 | 1.155 | 0.096 | 0.164 | 0.072 | 0.409 | -26.765 |
| 413 | 1.075 | 0.073 | 0.048 | 0.081 | 0.631 | -45.415 |
| 414 | 1.109 | 0.062 | 0.401 | 0.091 | 0.400 | -28.779 |
| 415 | 1.076 | 0.044 | 0.000 | 0.001 | 0.273 | -11.217 |
| 416 | 1.000 | 0.000 | 0.533 | 0.056 | 0.453 | -31.389 |
| 417 | 1.000 | 0.030 | 0.403 | 0.047 | 0.227 | 1.856 |
| 501 | 1.253 | 0.078 | 0.335 | 0.101 | 0.329 | -18.405 |
| 502 | 1.936 | 0.311 | 0.310 | 0.177 | 0.561 | -41.182 |
| 503 | 1.135 | 0.052 | 0.035 | 0.033 | 0.255 | -3.867 |
| 504 | 1.000 | 0.061 | 0.115 | 0.041 | 0.623 | -46.354 |
| 505 | 1.000 | 0.044 | 0.273 | 0.040 | 0.468 | -32.542 |
| 506 | 1.714 | 0.116 | 0.000 | 0.025 | 0.459 | -31.670 |
| 507 | 1.282 | 0.111 | 0.175 | 0.087 | 0.404 | -26.630 |
| 508 | 1.000 | 0.004 | 0.000 | 0.000 | 0.018 | -1.875 |
| 509 | 1.211 | 0.072 | 0.674 | 0.085 | 0.313 | -16.094 |
| 510 | 1.240 | 0.106 | 0.411 | 0.045 | 0.459 | -34.829 |
| 511 | 1.725 | 0.173 | 0.218 | 0.118 | 0.577 | -43.279 |

| ID | $\alpha$ | Std($\alpha$) | $\rho$ | Std($\rho$) | $\sigma$ | Log_lik |
|---|---|---|---|---|---|---|
| 512 | 1.569 | 0.124 | 0.233 | 0.086 | 0.508 | -38.865 |
| 513 | 1.320 | 0.159 | 0.477 | 0.133 | 0.471 | -35.505 |
| 514 | 1.000 | 0.000 | 0.366 | 0.050 | 0.515 | -37.726 |
| 515 | 1.067 | 0.074 | 0.494 | 0.239 | 0.835 | -63.991 |
| 516 | 1.242 | 0.139 | 0.000 | 0.086 | 0.713 | -57.577 |
| 517 | 1.198 | 0.159 | 0.109 | 0.052 | 0.413 | -25.961 |
| 518 | 1.193 | 0.094 | 0.272 | 0.082 | 0.526 | -41.748 |
| 519 | 1.117 | 0.108 | 0.071 | 0.056 | 0.553 | -39.230 |
| 520 | 1.462 | 0.128 | 0.000 | 0.033 | 0.500 | -31.365 |
| 601 | 1.043 | 0.027 | 0.000 | 0.000 | 0.219 | -8.631 |
| 602 | 1.308 | 0.103 | 0.375 | 0.083 | 0.410 | -27.791 |
| 603 | 1.000 | 0.000 | 0.000 | 0.000 | 25.532 | -34.642 |
| 604 | 1.141 | 0.095 | 0.385 | 0.085 | 0.571 | -46.962 |
| 605 | 1.000 | 0.000 | 0.444 | 0.046 | 0.439 | -29.735 |
| 606 | 2.662 | 0.434 | 0.000 | 0.022 | 0.820 | -43.676 |
| 607 | 1.280 | 0.159 | 0.000 | 0.124 | 0.774 | -59.579 |
| 608 | 1.920 | 0.186 | 0.000 | 0.006 | 0.581 | -41.397 |
| 609 | 1.242 | 0.055 | 0.120 | 0.038 | 0.291 | -12.707 |

Table AVIII2: Summary statistics of individual-level CRRA estimation

ML and NLLS

ML

| $\alpha$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 1.423 | 1.602 | 1.266 |
| Std | 0.432 | 0.474 | 0.323 |
| p5 | 1.000 | 1.355 | 1.075 |
| p25 | 1.155 | 1.177 | 1.000 |
| p50 | 1.287 | 1.520 | 1.196 |
| p75 | 1.595 | 1.644 | 1.282 |
| p95 | 2.662 | 2.924 | 1.920 |

| $\rho$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 0.219 | 0.189 | 0.246 |
| Std | 0.202 | 0.207 | 0.196 |
| p5 | 0.000 | 0.000 | 0.048 |
| p25 | 0.000 | 0.000 | 0.000 |
| p50 | 0.188 | 0.137 | 0.226 |
| p75 | 0.380 | 0.285 | 0.397 |
| p95 | 0.540 | 0.540 | 0.533 |

NLLS

| $\alpha$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 1.315 | 1.390 | 1.248 |
| Std | 0.493 | 0.584 | 0.388 |
| p5 | 1.000 | 1.000 | 1.000 |
| p25 | 1.000 | 1.000 | 1.000 |
| p50 | 1.115 | 1.179 | 1.083 |
| p75 | 1.445 | 1.477 | 1.297 |
| p95 | 2.427 | 2.876 | 2.333 |

| $\rho$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 1.662 | 2.448 | 0.950 |
| Std | 7.437 | 10.736 | 1.206 |
| p5 | 0.053 | 0.048 | 0.080 |
| p25 | 0.233 | 0.165 | 0.290 |
| p50 | 0.481 | 0.438 | 0.573 |
| p75 | 0.880 | 0.794 | 0.990 |
| p95 | 3.803 | 3.871 | 3.693 |

We omit the nine subjects with CCEI scores below 0.80 (ID 201, 211, 310, 321, 325, 328, 406, 504 and 603), the three subjects (ID 205, 218 and 320) who almost always chose a minimum level of consumption of ten tokens in each state, the subject (ID 508) who almost always chose a boundary portfolio, and the subject (ID 304) who always chose nearly safe portfolios.

Table AVIII3: CARA ML estimation

| ID | $\alpha$ | Std($\alpha$) | $A$ | Std($\rho$) | $\sigma$ | Log_lik |
|---|---|---|---|---|---|---|
| 201 | 1.770 | 0.207 | 0.004 | 0.003 | 0.483 | -34.096 |
| 202 | 1.491 | 0.178 | 0.012 | 0.006 | 0.553 | -42.138 |
| 203 | 1.496 | 0.108 | 0.000 | 0.001 | 0.469 | -34.210 |
| 204 | 1.596 | 0.137 | 0.000 | 0.000 | 0.569 | -43.318 |
| 205 | 1.145 | 0.000 | 0.135 | 0.000 | 0.135 | -2302.6 |
| 206 | 1.746 | 0.131 | 0.000 | 0.000 | 0.429 | -31.145 |
| 207 | 1.573 | 15.876 | 0.000 | 0.096 | 0.190 | -0.073 |
| 208 | 1.294 | 0.167 | 0.010 | 0.075 | 0.437 | -31.267 |
| 209 | 1.765 | 1.463 | 0.001 | 0.025 | 0.368 | -20.725 |
| 210 | 2.924 | 0.324 | 0.000 | 0.000 | 0.500 | -20.775 |
| 211 | 1.377 | 0.116 | 0.000 | 5.9E-04 | 0.608 | -46.537 |
| 212 | 1.290 | 0.139 | 0.014 | 0.004 | 0.485 | -35.718 |
| 213 | 1.697 | 0.116 | 0.000 | 0.000 | 0.367 | -21.944 |
| 214 | 1.760 | 0.473 | 0.000 | 0.012 | 0.413 | -27.406 |
| 215 | 1.419 | 1.220 | 0.000 | 0.027 | 0.539 | -35.061 |
| 216 | 1.097 | 0.232 | 0.013 | 0.097 | 0.244 | -2.990 |
| 217 | 1.733 | 0.203 | 0.010 | 0.004 | 0.416 | -28.160 |
| 218 | 1.854 | 1.256 | 0.000 | 0.144 | 0.599 | -45.895 |
| 219 | 1.287 | 0.074 | 0.012 | 0.003 | 0.242 | -3.294 |
| 301 | 1.423 | 0.105 | 0.014 | 0.004 | 0.340 | -21.456 |
| 302 | 1.131 | 0.042 | 0.005 | 0.001 | 0.178 | 9.010 |
| 303 | 1.259 | 0.078 | 0.021 | 0.005 | 0.265 | -11.086 |
| 304 | 8.7E+07 | 1.1E+09 | 0.357 | 1.1E-01 | 1.845 | 0.000 |
| 305 | 1.529 | 1.521 | 0.011 | 0.034 | 0.414 | -28.695 |
| 306 | 1.871 | 0.195 | 0.002 | 0.009 | 0.565 | -43.379 |
| 307 | 22.331 | 22.390 | 0.205 | 0.097 | 0.107 | -1519.7 |
| 308 | 3.408 | 1.637 | 0.000 | 0.039 | 0.508 | -16.593 |
| 309 | 1.245 | 0.120 | 0.012 | 0.043 | 0.364 | -24.604 |
| 310 | 1.929 | 9.879 | 0.000 | 0.021 | 0.662 | -49.812 |
| 311 | 8.146 | 948.780 | 0.266 | 0.041 | 0.078 | -1197.3 |
| 312 | 1.661 | 0.127 | 0.000 | 0.001 | 0.426 | -28.140 |
| 313 | 1.180 | 0.067 | 0.025 | 0.003 | 0.294 | -13.915 |
| 314 | 1.287 | 0.059 | 0.000 | 0.000 | 0.179 | -8.202 |
| 315 | 1.929 | 0.352 | 0.000 | 0.104 | 0.559 | -40.579 |
| 316 | 3.330 | 18.036 | 0.002 | 0.013 | 0.447 | -11.080 |
| 317 | 1.135 | 0.045 | 0.036 | 0.003 | 0.228 | -4.195 |

| ID | $\alpha$ | Std($\alpha$) | $A$ | Std($\rho$) | $\sigma$ | Log_lik |
|---|---|---|---|---|---|---|
| 318 | 1.612 | 0.968 | 0.000 | 0.110 | 0.291 | -11.953 |
| 319 | 1.4667 | 0.8425 | 0.0048 | 0.1086 | 0.3911 | -19.734 |
| 320 | 1.077 | 0.007 | 0.000 | 9.545 | 2.506 | -33.833 |
| 321 | 2.564 | 0.273 | 0.000 | 0.000 | 0.686 | -43.976 |
| 322 | 1.574 | 0.157 | 0.008 | 0.003 | 0.561 | -42.233 |
| 323 | 1.930 | 0.204 | 0.002 | 0.004 | 0.521 | -37.084 |
| 324 | 1.455 | 14.383 | 0.000 | 0.117 | 0.445 | -31.919 |
| 325 | 1.868 | 0.653 | 0.000 | 0.016 | 0.593 | -38.274 |
| 326 | 1.509 | 0.085 | 0.010 | 0.006 | 0.238 | -8.436 |
| 327 | 2.050 | 3.845 | 0.000 | 0.059 | 0.540 | -37.802 |
| 328 | 2.169 | 0.272 | 0.000 | 0.000 | 0.557 | -32.030 |
| 401 | 1.114 | 0.107 | 0.016 | 0.004 | 0.497 | -37.515 |
| 402 | 1.065 | 0.084 | 0.016 | 0.069 | 0.379 | -23.427 |
| 403 | 1.132 | 0.072 | 0.010 | 0.003 | 0.378 | -22.060 |
| 404 | 1.227 | 0.124 | 0.000 | 0.002 | 0.646 | -51.829 |
| 405 | 1.229 | 1.602 | 0.016 | 0.102 | 0.460 | -35.108 |
| 406 | 1.437 | 0.154 | 0.000 | 0.001 | 0.695 | -54.193 |
| 407 | 1.305 | 2.691 | 0.000 | 0.140 | 0.800 | -62.424 |
| 408 | 1.335 | 1.060 | 0.003 | 0.089 | 0.852 | -64.069 |
| 409 | 1.000 | 0.032 | 0.015 | 0.077 | 0.645 | -48.983 |
| 410 | 1.150 | 0.277 | 0.016 | 0.064 | 0.615 | -46.597 |
| 411 | 1.051 | 0.000 | 0.368 | 0.000 | 0.135 | -2302.6 |
| 412 | 1.083 | 0.069 | 0.009 | 0.002 | 0.390 | -24.925 |
| 413 | 1.069 | 0.071 | 0.003 | 0.037 | 0.630 | -45.377 |
| 414 | 1.103 | 0.221 | 0.016 | 0.085 | 0.441 | -32.902 |
| 415 | 1.076 | 0.089 | 0.000 | 0.031 | 0.273 | -11.217 |
| 416 | 1.000 | 0.020 | 0.017 | 0.049 | 0.539 | -40.046 |
| 417 | 1.000 | 0.061 | 0.014 | 0.142 | 0.275 | -6.291 |
| 501 | 1.511 | 0.110 | 0.002 | 0.003 | 0.400 | -25.484 |
| 502 | 2.165 | 0.314 | 0.002 | 0.006 | 0.604 | -42.509 |
| 503 | 1.111 | 0.756 | 0.002 | 0.100 | 0.252 | -3.687 |
| 504 | 1.000 | 0.047 | 0.005 | 0.114 | 0.618 | -45.959 |
| 505 | 1.000 | 0.022 | 0.013 | 0.002 | 0.482 | -32.260 |
| 506 | 1.655 | 0.174 | 0.000 | 0.109 | 0.432 | -28.562 |
| 507 | 1.270 | 1.690 | 0.007 | 0.130 | 0.417 | -27.602 |
| 508 | 1.051 | 0.000 | 0.368 | 0.000 | 0.135 | -2302.6 |
| 509 | 1.199 | 0.103 | 0.028 | 0.005 | 0.370 | -24.452 |
| 510 | 1.275 | 4.328 | 0.017 | 0.144 | 0.512 | -39.865 |
| 511 | 2.067 | 0.701 | 0.000 | 0.074 | 0.619 | -45.170 |

| ID | $\alpha$ | Std($\alpha$) | $A$ | Std($\rho$) | $\sigma$ | Log_lik |
|---|---|---|---|---|---|---|
| 512 | 1.610 | 0.171 | 0.008 | 0.004 | 0.535 | -40.113 |
| 513 | 1.637 | 0.240 | 0.006 | 0.005 | 0.543 | -41.054 |
| 514 | 1.000 | 0.072 | 0.012 | 0.175 | 0.582 | -43.844 |
| 515 | 1.113 | 0.134 | 0.010 | 0.007 | 0.867 | -65.332 |
| 516 | 1.242 | 0.126 | 0.000 | 0.176 | 0.713 | -57.577 |
| 517 | 1.433 | 0.174 | 0.001 | 0.174 | 0.427 | -27.158 |
| 518 | 1.218 | 0.116 | 0.008 | 0.021 | 0.537 | -41.326 |
| 519 | 1.104 | 0.064 | 0.003 | 0.179 | 0.552 | -39.079 |
| 520 | 1.462 | 1.613 | 0.000 | 0.099 | 0.500 | -31.365 |
| 601 | 1.043 | 0.294 | 0.000 | 0.108 | 0.219 | -8.631 |
| 602 | 1.326 | 0.132 | 0.014 | 0.004 | 0.462 | -33.040 |
| 603 | 1.051 | 0.000 | 0.368 | 0.000 | 0.135 | -2302.6 |
| 604 | 1.232 | 0.158 | 0.009 | 0.020 | 0.627 | -50.312 |
| 605 | 1.063 | 0.111 | 0.013 | 0.164 | 0.583 | -43.989 |
| 606 | 2.662 | 0.521 | 0.000 | 0.000 | 0.820 | -43.676 |
| 607 | 1.280 | 0.134 | 0.000 | 0.001 | 0.774 | -59.579 |
| 608 | 1.920 | 0.189 | 0.000 | 0.000 | 0.581 | -41.397 |
| 609 | 1.200 | 0.081 | 0.005 | 0.032 | 0.266 | -9.597 |

Table AVIII4: Summary statistics of individual-level CARA estimation
ML and NLLS

ML

| $\alpha$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 1.815 | 2.395 | 1.303 |
| Std | 2.501 | 3.573 | 0.353 |
| p5 | 1.000 | 1.294 | 1.076 |
| p25 | 1.132 | 1.131 | 1.000 |
| p50 | 1.305 | 1.573 | 1.209 |
| p75 | 1.655 | 1.765 | 1.335 |
| p95 | 3.330 | 8.146 | 2.067 |

NLLS

| $\alpha$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 1.154 | 1.121 | 1.182 |
| Std | 0.488 | 0.332 | 0.595 |
| p5 | 1.000 | 1.000 | 1.000 |
| p25 | 1.000 | 1.000 | 1.000 |
| p50 | 1.000 | 1.000 | 1.000 |
| p75 | 1.083 | 1.066 | 1.110 |
| p95 | 1.787 | 1.929 | 1.506 |

| $\rho$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 0.017 | 0.019 | 0.016 |
| Std | 0.055 | 0.054 | 0.056 |
| p5 | 0.000 | 0.000 | 0.000 |
| p25 | 0.000 | 0.000 | 0.000 |
| p50 | 0.005 | 0.002 | 0.008 |
| p75 | 0.013 | 0.012 | 0.014 |
| p95 | 0.036 | 0.205 | 0.017 |

| $A$ | All | $\pi$=1/2 | $\pi\neq$1/2 |
|---|---|---|---|
| Mean | 0.043 | 0.038 | 0.047 |
| Std | 0.052 | 0.042 | 0.059 |
| p5 | 0.003 | 0.004 | 0.003 |
| p25 | 0.014 | 0.016 | 0.014 |
| p50 | 0.029 | 0.029 | 0.031 |
| p75 | 0.046 | 0.038 | 0.050 |
| p95 | 0.159 | 0.144 | 0.159 |

We omit the nine subjects with CCEI scores below 0.80 (ID 201, 211, 310, 321, 325, 328, 406, 504 and 603), the three subjects (ID 205, 218 and 320) who almost always chose a minimum level of consumption of ten tokens in each state, the subject (ID 508) who almost always chose a boundary portfolio, and the subject (ID 304) who always chose nearly safe portfolios.