Plot_Proportion_Studies_0510

Lan Tao

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read data

```r
num_greedy_05_m30_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m30_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m30_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m30_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m30_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m30_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m30_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m30_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I


#-----------------------------------------------------------------------------

num_greedy_05_m50_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m50_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m50_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m50_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m50_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m50_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m50_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m50_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I


#-----------------------------------------------------------------------------

num_greedy_05_m70_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m70_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m70_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m70_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m70_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
num_patient_05_m70_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_I

num_greedy_05_m70_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_Re
```

```
num_patient_05_m70_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_

#------------------------------------------------------------------------------

num_greedy_05_m100_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_
num_patient_05_m100_pr2_11<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_

num_greedy_05_m100_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_
num_patient_05_m100_pr2_12<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_

num_greedy_05_m100_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_
num_patient_05_m100_pr2_13<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_

num_greedy_05_m100_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_
num_patient_05_m100_pr2_14<-read_excel("~/Desktop/Matching Market/Simulation/Simulation_0510/Simulation_
```

Part 1 - plot the loss

Market size m = 30

```
#--------------------------------------------------
T=1000

p1<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m30_pr2_11,col="red",size=0.1) +
  geom_point(data=num_patient_05_m30_pr2_11,col="blue",size=0.1) +
  ylim(0.15,0.25)+
  xlab("Time period")+
  labs(title = "m=30,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()

#--------------------------------------------------
p2<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m30_pr2_12,col="red",size=0.1) +
  geom_point(data=num_patient_05_m30_pr2_12,col="blue",size=0.1) +
  xlab("Time period")+
  #ylim(-0.01,0.01)+
  labs(title = "m=30,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()

#--------------------------------------------------
p3<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m30_pr2_13,col="red",size=0.1) +
  geom_point(data=num_patient_05_m30_pr2_13,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=30,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()

#--------------------------------------------------
p4<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m30_pr2_14,col="red",size=0.1) +
```
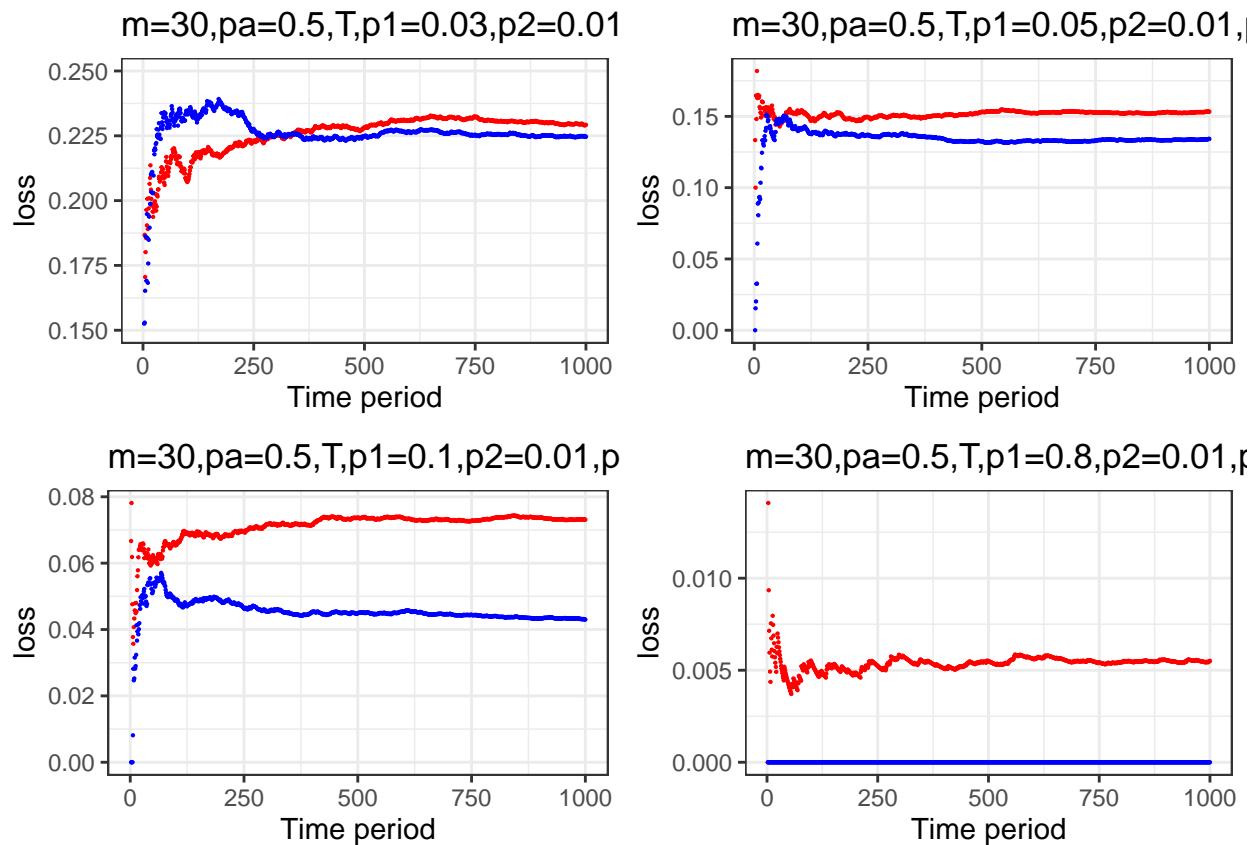
```
    geom_point(data=num_patient_05_m30_pr2_14,col="blue",size=0.1) +
    #ylim(-0.01,0.01)+
    xlab("Time period")+
    labs(title = "m=30,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
    theme_bw()

grid.arrange(p1,p2,p3,p4,nrow=2,ncol=2 )
```

```
## Warning: Removed 3 rows containing missing values (`geom_point()`).
## Removed 3 rows containing missing values (`geom_point()`).

## Warning: Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
```


Market size m = 50

```
#-----------------------------------------------
T=1000


p1<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m50_pr2_11,col="red",size=0.1) +
  geom_point(data=num_patient_05_m50_pr2_11,col="blue",size=0.1) +
```

```r
  #ylim(0.15,0.25)+
  xlab("Time period")+
  labs(title = "m=50,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------
p2<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m50_pr2_12,col="red",size=0.1) +
  geom_point(data=num_patient_05_m50_pr2_12,col="blue",size=0.1) +
  xlab("Time period")+
  #ylim(-0.01,0.01)+
  labs(title = "m=50,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------
p3<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m50_pr2_13,col="red",size=0.1) +
  geom_point(data=num_patient_05_m50_pr2_13,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=50,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------
p4<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m50_pr2_14,col="red",size=0.1) +
  geom_point(data=num_patient_05_m50_pr2_14,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=50,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()

grid.arrange(p1,p2,p3,p4,nrow=2,ncol=2 )
```

```
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
```

m=50,pa=0.5,T,p1=0.03,p2=0.01

m=50,pa=0.5,T,p1=0.05,p2=0.01,

m=50,pa=0.5,T,p1=0.1,p2=0.01,p

m=50,pa=0.5,T,p1=0.8,p2=0.01,p
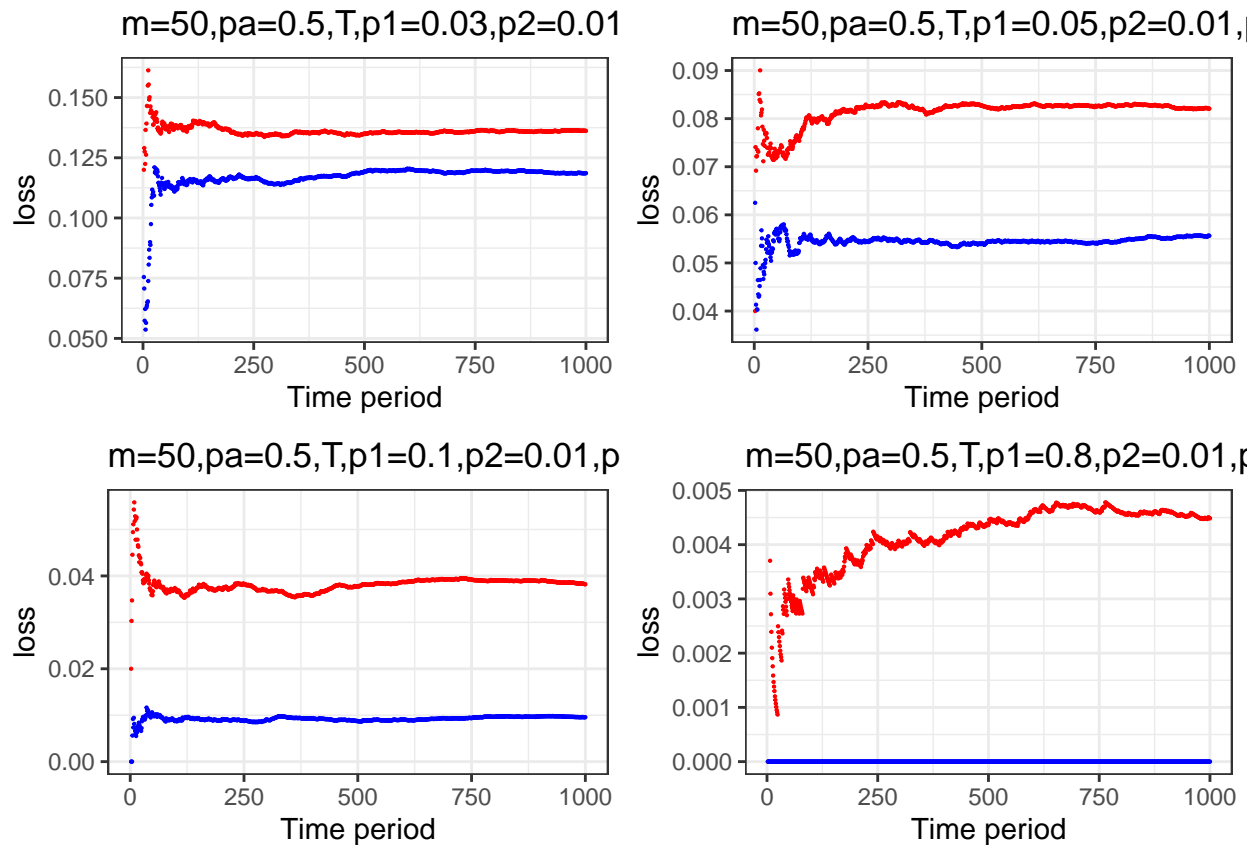
Market size m = 70

```
#-------------------------------------------------
T=1000

p1<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m70_pr2_11,col="red",size=0.1) +
  geom_point(data=num_patient_05_m70_pr2_11,col="blue",size=0.1) +
  #ylim(0.15,0.25)+
  xlab("Time period")+
  labs(title = "m=70,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()

#-------------------------------------------------
p2<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m70_pr2_12,col="red",size=0.1) +
  geom_point(data=num_patient_05_m70_pr2_12,col="blue",size=0.1) +
  xlab("Time period")+
  #ylim(-0.01,0.01)+
  labs(title = "m=70,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()

#-------------------------------------------------
p3<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m70_pr2_13,col="red",size=0.1) +
```

```
  geom_point(data=num_patient_05_m70_pr2_13,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=70,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()

#-------------------------------------------------
p4<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m70_pr2_14,col="red",size=0.1) +
  geom_point(data=num_patient_05_m70_pr2_14,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=70,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()

grid.arrange(p1,p2,p3,p4,nrow=2,ncol=2 )
```
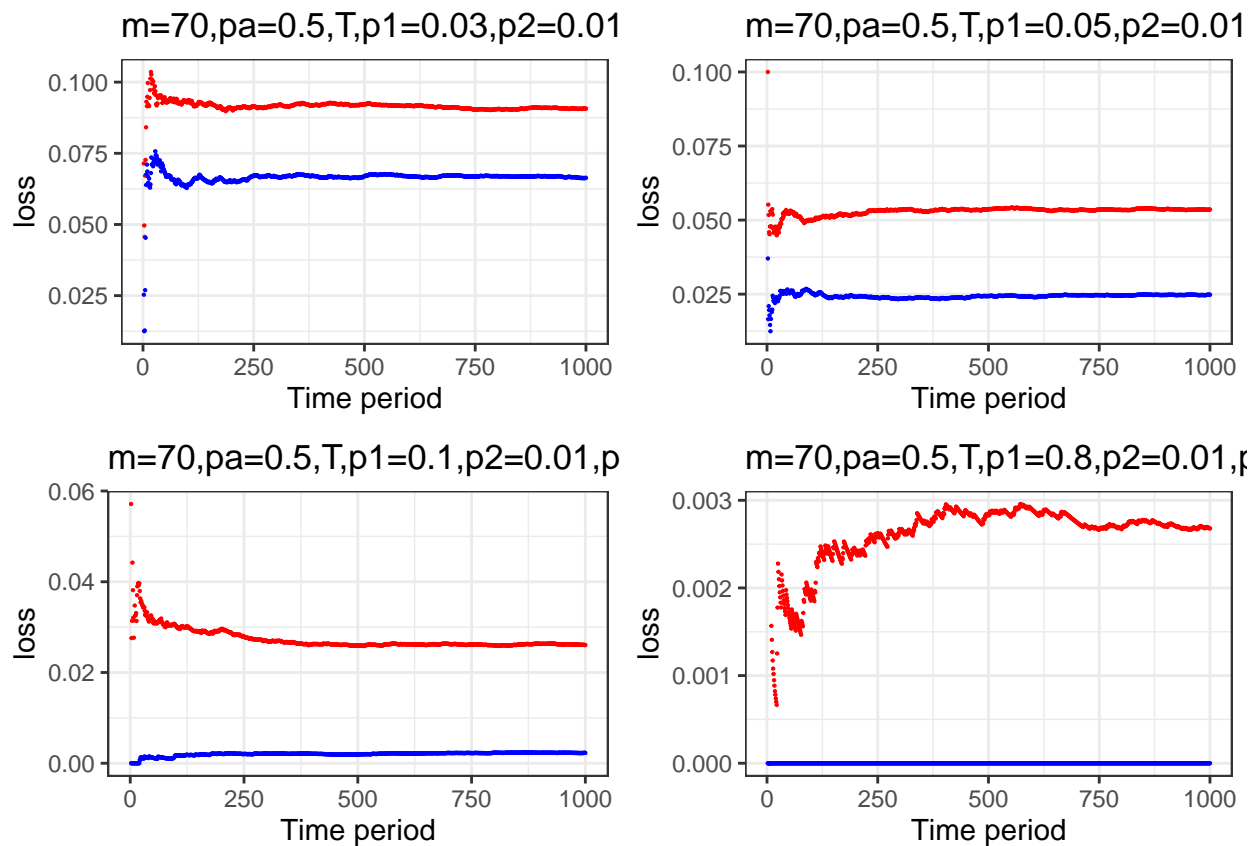
```
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
```

Market size m = 100

```r
#--------------------------------------------------
T=1000

p1<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m100_pr2_11,col="red",size=0.1) +
  geom_point(data=num_patient_05_m100_pr2_11,col="blue",size=0.1) +
  #ylim(0.15,0.25)+
  xlab("Time period")+
  labs(title = "m=100,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()

#--------------------------------------------------
p2<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m100_pr2_12,col="red",size=0.1) +
  geom_point(data=num_patient_05_m100_pr2_12,col="blue",size=0.1) +
  xlab("Time period")+
  #ylim(-0.01,0.01)+
  labs(title = "m=100,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()

#--------------------------------------------------
p3<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m100_pr2_13,col="red",size=0.1) +
  geom_point(data=num_patient_05_m100_pr2_13,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=100,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()

#--------------------------------------------------
p4<-ggplot(data = NULL, aes(x = c(1:T), y = loss)) +
  geom_point(data=num_greedy_05_m100_pr2_14,col="red",size=0.1) +
  geom_point(data=num_patient_05_m100_pr2_14,col="blue",size=0.1) +
  #ylim(-0.01,0.01)+
  xlab("Time period")+
  labs(title = "m=100,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()

grid.arrange(p1,p2,p3,p4,nrow=2,ncol=2 )
```

```
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).
```

```
#
```
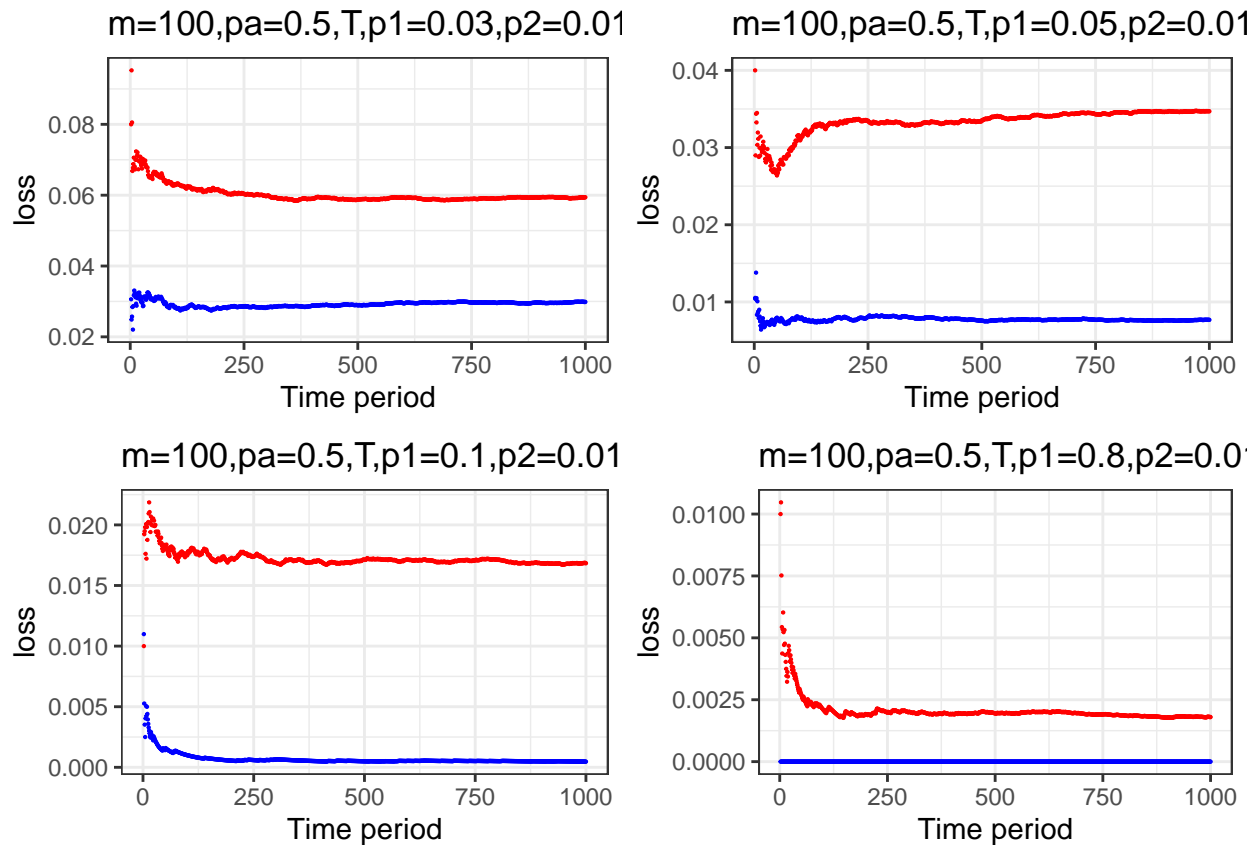
Part 2 - plot the distribution of proportion

2.1 Greedy algorithm plot

```r
p1 <- ggplot(num_greedy_05_m30_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=30,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m30_pr2_11,size=0.1) +
  ylim(0,4)+
  xlab("Time period")+
  labs(title = "Greedy - m=30,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()


#---------------------------------------------------------------------------

p3 <- ggplot(num_greedy_05_m30_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
```

```r
 labs(title = "Greedy - m=30,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m30_pr2_12,size=0.1) +
  ylim(0,5)+
  xlab("Time period")+
  labs(title = "Greedy - m=30,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()



#-------------------------------------------------------------------------------

p5 <- ggplot(num_greedy_05_m30_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=30,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m30_pr2_13,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  ylim(0,6)+
  labs(title = "Greedy - m=30,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()



#-------------------------------------------------------------------------------

p7 <- ggplot(num_greedy_05_m30_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=30,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()


p8 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m30_pr2_14,size=0.1) +
  xlab("Time period")+
  labs(title = "Greedy - m=30,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p3,p4,p6,p8,nrow=3,ncol=2 )
```

2.1.1 market size m = 30

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

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 2 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```
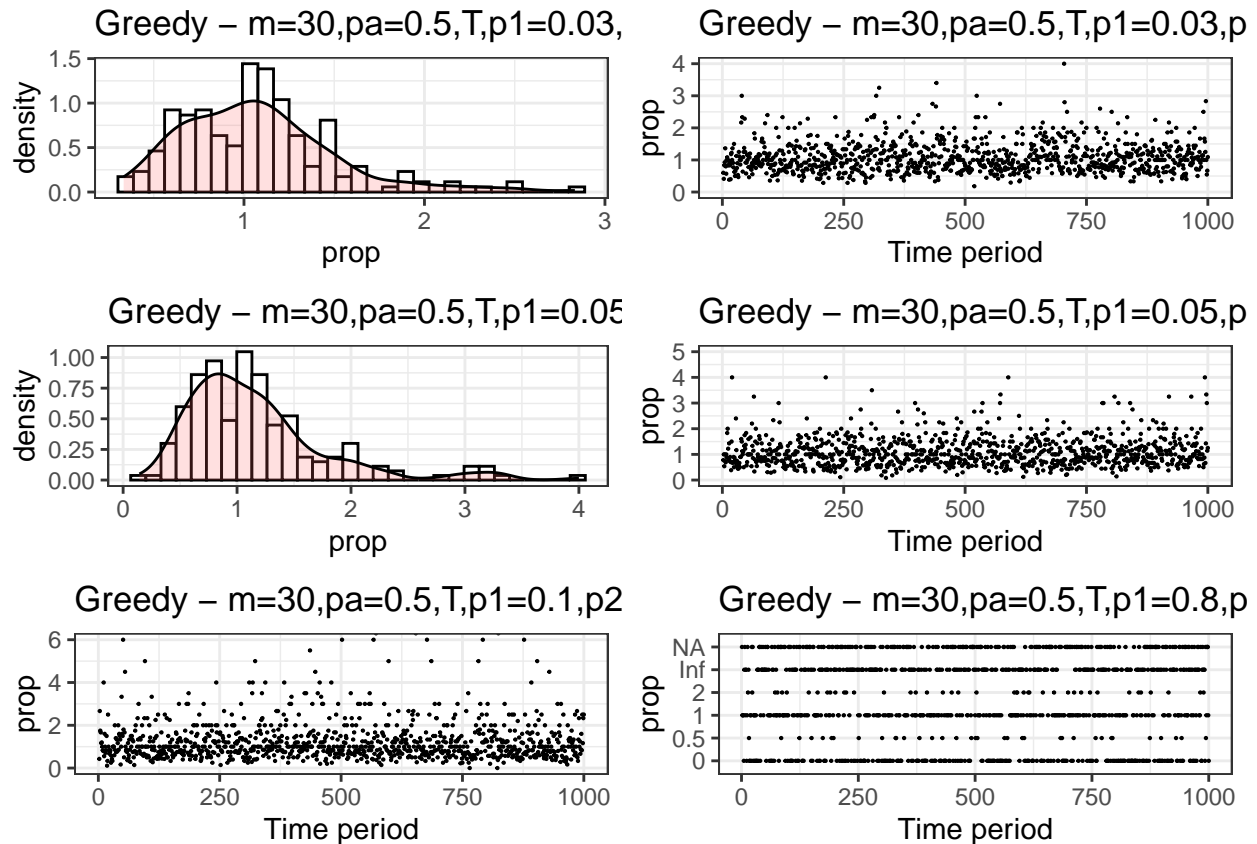
```
p1 <- ggplot(num_greedy_05_m50_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=50,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m50_pr2_11,size=0.1) +
  #ylim(0,4)+
  xlab("Time period")+
  labs(title = "Greedy - m=50,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()


#-----------------------------------------------------------------------

p3 <- ggplot(num_greedy_05_m50_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=50,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()
```

```
p4 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m50_pr2_12,size=0.1) +
  #ylim(0,5)+
  xlab("Time period")+
  labs(title = "Greedy - m=50,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()



#-------------------------------------------------------------------------------

p5 <- ggplot(num_greedy_05_m50_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=50,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m50_pr2_13,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Greedy - m=50,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()



#-------------------------------------------------------------------------------

p7 <- ggplot(num_greedy_05_m50_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=50,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()

p8 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m50_pr2_14,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Greedy - m=50,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p3,p4,p6,p8,nrow=3,ncol=2 )
```

2.1.2 market size m = 50

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).

## Warning: Removed 213 rows containing missing values (`geom_point()`).
```
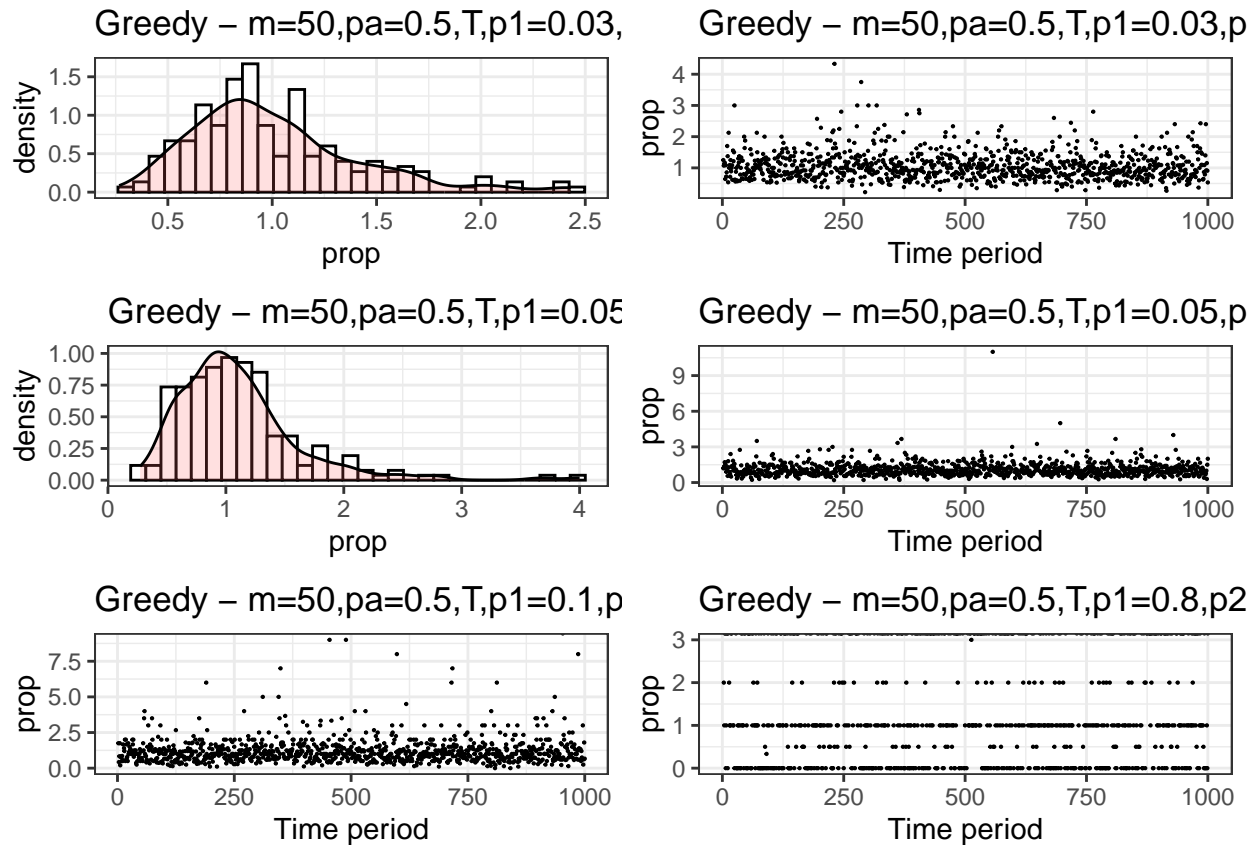
```
p1 <- ggplot(num_greedy_05_m70_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=70,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m70_pr2_11,size=0.1) +
  #ylim(0,4)+
  xlab("Time period")+
  labs(title = "Greedy - m=70,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()


#-------------------------------------------------------------------------

p3 <- ggplot(num_greedy_05_m70_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=70,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m70_pr2_12,size=0.1) +
  #ylim(0,5)+
```

```r
  xlab("Time period")+
  labs(title = "Greedy - m=70,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------------------------

p5 <- ggplot(num_greedy_05_m70_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=70,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m70_pr2_13,size=0.1) +
  ylab("prop")+
  xlab("Time period")+
  labs(title = "Greedy - m=70,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------------------------

p7 <- ggplot(num_greedy_05_m70_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=70,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()

p8 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m70_pr2_14,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Greedy - m=70,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p3,p4,p6,p8,nrow=3,ncol=2 )
```

2.1.3 market size m = 70

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

Warning: Removed 1 rows containing missing values (`geom_point()`).

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

Warning: Removed 1 rows containing missing values (`geom_point()`).
Removed 1 rows containing missing values (`geom_point()`).

Warning: Removed 221 rows containing missing values (`geom_point()`).
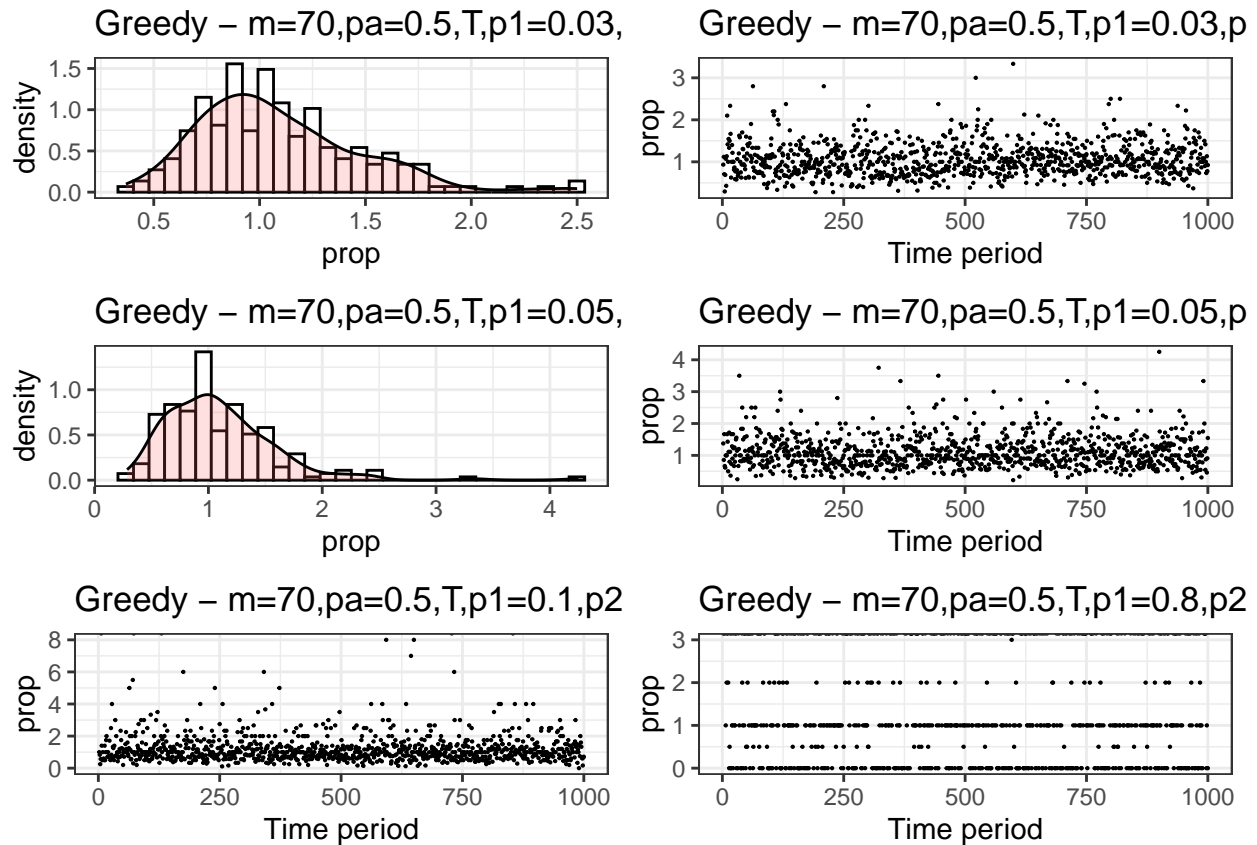
```
p1 <- ggplot(num_greedy_05_m100_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=100,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_greedy_05_m100_pr2_11,size=0.1) +
  #ylim(0,4)+
  xlab("Time period")+
  labs(title = "Greedy - m=100,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------------------------

p3 <- ggplot(num_greedy_05_m100_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=100,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m100_pr2_12,size=0.1) +
  #ylim(0,5)+
  ylab("prop")+
```

```r
  xlab("Time period")+
  labs(title = "Greedy - m=100,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()

#------------------------------------------------------------------------------

p5 <- ggplot(num_greedy_05_m100_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=100,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m100_pr2_13,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Greedy - m=100,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()

#------------------------------------------------------------------------------

p7 <- ggplot(num_greedy_05_m100_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Greedy - m=100,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()

p8 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_greedy_05_m100_pr2_14,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Greedy - m=100,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p6,p8,nrow=2,ncol=2 )
```
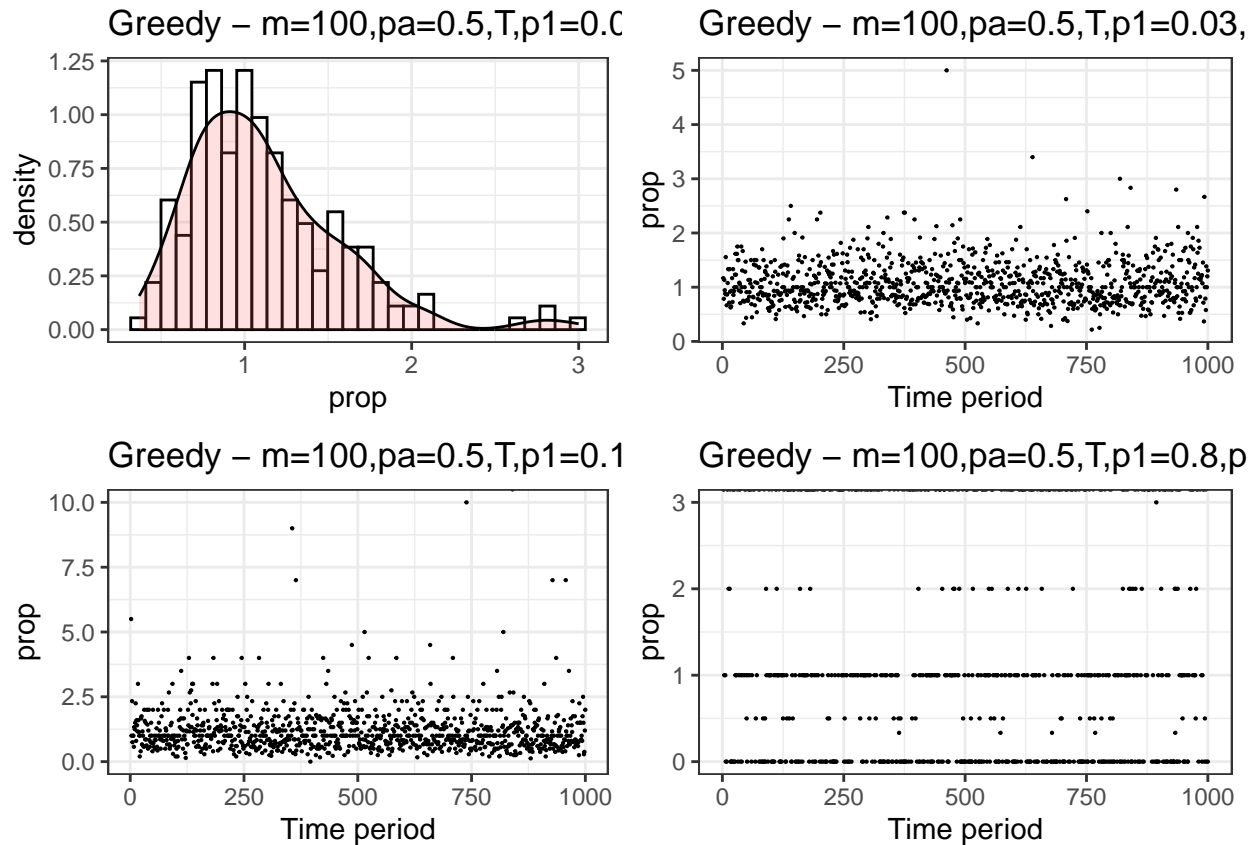
2.1.4 market size m = 100

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).
## Removed 1 rows containing missing values (`geom_point()`).

## Warning: Removed 218 rows containing missing values (`geom_point()`).
```

2.2 Patient algorithm plot

```r
p1 <- ggplot(num_patient_05_m30_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=30,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_patient_05_m30_pr2_11,size=0.1) +
  ylim(0,4)+
  xlab("Time period")+
  labs(title = "Patient - m=30,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()


#-----------------------------------------------------------------------------

p3 <- ggplot(num_patient_05_m30_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=30,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
```

```
     geom_point(data=num_patient_05_m30_pr2_12,size=0.1) +
     ylim(0,5)+
     xlab("Time period")+
     labs(title = "Patient - m=30,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
     theme_bw()



#-------------------------------------------------------------------------------

p5 <- ggplot(num_patient_05_m30_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=30,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
   geom_point(data=num_patient_05_m30_pr2_13,size=0.1) +
   xlab("Time period")+
   ylab("prop")+
   ylim(0,6)+
   labs(title = "Patient - m=30,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
   theme_bw()



#-------------------------------------------------------------------------------

p7 <- ggplot(num_patient_05_m30_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=30,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()


p8 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
   geom_point(data=num_patient_05_m30_pr2_14,size=0.1) +
   xlab("Time period")+
   labs(title = "Patient - m=30,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
   theme_bw()


grid.arrange(p1,p2,p3,p4,p5,p6,p7,p8,nrow=4,ncol=2 )
```

2.2.1 market size m = 30

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

Warning: Removed 1 rows containing missing values (`geom_point()`).
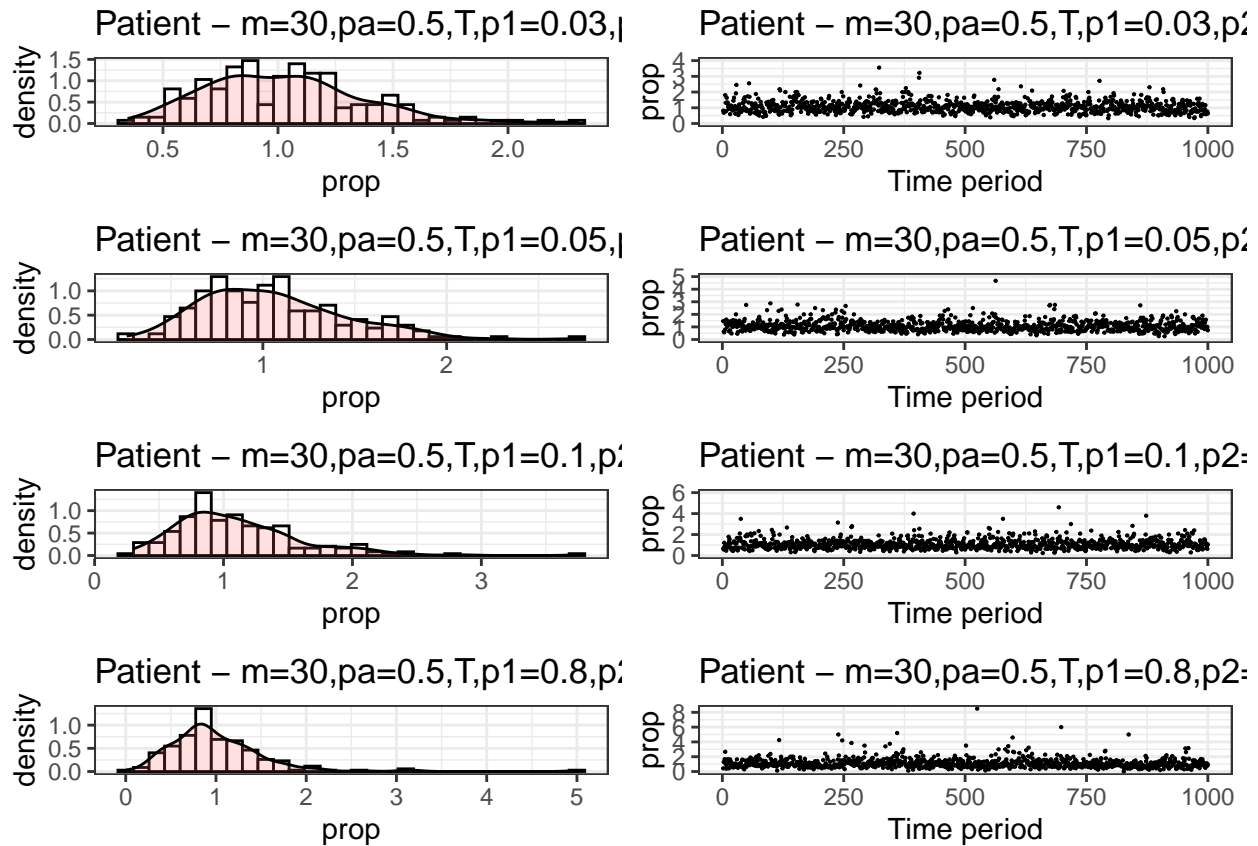

```
p1 <- ggplot(num_patient_05_m50_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=50,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_patient_05_m50_pr2_11,size=0.1) +
  #ylim(0,4)+
  xlab("Time period")+
  labs(title = "Patient - m=50,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()


#----------------------------------------------------------------------------

p3 <- ggplot(num_patient_05_m50_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=50,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
```

```
    geom_point(data=num_patient_05_m50_pr2_12,size=0.1) +
    #ylim(0,5)+
    xlab("Time period")+
    labs(title = "Patient - m=50,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
    theme_bw()



#-------------------------------------------------------------------------------

p5 <- ggplot(num_patient_05_m50_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=50,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m50_pr2_13,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Patient - m=50,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()



#-------------------------------------------------------------------------------

p7 <- ggplot(num_patient_05_m50_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=50,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()

p8 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m50_pr2_14,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Patient - m=50,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p3,p4,p5,p6,p7,p8,nrow=4,ncol=2 )
```

2.2.2 market size m = 50

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 1 rows containing missing values (`geom_point()`).
```
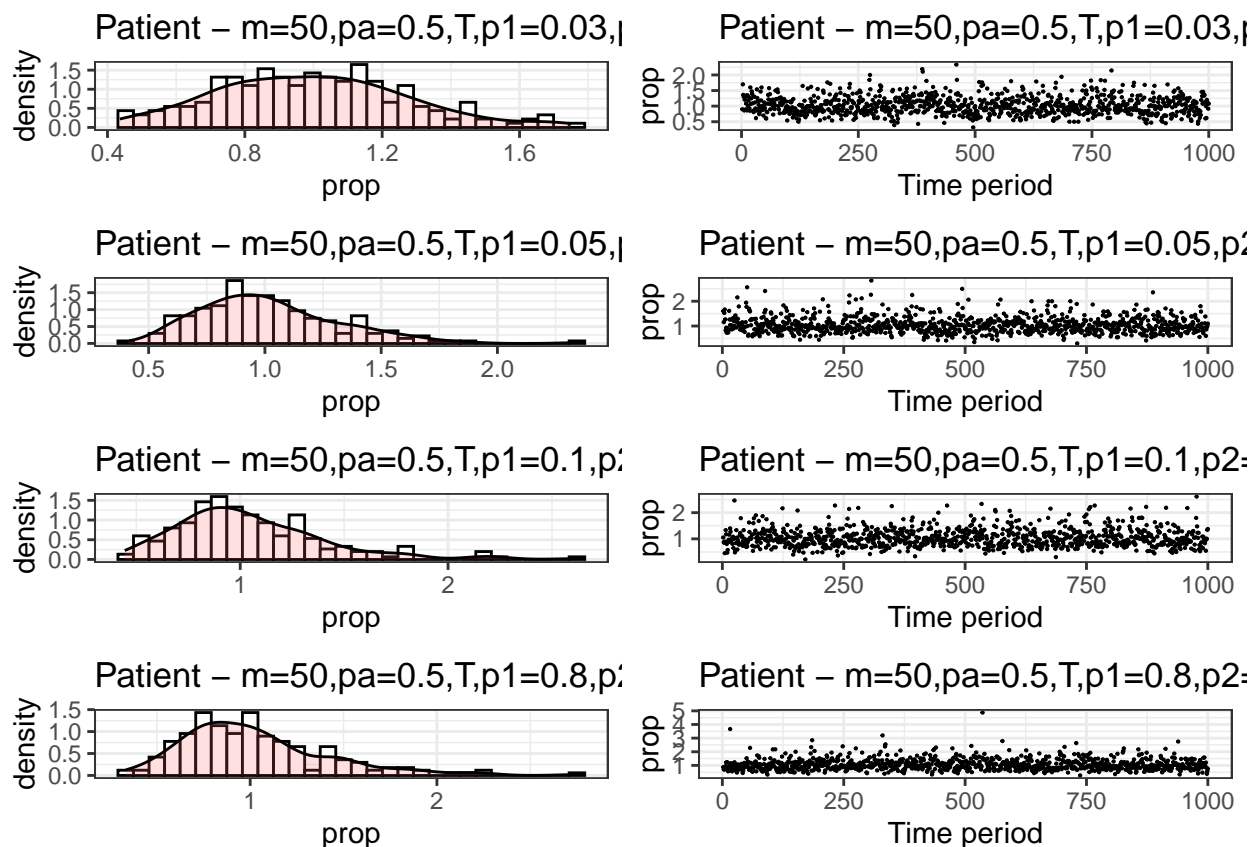
```
p1 <- ggplot(num_patient_05_m70_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=70,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_patient_05_m70_pr2_11,size=0.1) +
  #ylim(0,4)+
  xlab("Time period")+
  labs(title = "Patient - m=70,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()


#----------------------------------------------------------------------

p3 <- ggplot(num_patient_05_m70_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=70,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_patient_05_m70_pr2_12,size=0.1) +
  #ylim(0,5)+
```

```r
  xlab("Time period")+
  labs(title = "Patient - m=70,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()


#-------------------------------------------------------------------------------

p5 <- ggplot(num_patient_05_m70_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=70,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m70_pr2_13,size=0.1) +
  ylab("prop")+
  xlab("Time period")+
  labs(title = "Patient - m=70,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()


#-------------------------------------------------------------------------------

p7 <- ggplot(num_patient_05_m70_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=70,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()

p8 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m70_pr2_14,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Patient - m=70,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p3,p4,p5,p6,p7,p8,nrow=4,ncol=2 )
```
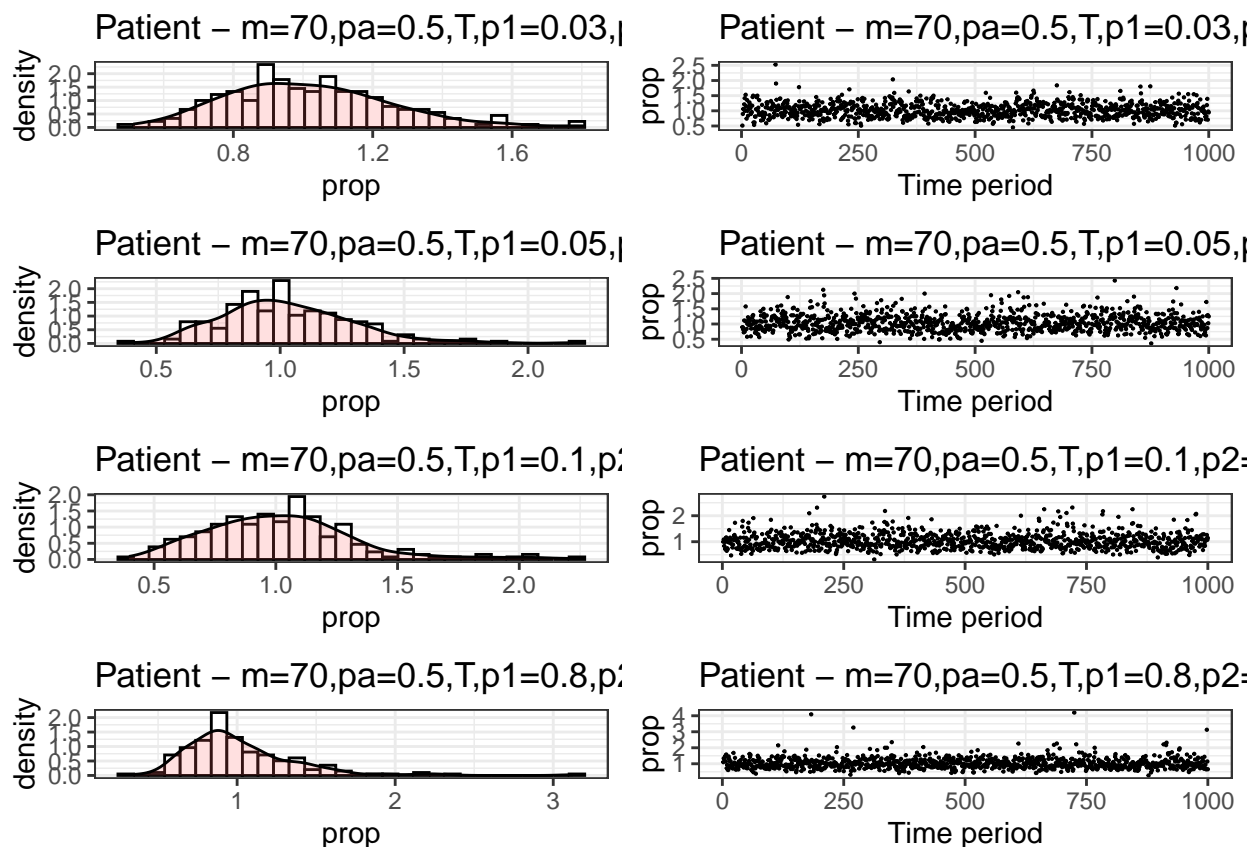
2.2.3 market size m = 70

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).
```

Patient – m=70,pa=0.5,T,p1=0.03,p
Patient – m=70,pa=0.5,T,p1=0.05,p
Patient – m=70,pa=0.5,T,p1=0.1,p2
Patient – m=70,pa=0.5,T,p1=0.8,p2

```r
p1 <- ggplot(num_patient_05_m100_pr2_11[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=100,pa=0.5,T,p1=0.03,p2=0.01,pr=2")+
 theme_bw()

p2 <- ggplot(data = NULL, aes(x = c(1:T), y = prop)) +
  geom_point(data=num_patient_05_m100_pr2_11,size=0.1) +
  #ylim(0,4)+
  xlab("Time period")+
  labs(title = "Patient - m=100,pa=0.5,T,p1=0.03,p2=0.01,pr=2") +
  theme_bw()

#---------------------------------------------------------------------------

p3 <- ggplot(num_patient_05_m100_pr2_12[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=100,pa=0.5,T,p1=0.05,p2=0.01,pr=2")+
 theme_bw()

p4 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m100_pr2_12,size=0.1) +
  #ylim(0,5)+
  ylab("prop")+
```

```r
  xlab("Time period")+
  labs(title = "Patient - m=100,pa=0.5,T,p1=0.05,p2=0.01,pr=2") +
  theme_bw()


#------------------------------------------------------------------------------

p5 <- ggplot(num_patient_05_m100_pr2_13[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=100,pa=0.5,T,p1=0.1,p2=0.01,pr=2")+
 theme_bw()

p6 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m100_pr2_13,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Patient - m=100,pa=0.5,T,p1=0.1,p2=0.01,pr=2") +
  theme_bw()


#------------------------------------------------------------------------------

p7 <- ggplot(num_patient_05_m100_pr2_14[800:1000,], aes(x=prop)) +
 geom_histogram(aes(y=..density..), colour="black", fill="white")+
 geom_density(alpha=.2, fill="#FF6666")+
 labs(title = "Patient - m=100,pa=0.5,T,p1=0.8,p2=0.01,pr=2")+
 theme_bw()

p8 <- ggplot(data = NULL, aes(x = c(1:T), y = as.double(prop))) +
  geom_point(data=num_patient_05_m100_pr2_14,size=0.1) +
  xlab("Time period")+
  ylab("prop")+
  labs(title = "Patient - m=100,pa=0.5,T,p1=0.8,p2=0.01,pr=2") +
  theme_bw()


grid.arrange(p1,p2,p3,p4,p5,p6,p7,p8,nrow=4,ncol=2)
```
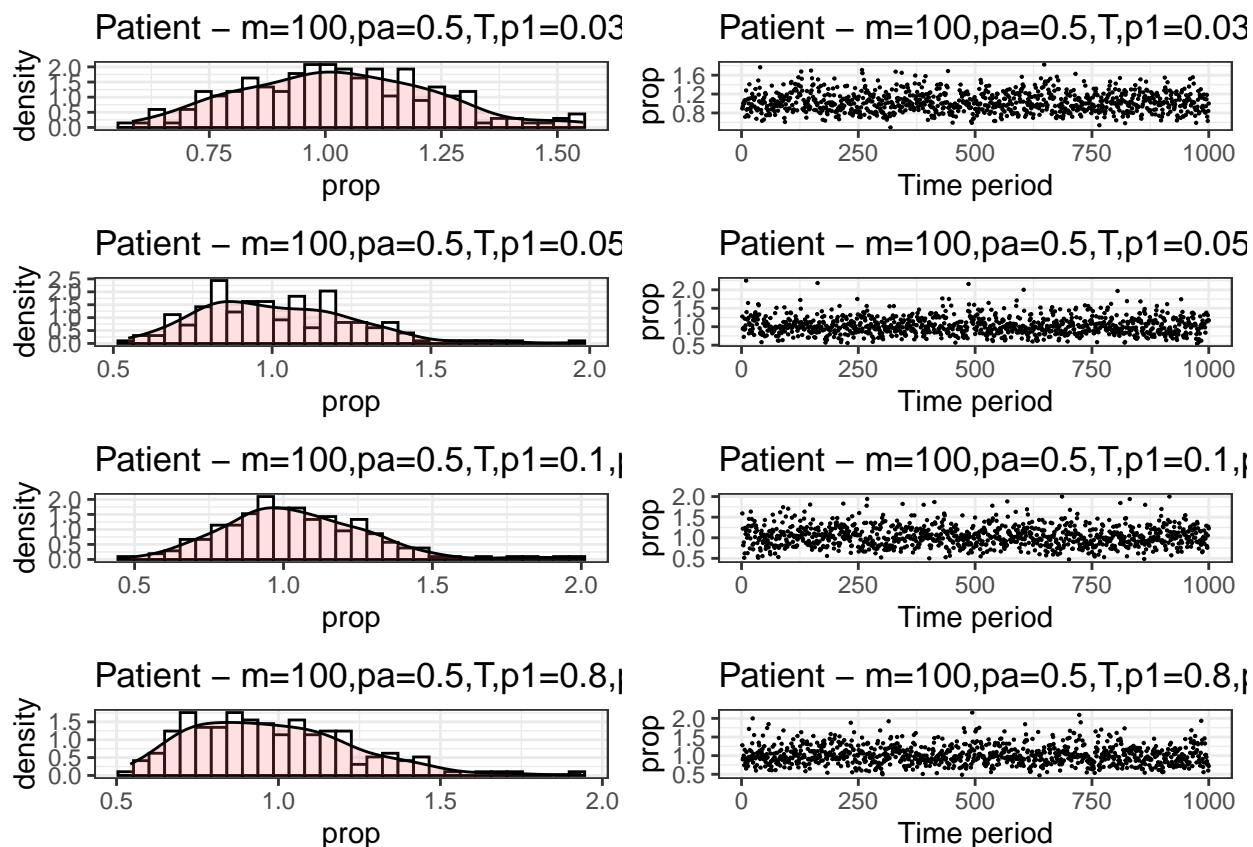
2.2.4 market size $m = 100$

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing missing values (`geom_point()`).
```

Patient − m=100,pa=0.5,T,p1=0.03

Patient − m=100,pa=0.5,T,p1=0.03

Patient − m=100,pa=0.5,T,p1=0.05

Patient − m=100,pa=0.5,T,p1=0.05

Patient − m=100,pa=0.5,T,p1=0.1,

Patient − m=100,pa=0.5,T,p1=0.1,

Patient − m=100,pa=0.5,T,p1=0.8,

Patient − m=100,pa=0.5,T,p1=0.8,

_____

Draft