

## Managebrandandcategorydata for (aggregate model) discount loss threshold

Ned

22/12/2021

```
df_online <- subset(df_scanner, saljkanal == 1)
message(paste("The total number of weekly online sold:", dim(df_online)[1]))
```

```
## The total number of weekly online sold: 173528
```

```
df_offline <- subset(df_scanner, saljkanal == 0)
message(paste("The total number of weekly offline sold:", dim(df_offline)[1]))
```

```
## The total number of weekly offline sold: 6553040
```

```
#dropdecimal and non-integer
```

```
df <- df_offline[df_offline$sales_volume>=1,]
df <- df_offline[!df$sales_volume%1,]
```

```
message(paste("The total n before dropping decimal and non-integer:", dim(df_offline)[1]))
```

```
## The total n before dropping decimal and non-integer: 6553040
```

```
message(paste("The total n after dropping decimal and non-integer:", dim(df)[1]))
```

```
## The total n after dropping decimal and non-integer: 6207035
```

```
remove(list=c("df_scanner", "df_online", "df_offline"))
```

```
#Function of creating relevant variables
```

We create a function `genrelevantvar` that generates 1) calculate aggregate brand price/discount/unit sales of each brand from sales-weighted average across its SKUs sold in period t 2) calculated (aggregated) competitive variables and 3) generate lag variable 4) first difference of log of relevant variables (dropped the t = 1) 5) generate holiday (0/1)

```
#Prepare data for estimating aggregate
```

```

baking_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Baking ingredients")
baking_super_PL <- genrelevantvar(df,format = "supermarket",category = "Baking ingredients")
baking_conve_PL <- genrelevantvar(df,format = "convenience",category = "Baking ingredients")

biscuit_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Biscuits")
biscuit_super_PL <- genrelevantvar(df,format = "supermarket",category = "Biscuits")
# biscuit_conve_PL <- genrelevantvar(df,format = "convenience",category = "Biscuits") #there are several

butter_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Butter")
butter_super_PL <- genrelevantvar(df,format = "supermarket",category = "Butter")
butter_conve_PL <- genrelevantvar(df,format = "convenience",category = "Butter")

bottledwater_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Bottled water")
bottledwater_super_PL <- genrelevantvar(df,format = "supermarket",category = "Bottled water")
# bottledwater_conve_PL <- genrelevantvar(df,format = "convenience",category = "Bottled water") #there i

cereals_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Cereals")
cereals_super_PL <- genrelevantvar(df,format = "supermarket",category = "Cereals")
# cereals_conve_PL <- genrelevantvar(df,format = "convenience",category = "Cereals") #there is one week

chips_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Chips & Salty snacks")
chips_super_PL <- genrelevantvar(df,format = "supermarket",category = "Chips & Salty snacks")
chips_conve_PL <- genrelevantvar(df,format = "convenience",category = "Chips & Salty snacks")

coffee_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Coffee")
coffee_super_PL <- genrelevantvar(df,format = "supermarket",category = "Coffee")
#coffee_conve_PL <- genrelevantvar(df,format = "convenience",category = "Coffee") #there are several wee

cookie_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Cookies")
cookie_super_PL <- genrelevantvar(df,format = "supermarket",category = "Cookies")
# cookie_conve_PL <- genrelevantvar(df,format = "convenience",category = "Cookies") #there is one week I

cream_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Cream")
cream_super_PL <- genrelevantvar(df,format = "supermarket",category = "Cream")
cream_conve_PL <- genrelevantvar(df,format = "convenience",category = "Cream")

frozenpizz_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Frozen Pizza Snacks")
# frozenpizz_super_PL <- genrelevantvar(df,format = "supermarket",category = "Frozen Pizza Snacks") #the
# frozenpizz_conve_PL <- genrelevantvar(df,format = "convenience",category = "Frozen Pizza Snacks") #the

juice_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Fruit Juice")
juice_super_PL <- genrelevantvar(df,format = "supermarket",category = "Fruit Juice")
# juice_conve_PL <- genrelevantvar(df,format = "convenience",category = "Fruit Juice") #there is one wee

icecream_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Ice cream")
icecream_super_PL <- genrelevantvar(df,format = "supermarket",category = "Ice cream")
# icecream_conve_PL <- genrelevantvar(df,format = "convenience",category = "Ice cream") #there are sever

jam_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Jam")
jam_super_PL <- genrelevantvar(df,format = "supermarket",category = "Jam")
jam_conve_PL <- genrelevantvar(df,format = "convenience",category = "Jam")

lactosefree_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "LactoseFree")

```

```

lactosefree_super_PL <- genrelevantvar(df,format = "supermarket",category = "LactoseFree")
lactosefree_conve_PL <- genrelevantvar(df,format = "convenience",category = "LactoseFree")

pastry_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Pastry")
pastry_super_PL <- genrelevantvar(df,format = "supermarket",category = "Pastry")
#pastry_conve_PL <- genrelevantvar(df,format = "convenience",category = "Pastry") #there are several weeks I

readymeal_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Ready-made meals")
readymeal_super_PL <- genrelevantvar(df,format = "supermarket",category = "Ready-made meals")
readymeal_conve_PL <- genrelevantvar(df,format = "convenience",category = "Ready-made meals")

rice_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Rice")
rice_super_PL <- genrelevantvar(df,format = "supermarket",category = "Rice")
#rice_conve_PL <- genrelevantvar(df,format = "convenience",category = "Rice") #there are several weeks I

seasoning_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Seasoning")
seasoning_super_PL <- genrelevantvar(df,format = "supermarket",category = "Seasoning")
#seasoning_conve_PL <- genrelevantvar(df,format = "convenience",category = "Seasoning") #there is one week I

softdrink_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Soft drinks")
softdrink_super_PL <- genrelevantvar(df,format = "supermarket",category = "Soft drinks")
#softdrink_conve_PL <- genrelevantvar(df,format = "convenience",category = "Soft drinks") #there is one week I

yoghurt_hyper_PL <- genrelevantvar(df,format = "hypermarket",category = "Yogurt")
yoghurt_super_PL <- genrelevantvar(df,format = "supermarket",category = "Yogurt")
yoghurt_conve_PL <- genrelevantvar(df,format = "convenience",category = "Yogurt")

```

#Estimate Nonlinear Model

```

Combined_Dataset <- rbind(baking_hyper_PL,baking_super_PL,baking_conve_PL,
  biscuit_hyper_PL,biscuit_super_PL,
  butter_hyper_PL,butter_super_PL,butter_conve_PL,
  bottledwater_hyper_PL,bottledwater_super_PL,
  cereals_hyper_PL,cereals_super_PL,
  chips_hyper_PL,chips_super_PL,chips_conve_PL,
  coffee_hyper_PL,coffee_super_PL,
  cookie_hyper_PL,cookie_super_PL,
  cream_hyper_PL,cream_super_PL,cream_conve_PL,
  frozenpizz_hyper_PL,
  juice_hyper_PL,juice_super_PL,
  icecream_hyper_PL,icecream_super_PL,
  jam_hyper_PL,jam_super_PL,jam_conve_PL,
  lactosefree_hyper_PL,lactosefree_super_PL,lactosefree_conve_PL,
  pastry_hyper_PL,pastry_super_PL,
  readymeal_hyper_PL,readymeal_super_PL,readymeal_conve_PL,
  rice_hyper_PL,rice_super_PL,
  seasoning_hyper_PL,seasoning_super_PL,
  softdrink_hyper_PL,softdrink_super_PL,
  yoghurt_hyper_PL,yoghurt_super_PL,yoghurt_conve_PL)

```

```

Combined_Dataset_PL <- Combined_Dataset[Combined_Dataset$brand == "PL",]

```

```

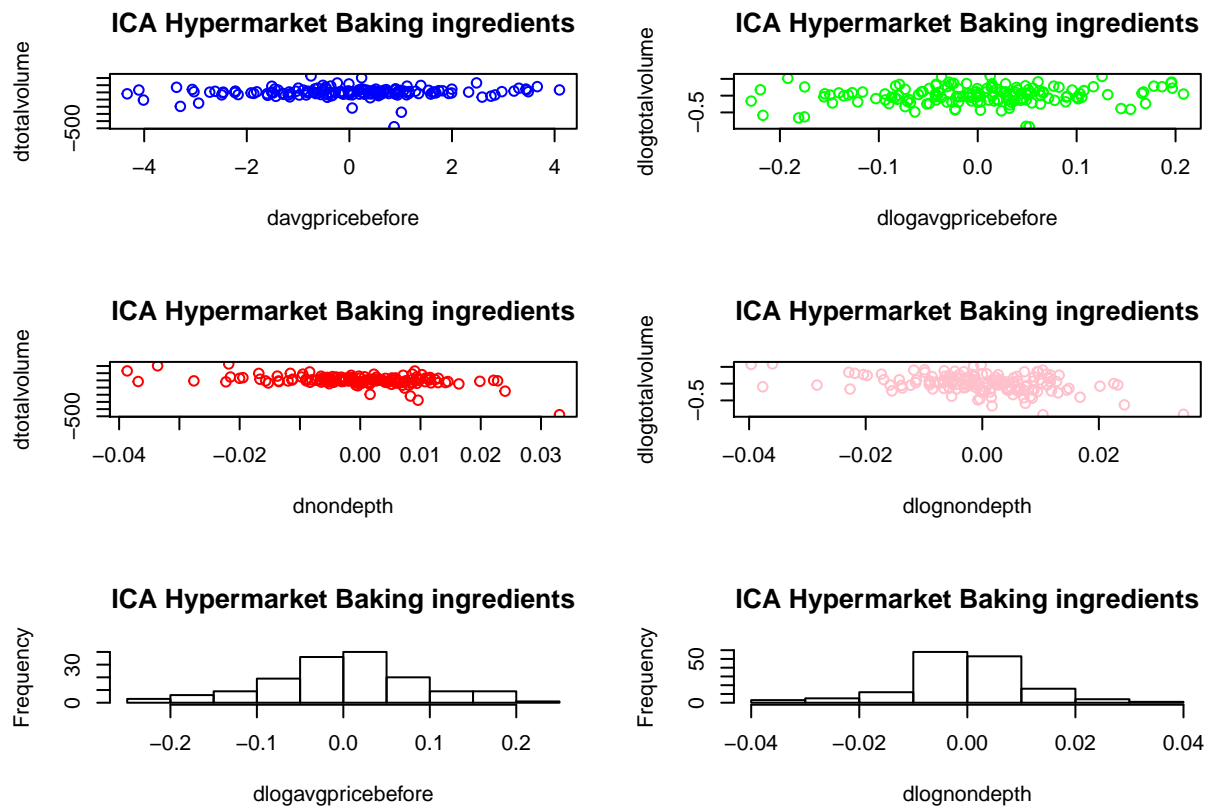
data_PL_hypermarket <- Combined_Dataset_PL[Combined_Dataset_PL$format == "hypermarket",]
distinctcategory_hyper <- unique(data_PL_hypermarket$category)
ncategory_hyper<-length(distinctcategory_hyper)

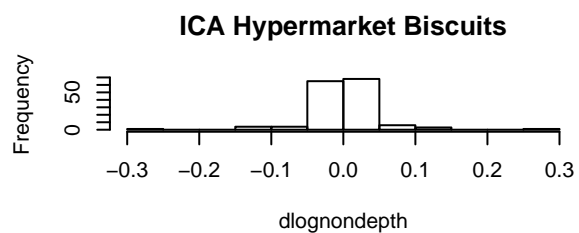
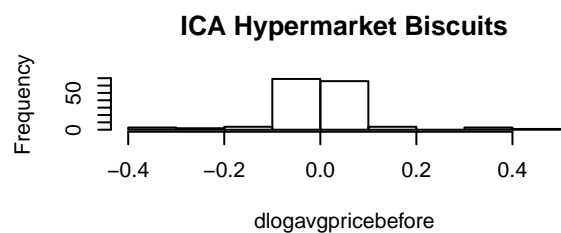
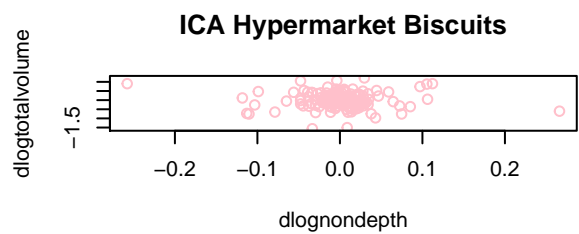
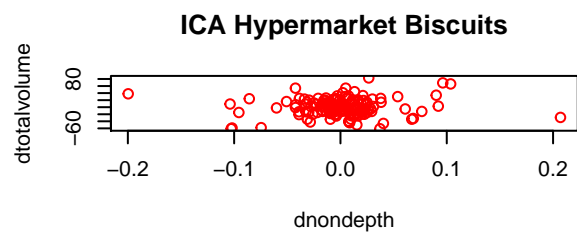
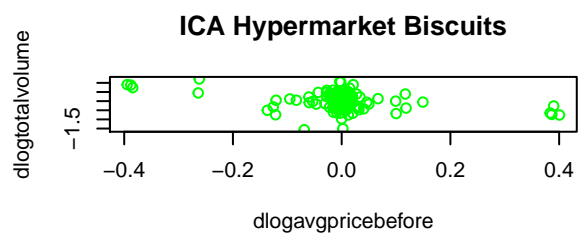
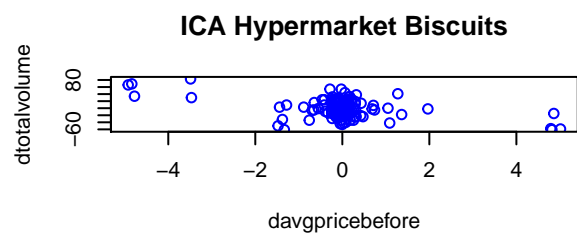
data_PL_supermarket <- Combined_Dataset_PL[Combined_Dataset_PL$format == "supermarket",]
distinctcategory_super <- unique(data_PL_supermarket$category)
ncategory_super<-length(distinctcategory_super)

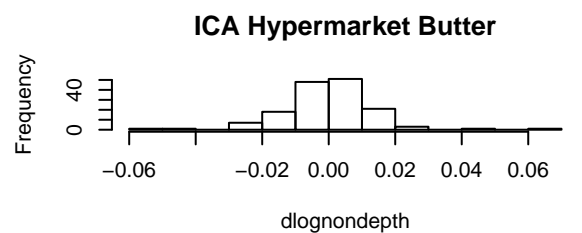
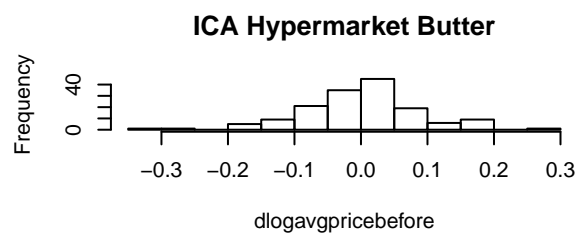
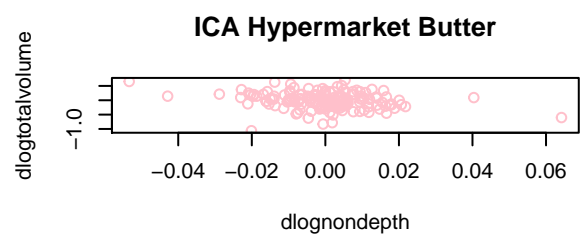
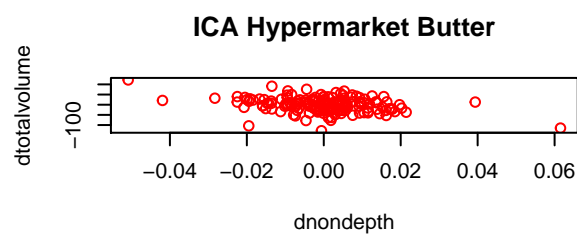
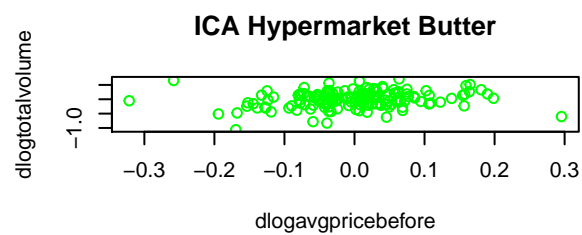
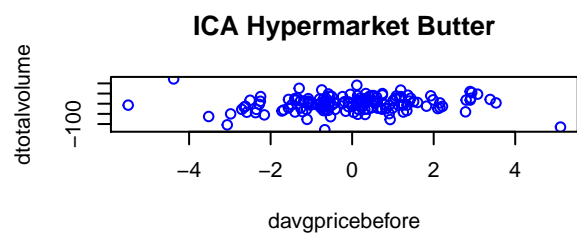
data_PL_conve <- Combined_Dataset_PL[Combined_Dataset_PL$format == "convenience",]
distinctcategory_conve <- unique(data_PL_conve$category)
ncategory_conve<-length(distinctcategory_conve)

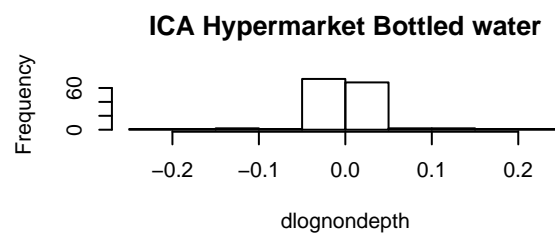
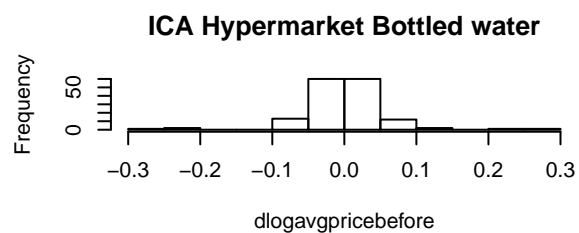
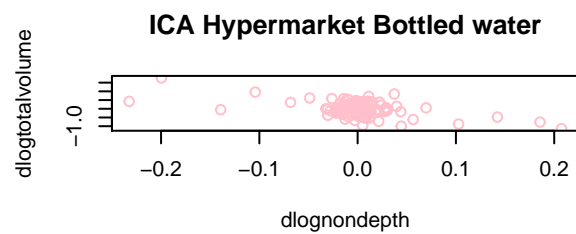
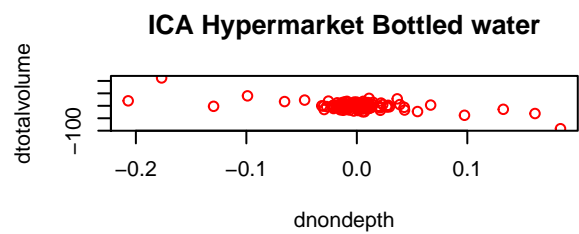
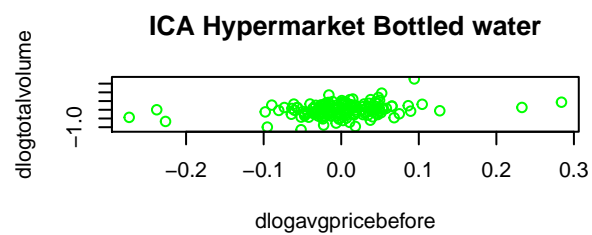
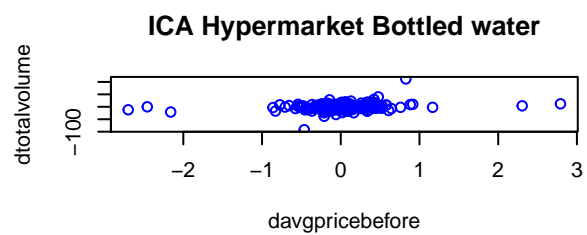
par(mfrow = c(3,2))
for (i in 1:length(distinctcategory_hyper)){
plot(dtotalvolume ~ davgpricebefore, data=data_PL_hypermarket[data_PL_hypermarket$category == distinctcategory_hyper[i],])
plot(dlogtotalvolume ~ dlogavgpricebefore, data=data_PL_hypermarket[data_PL_hypermarket$category == distinctcategory_hyper[i],])
plot(dtotalvolume ~ dnondepth, data=data_PL_hypermarket[data_PL_hypermarket$category == distinctcategory_hyper[i],])
plot(dlogtotalvolume ~ dlognondepth, data=data_PL_hypermarket[data_PL_hypermarket$category == distinctcategory_hyper[i],])
hist(data_PL_hypermarket[data_PL_hypermarket$category == distinctcategory_hyper[i],]$dlogavgpricebefore)
hist(data_PL_hypermarket[data_PL_hypermarket$category == distinctcategory_hyper[i],]$dlognondepth,main="")
}

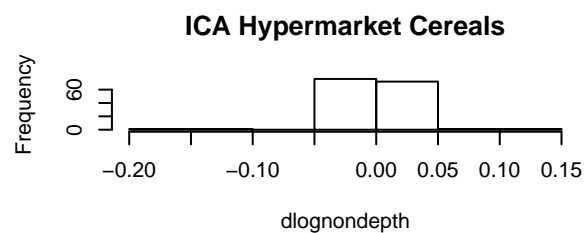
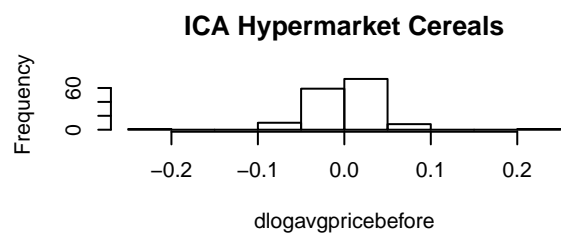
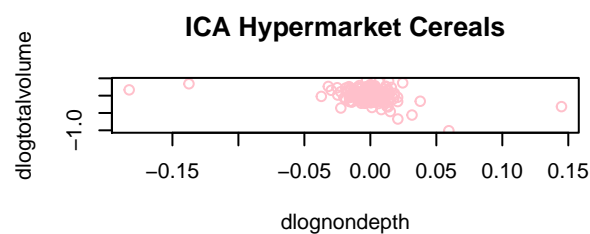
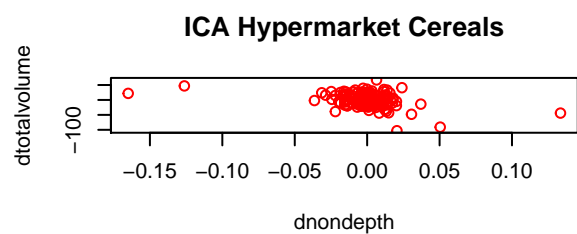
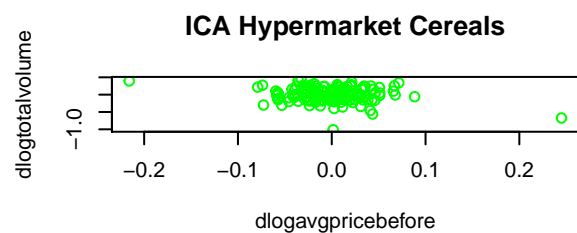
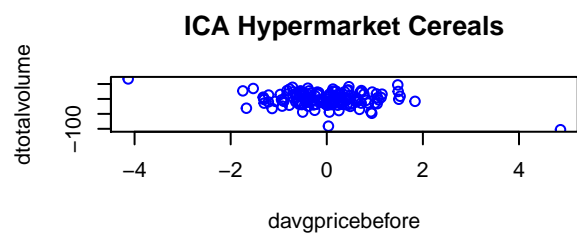
```



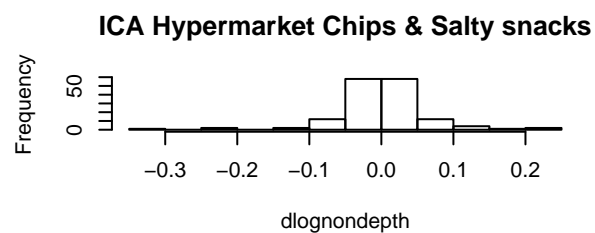
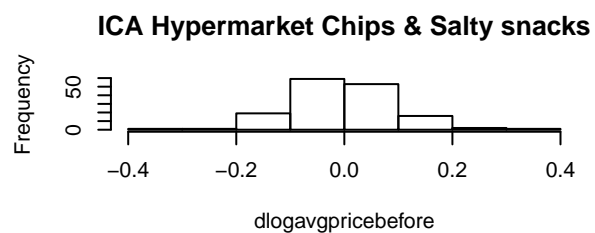
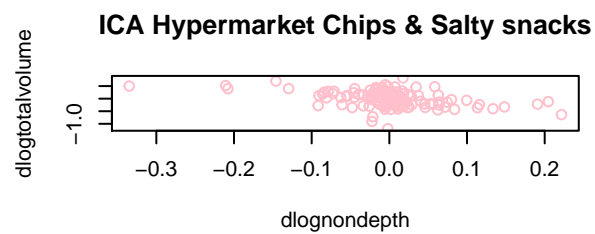
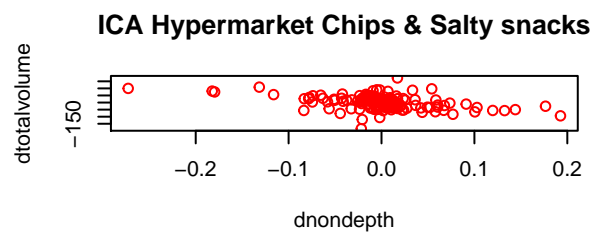
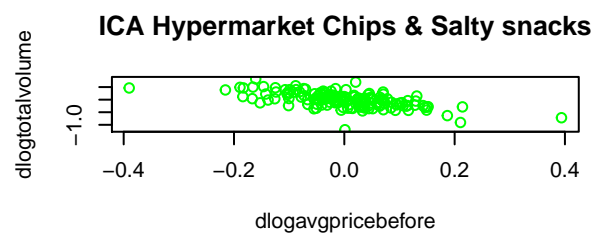
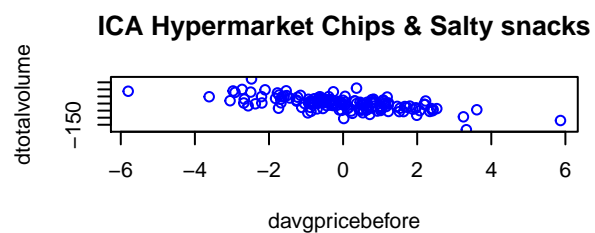


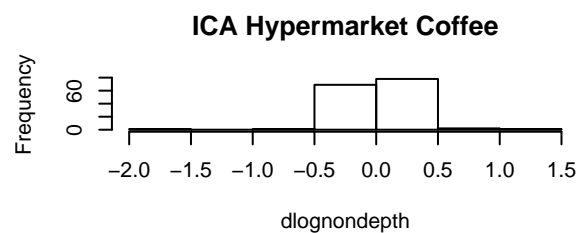
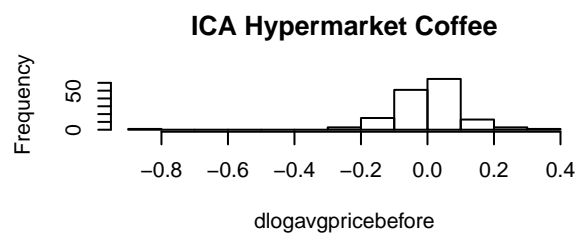
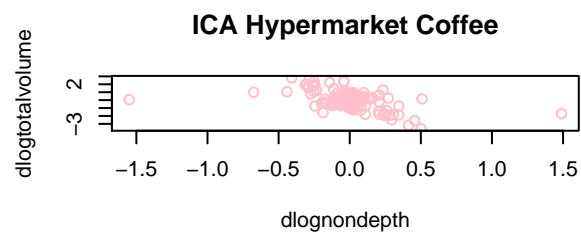
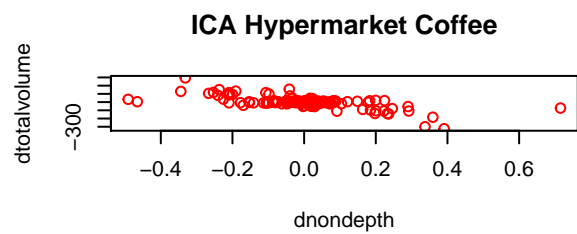
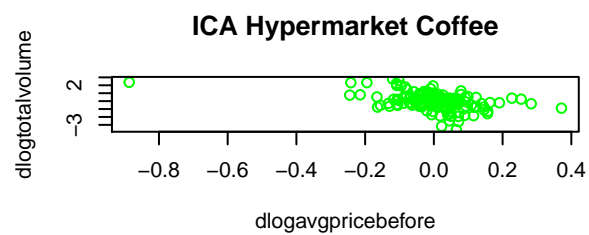
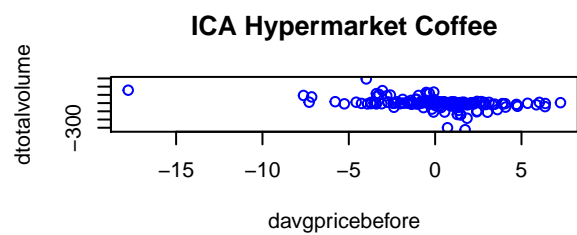


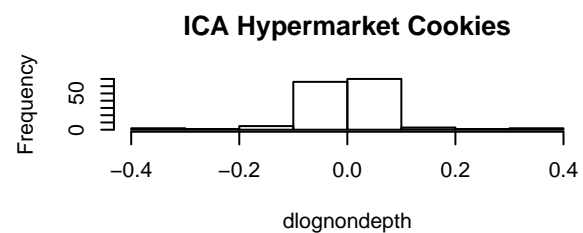
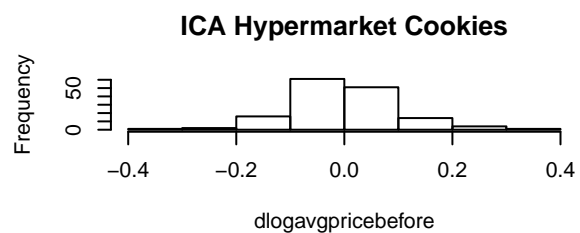
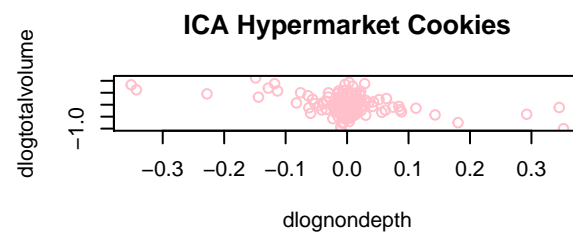
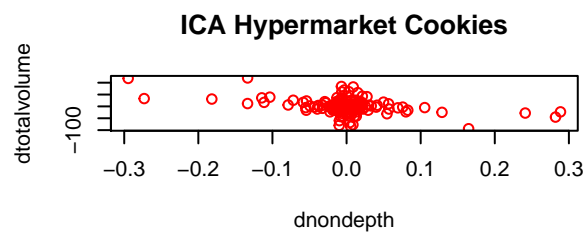
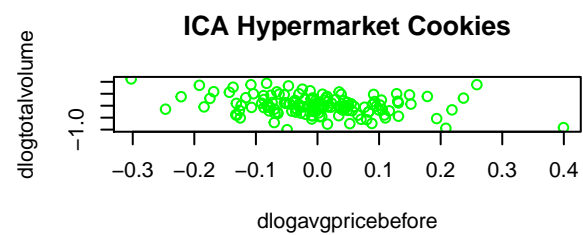
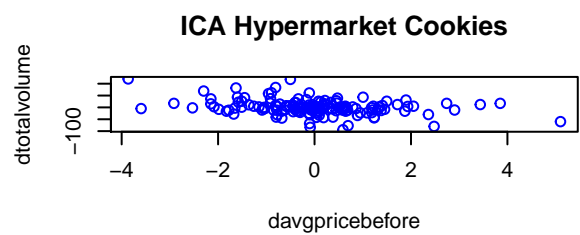


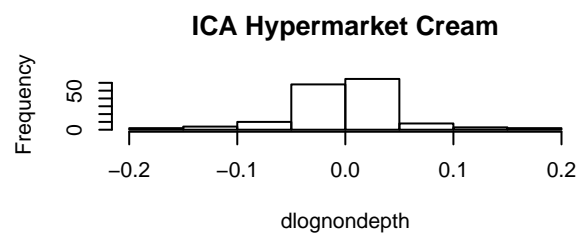
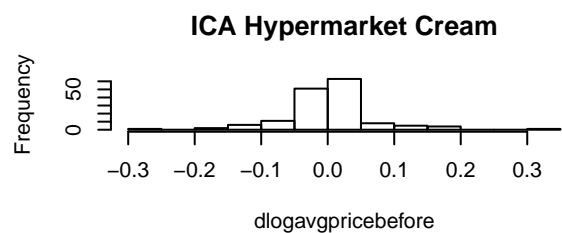
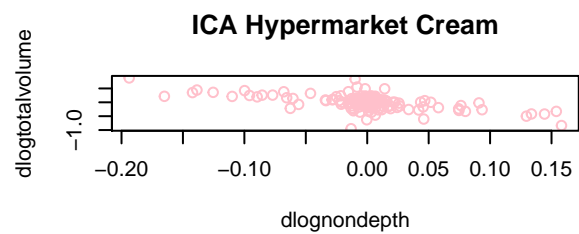
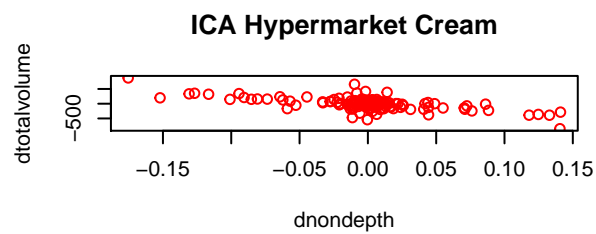
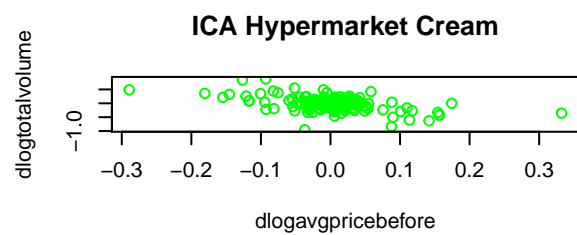
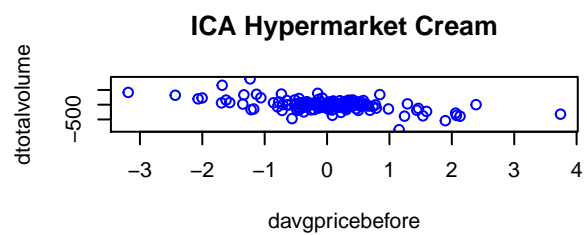


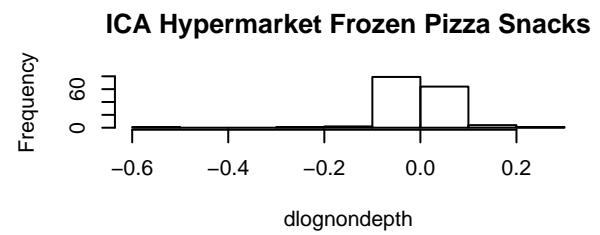
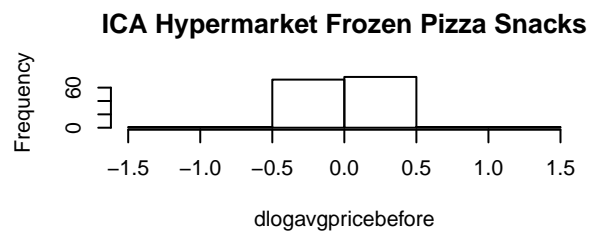
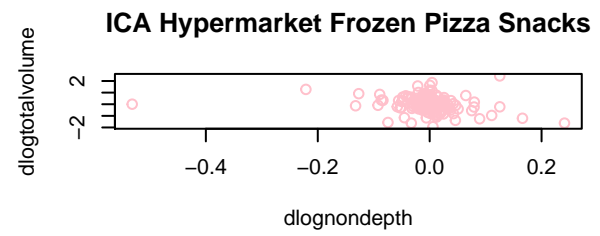
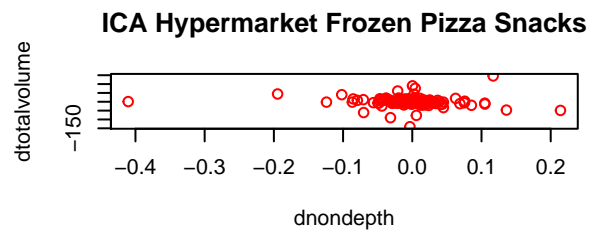
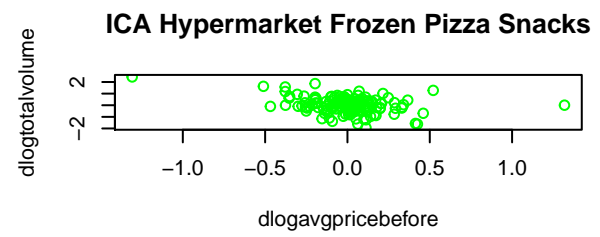
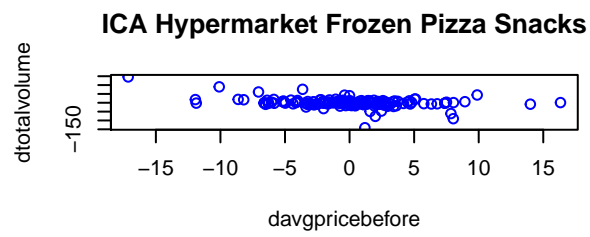


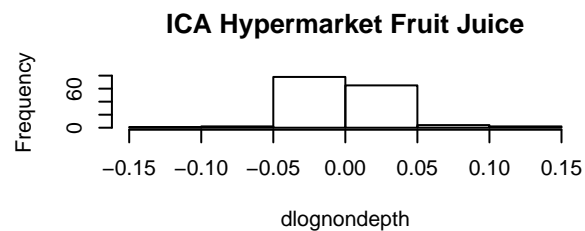
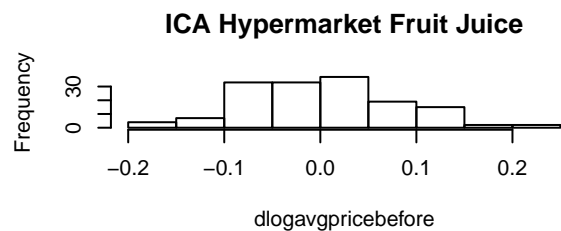
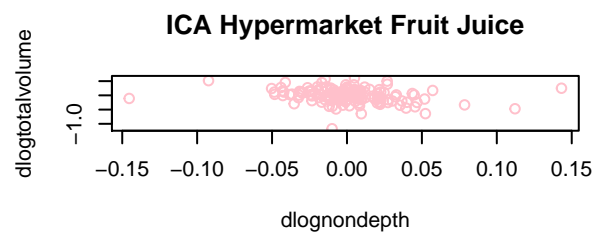
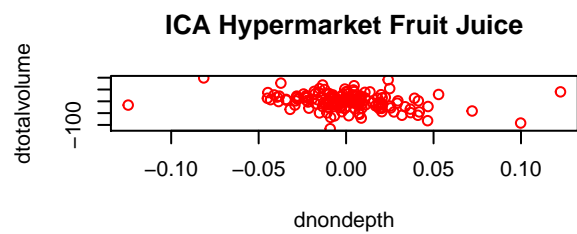
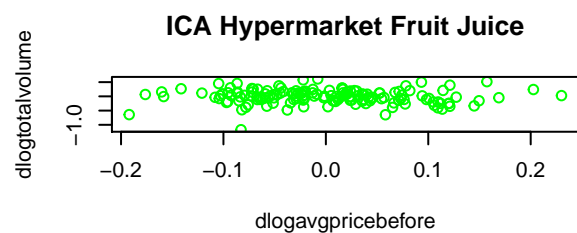
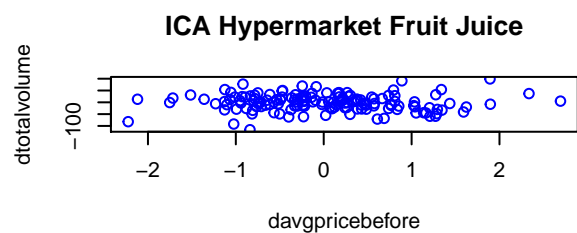


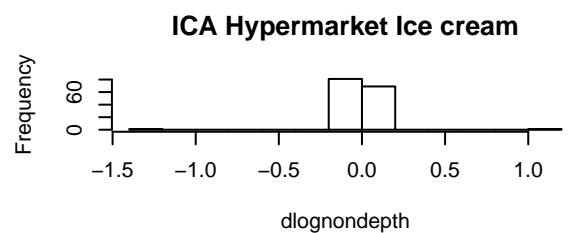
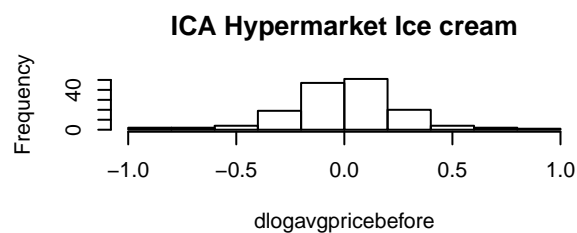
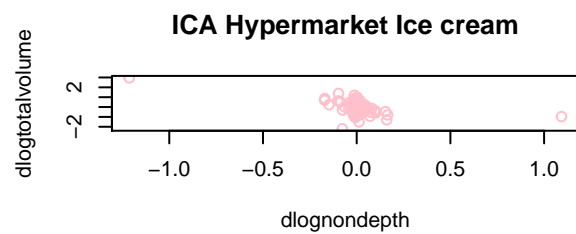
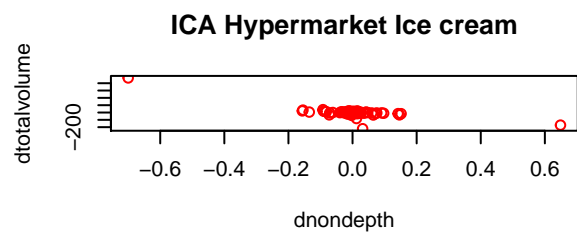
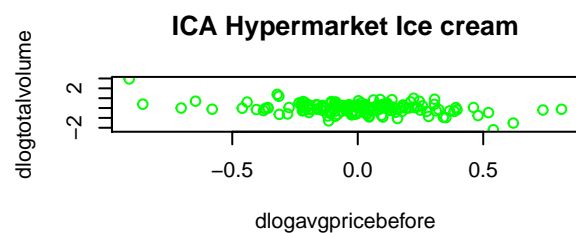
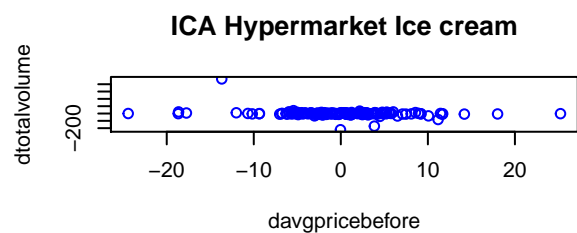


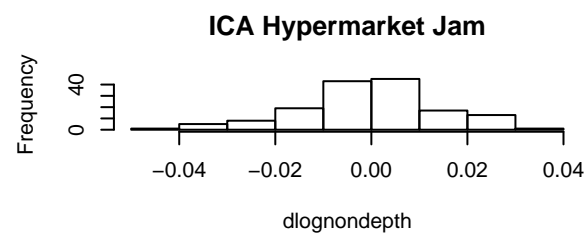
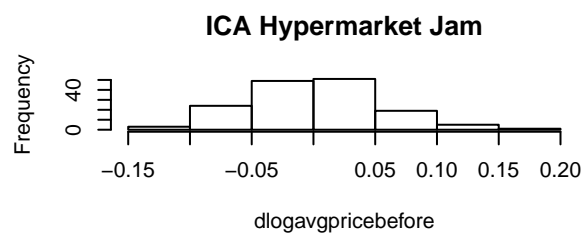
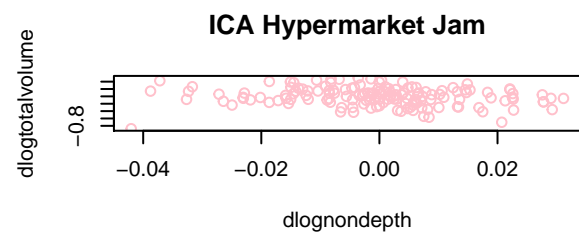
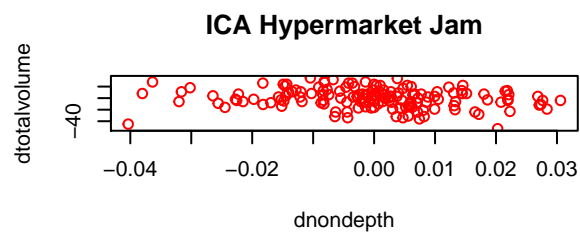
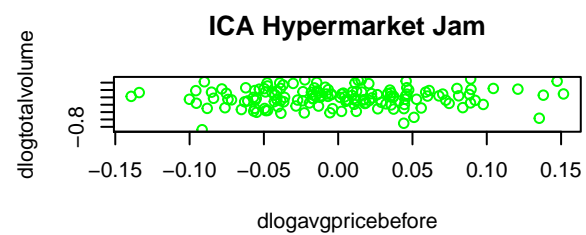
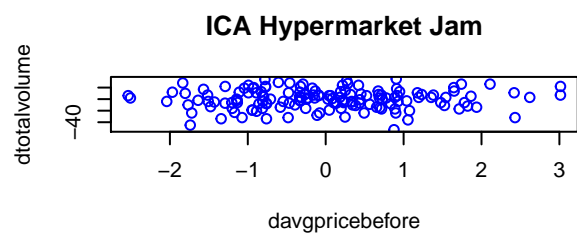




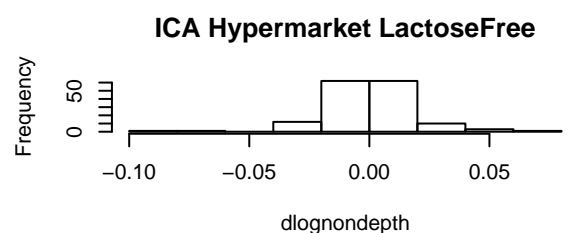
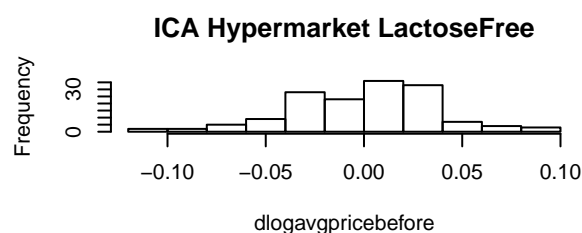
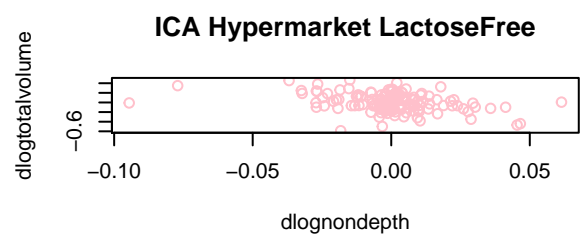
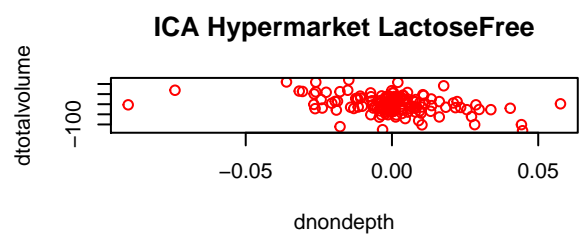
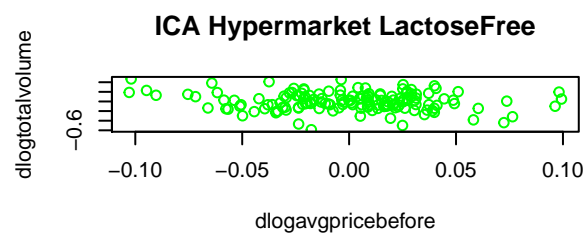
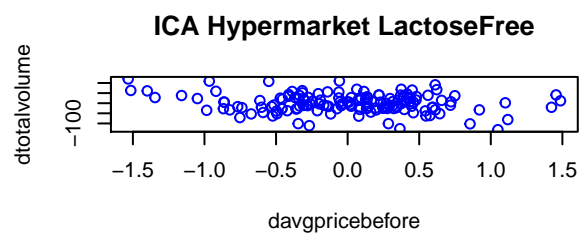


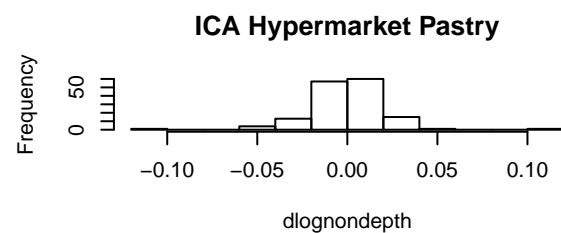
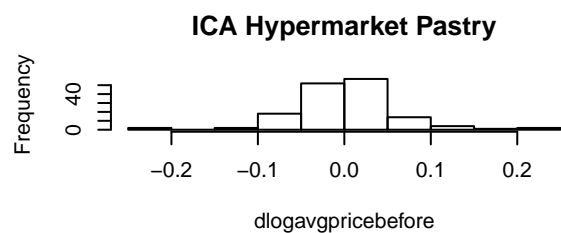
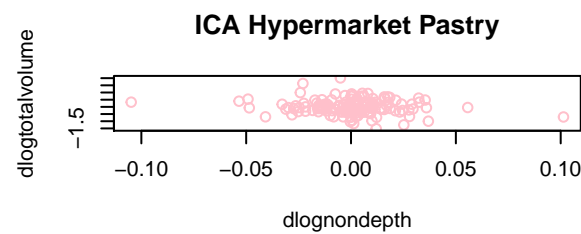
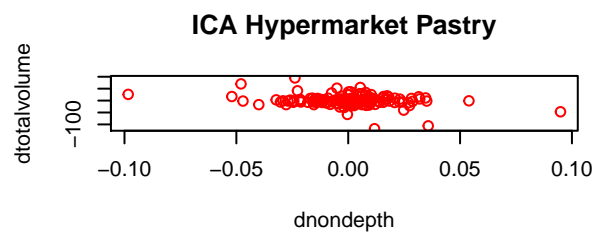
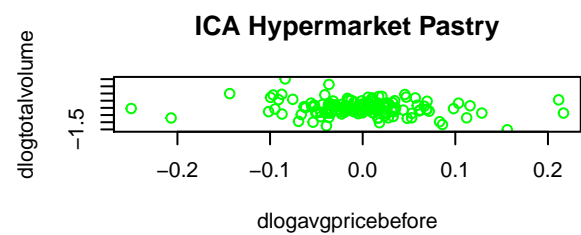
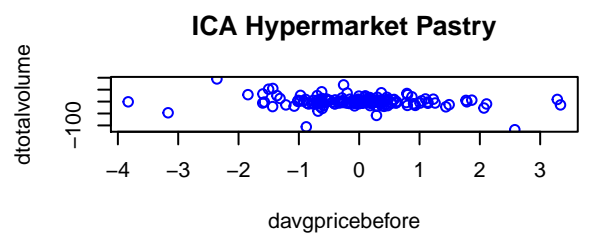


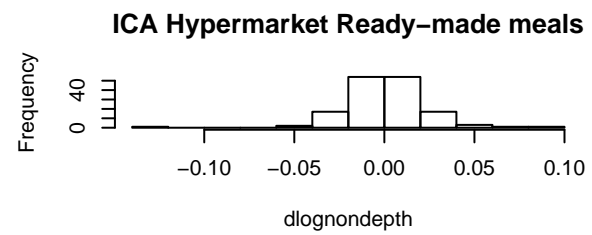
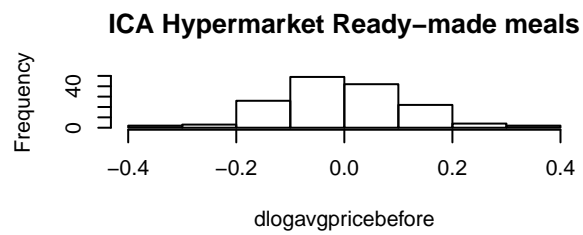
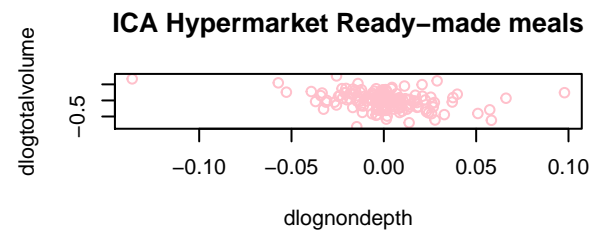
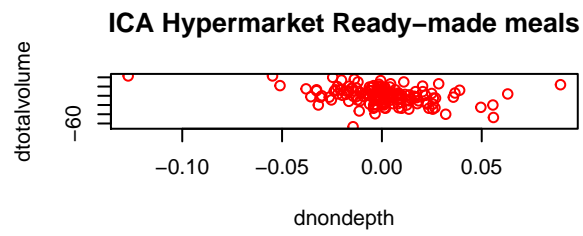
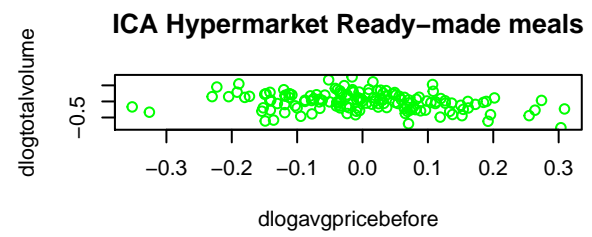
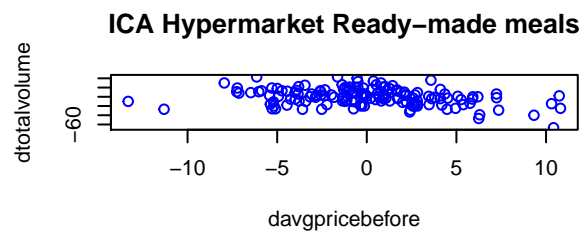


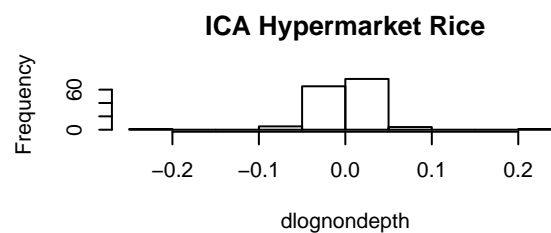
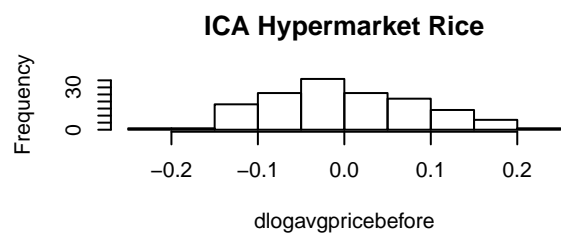
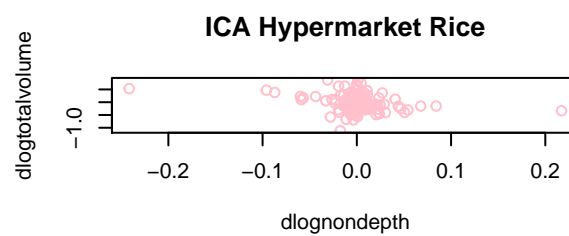
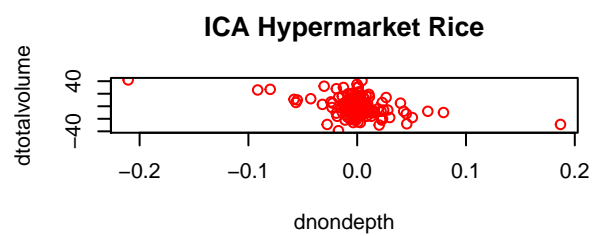
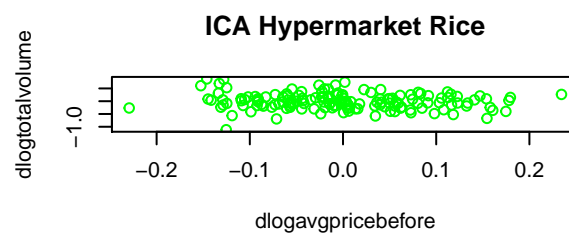
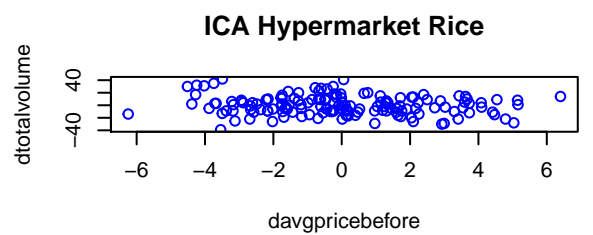


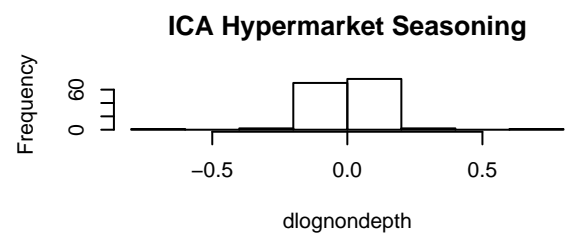
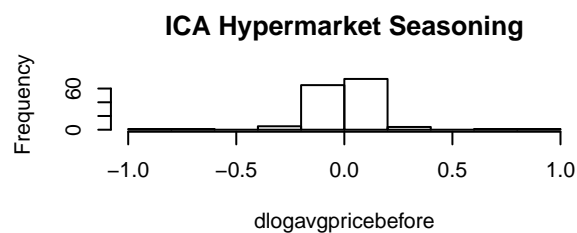
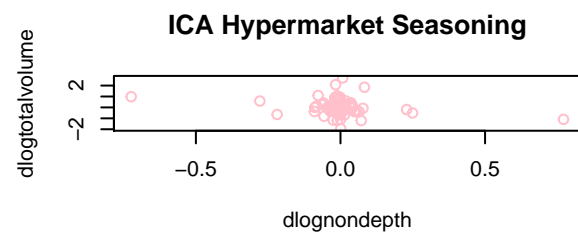
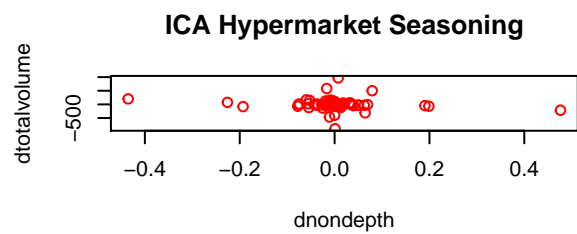
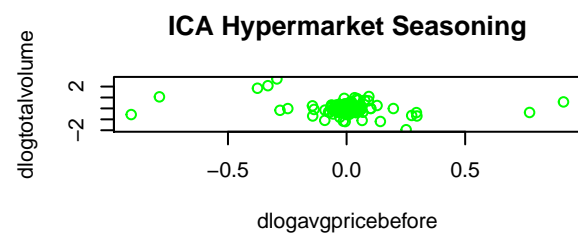
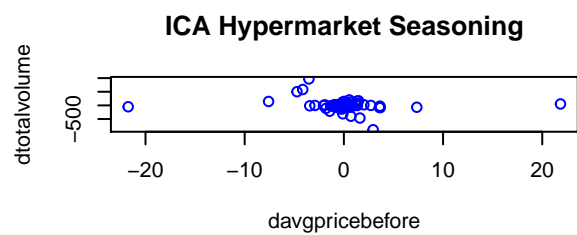


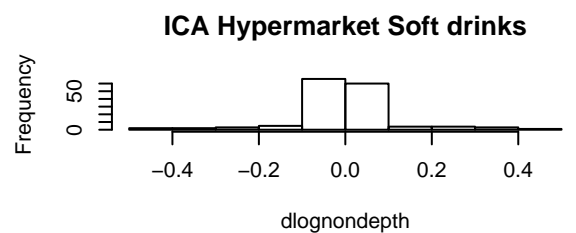
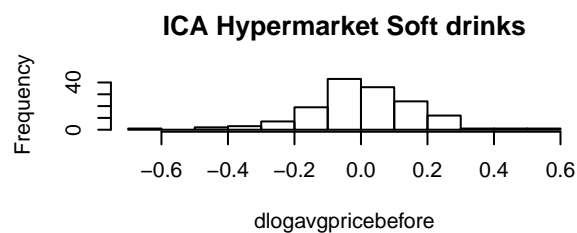
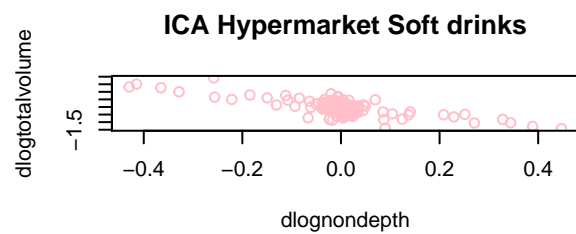
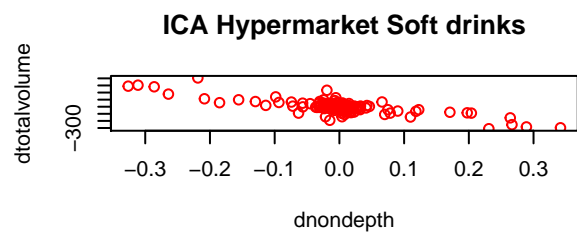
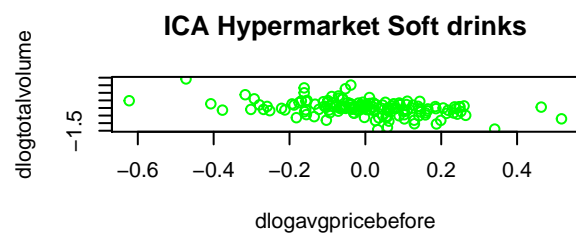
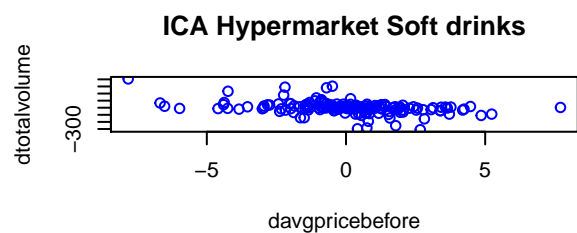


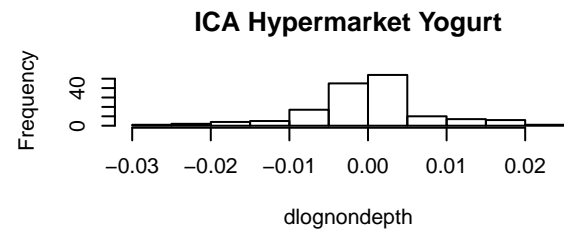
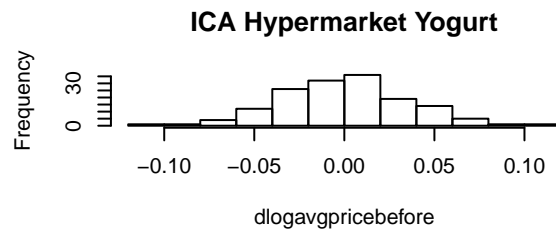
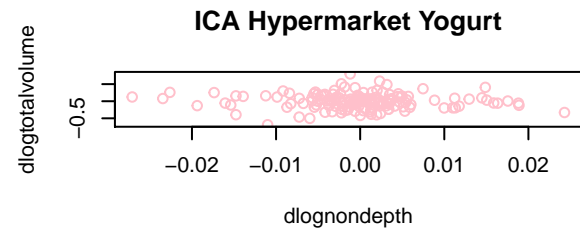
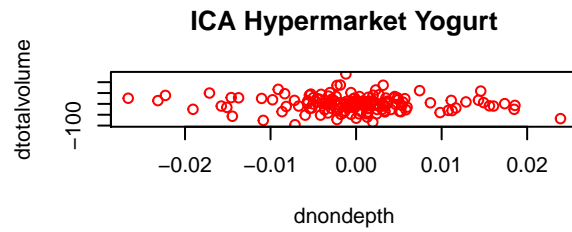
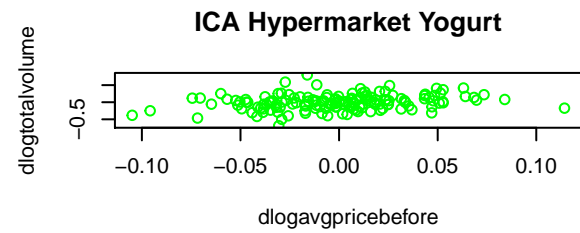
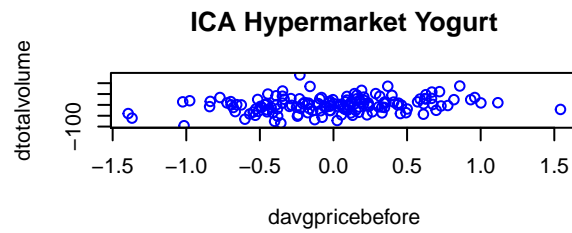




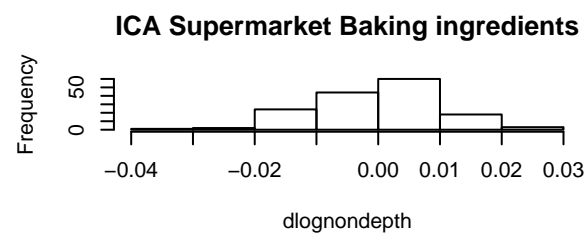
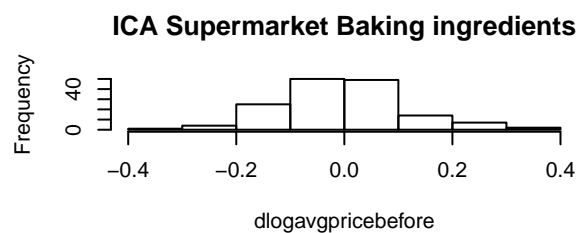
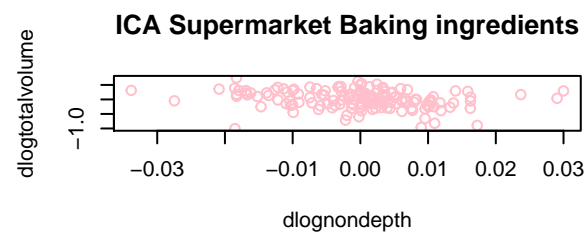
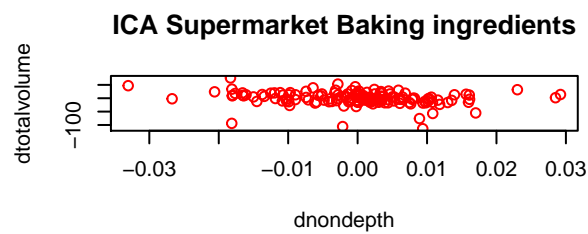
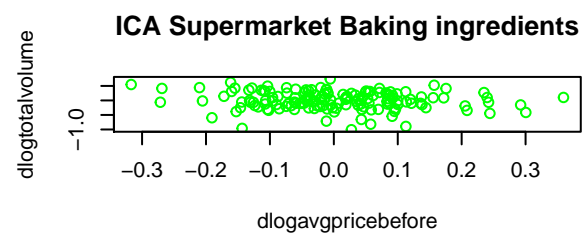
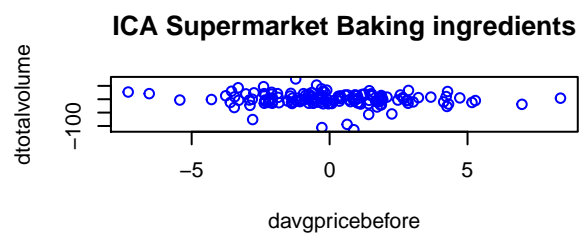




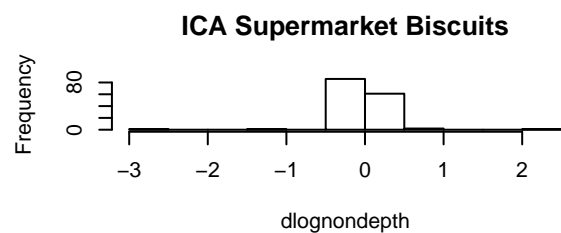
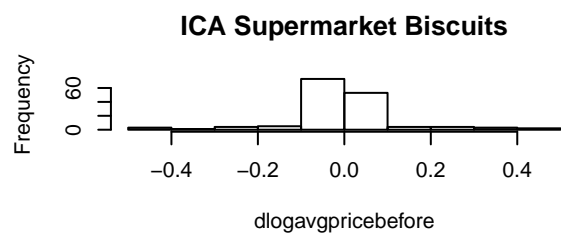
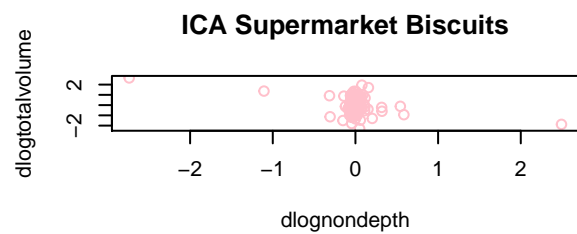
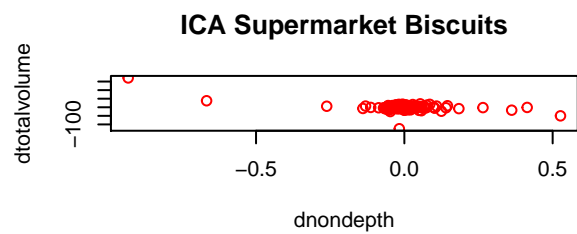
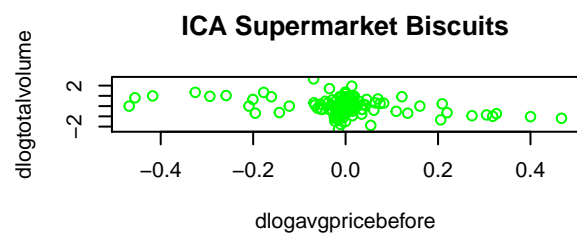
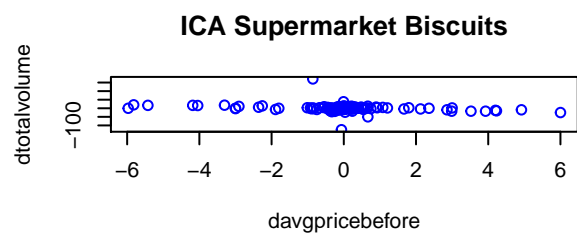


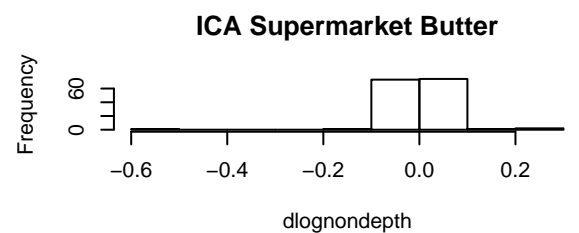
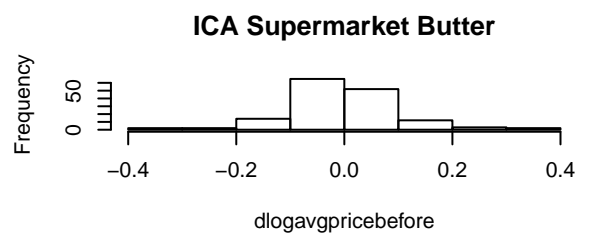
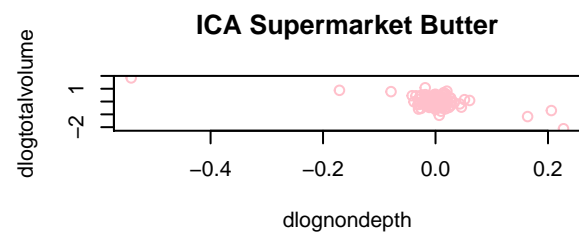
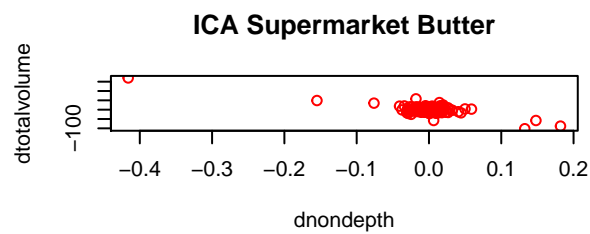
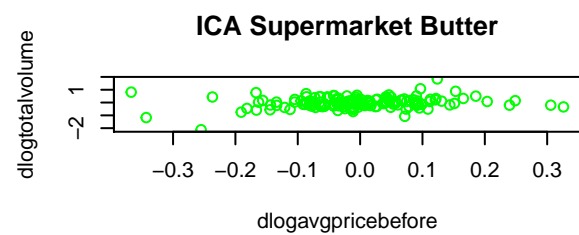
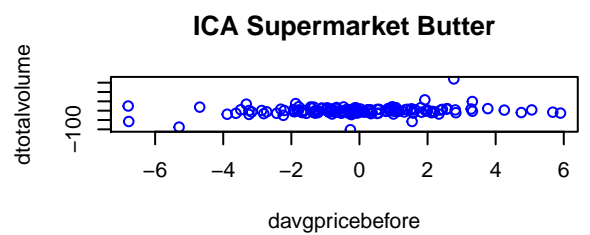


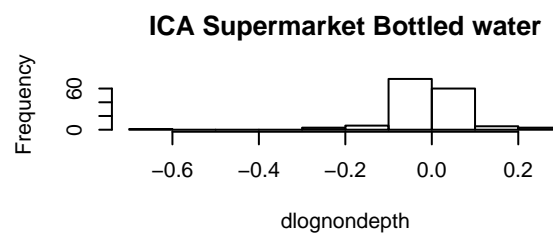
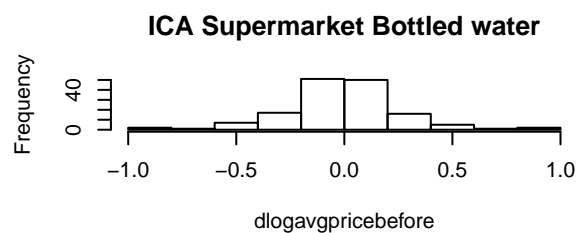
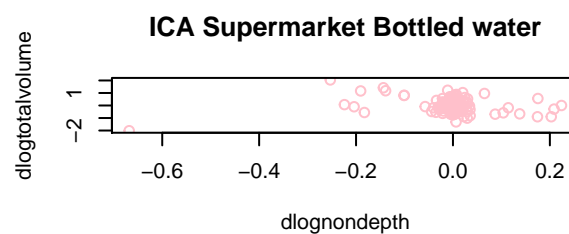
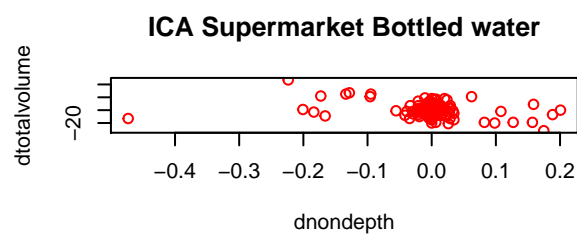
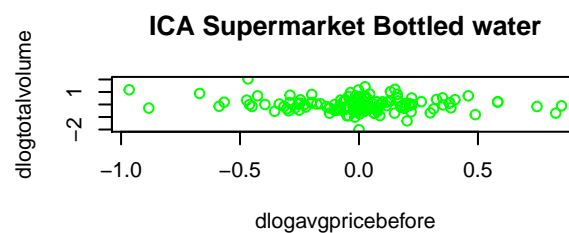
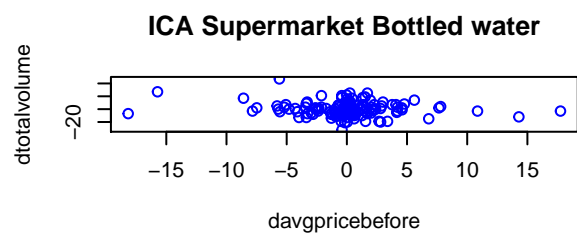
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for (i in 1:length(distinctcategory_super)){
  plot(dtotalvolume ~ davgpricebefore, data=data_PL_supermarket[data_PL_supermarket$category == distinctcategory_super[i]], main=paste("ICA Hypermarket Yogurt", distinctcategory_super[i]), col="blue")
  plot(dlogtotalvolume ~ dlogavgpricebefore, data=data_PL_supermarket[data_PL_supermarket$category == distinctcategory_super[i]], main=paste("ICA Hypermarket Yogurt", distinctcategory_super[i]), col="green")
  plot(dtotalvolume ~ dnondepth, data=data_PL_supermarket[data_PL_supermarket$category == distinctcategory_super[i]], main=paste("ICA Hypermarket Yogurt", distinctcategory_super[i]), col="red")
  plot(dlogtotalvolume ~ dlognondepth, data=data_PL_supermarket[data_PL_supermarket$category == distinctcategory_super[i]], main=paste("ICA Hypermarket Yogurt", distinctcategory_super[i]), col="pink")
  hist(data_PL_supermarket[data_PL_supermarket$category == distinctcategory_super[i]], $dlogavgpricebefore, main=paste("ICA Hypermarket Yogurt", distinctcategory_super[i]), col="blue")
  hist(data_PL_supermarket[data_PL_supermarket$category == distinctcategory_super[i]], $dlognondepth, main=paste("ICA Hypermarket Yogurt", distinctcategory_super[i]), col="pink")
}
```

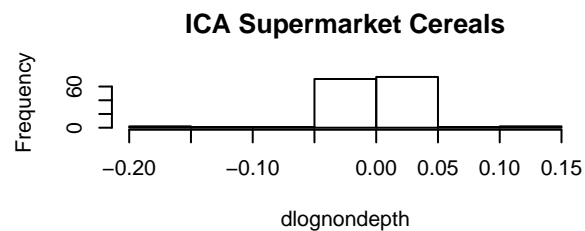
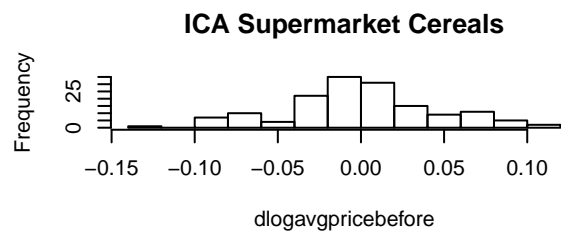
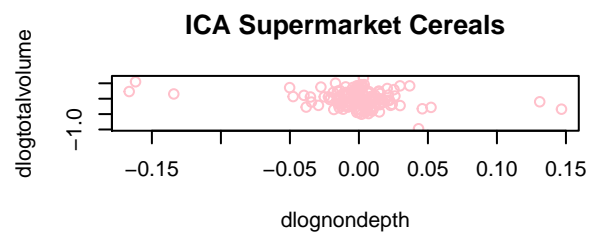
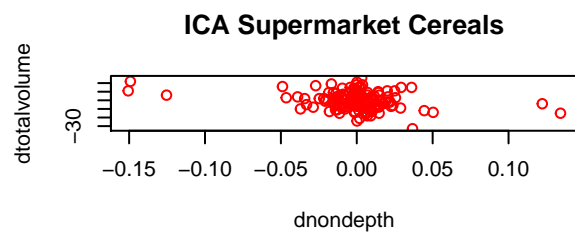
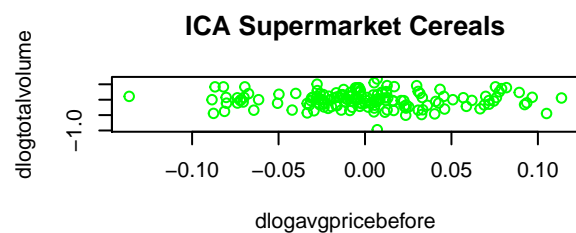
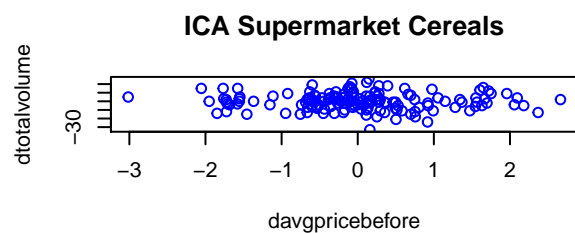


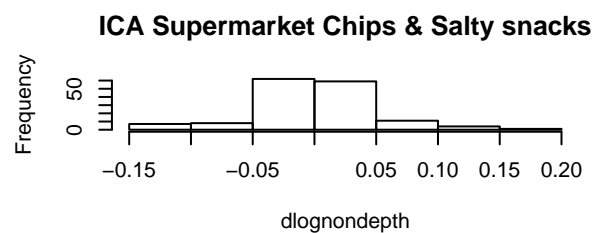
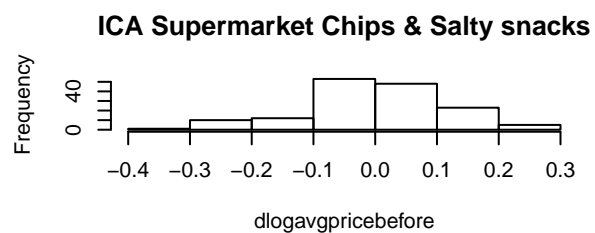
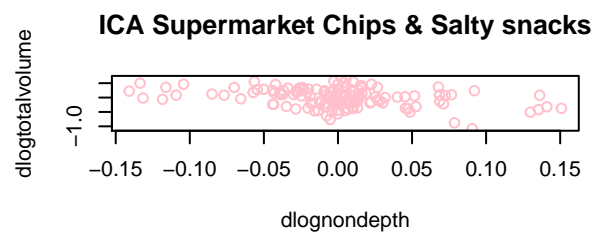
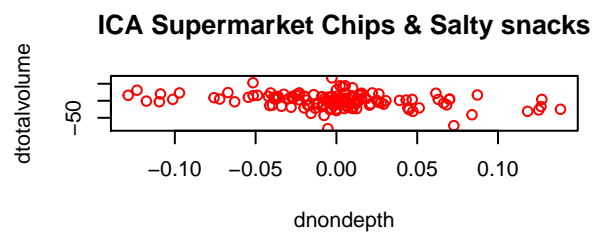
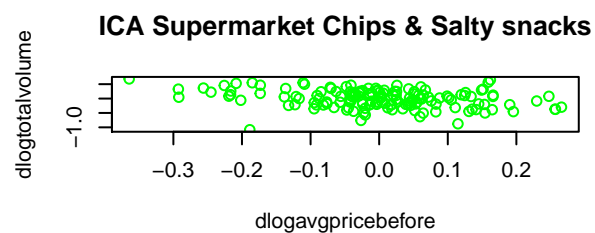
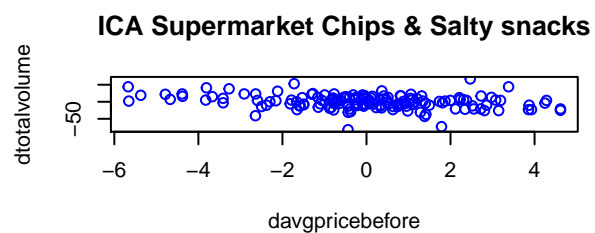


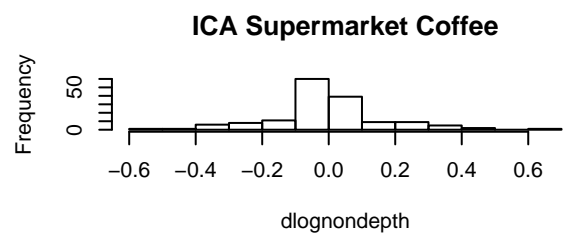
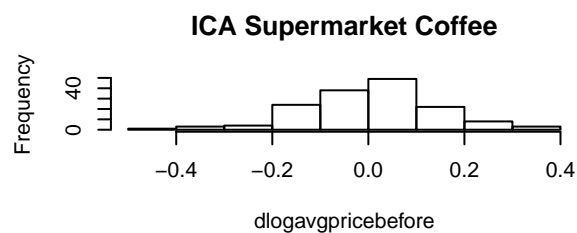
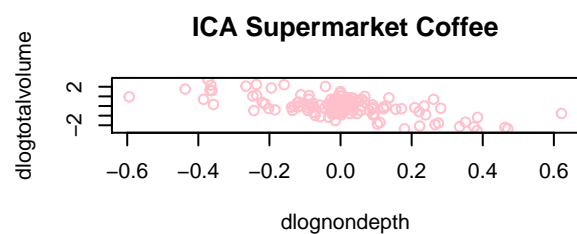
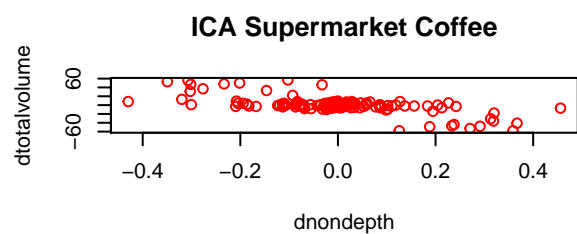
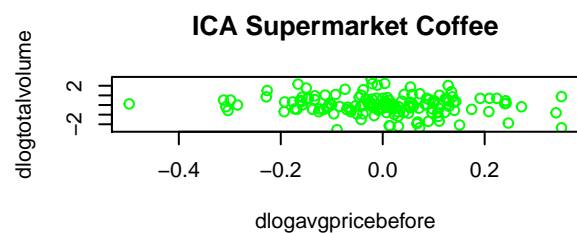
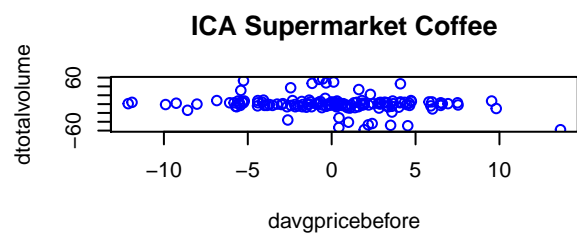


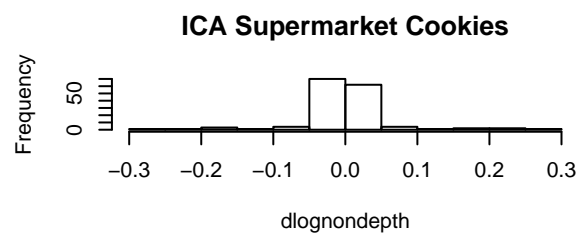
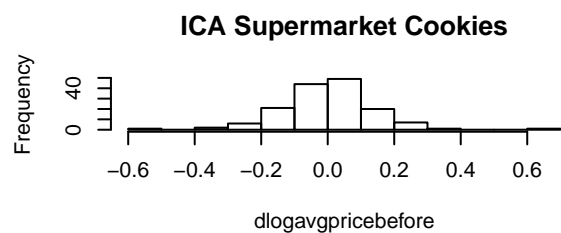
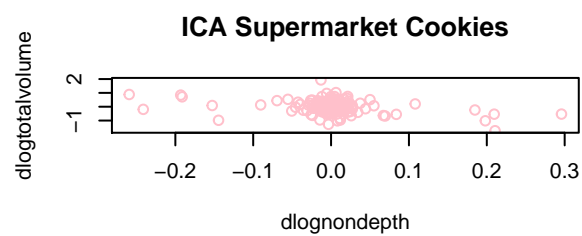
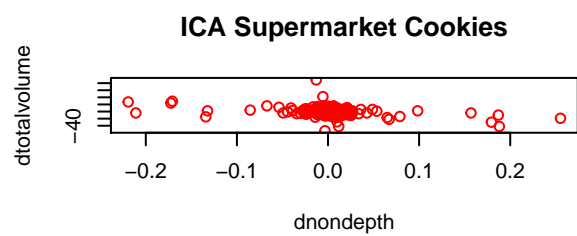
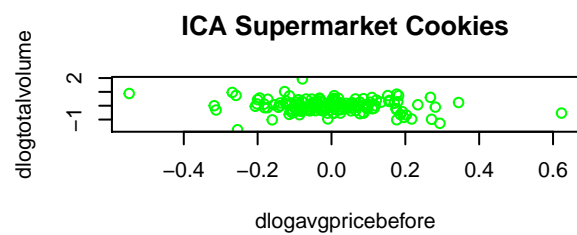
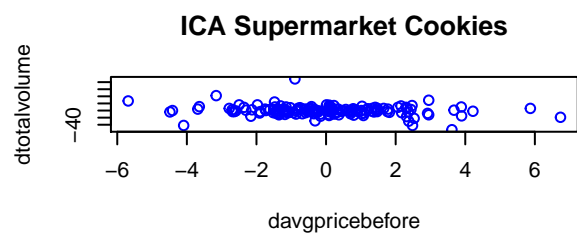


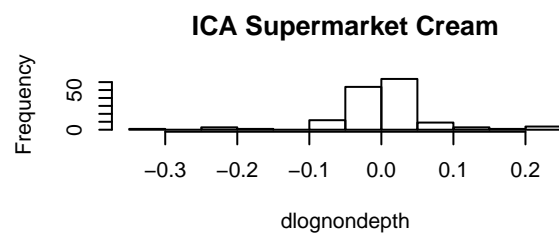
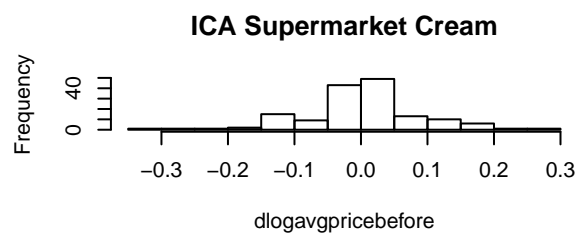
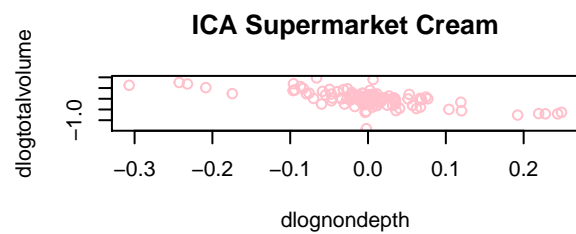
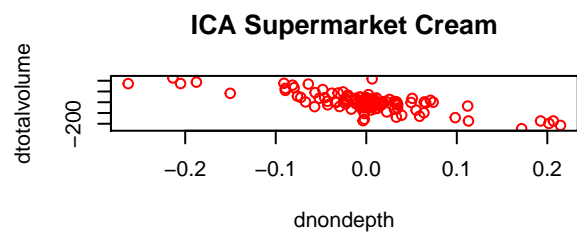
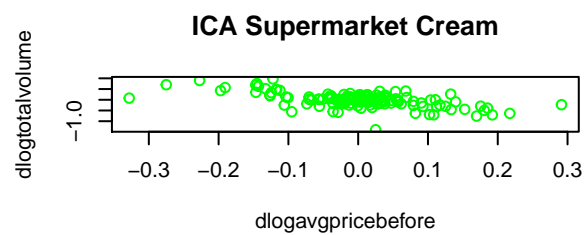
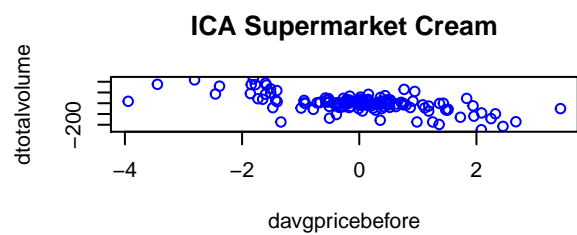




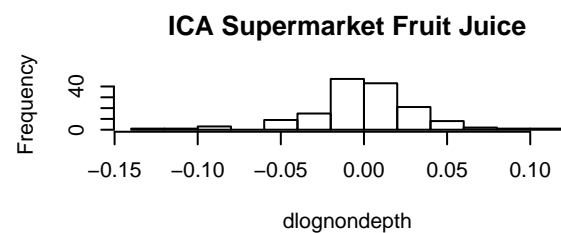
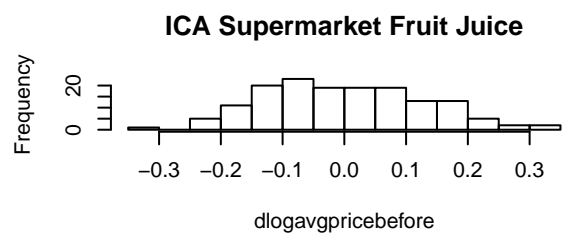
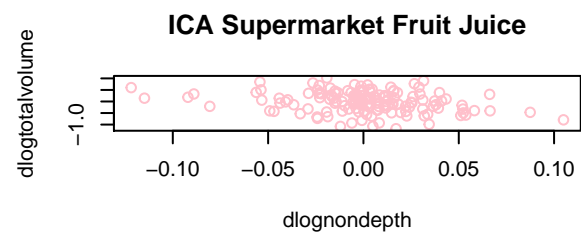
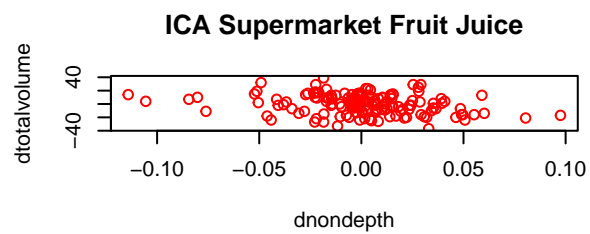
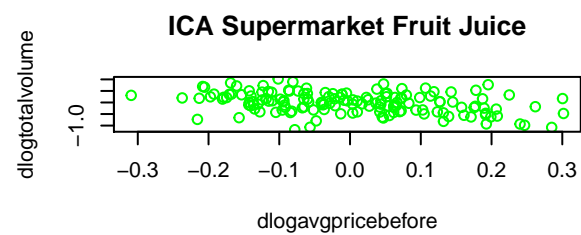
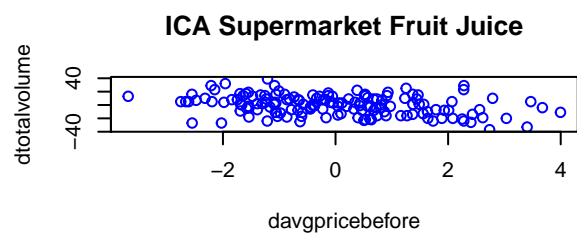


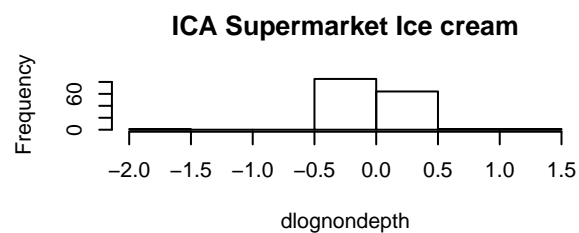
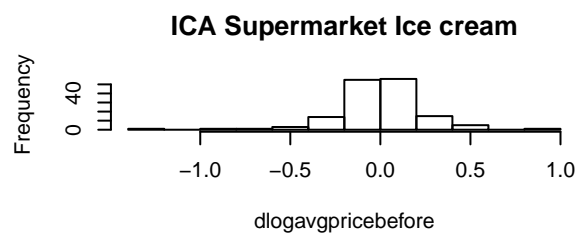
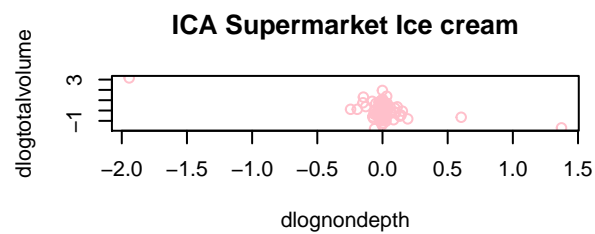
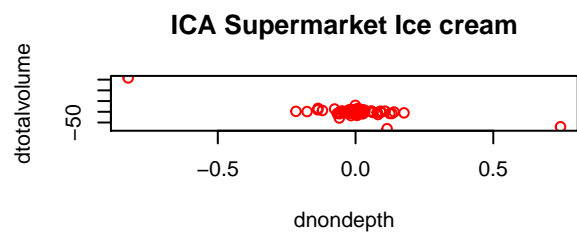
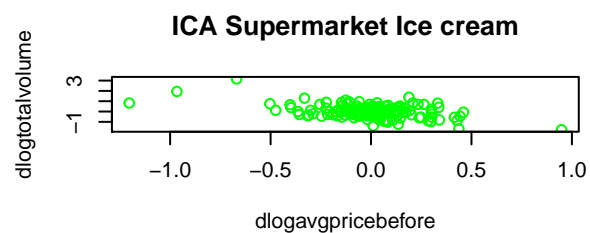
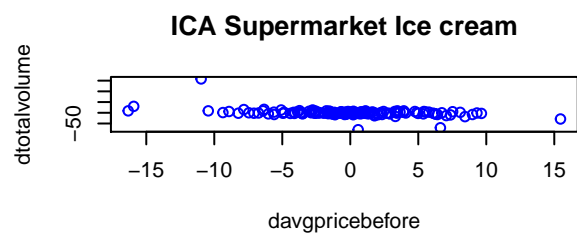


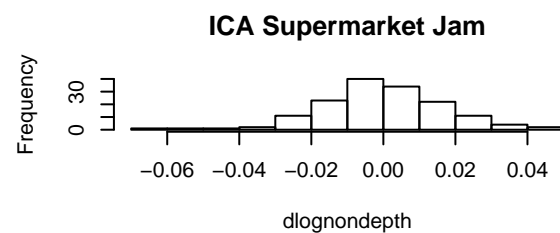
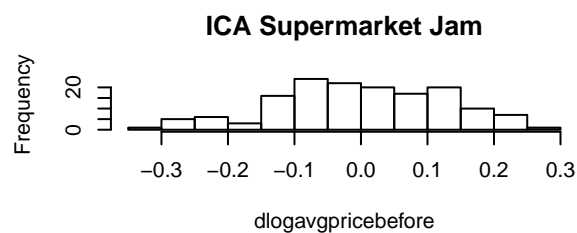
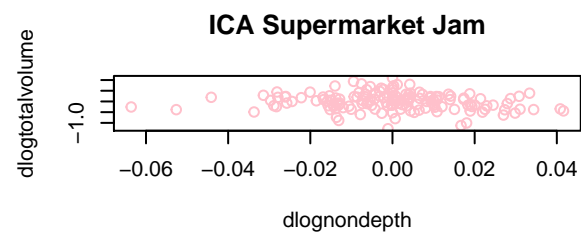
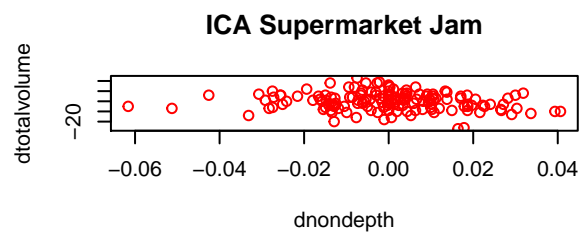
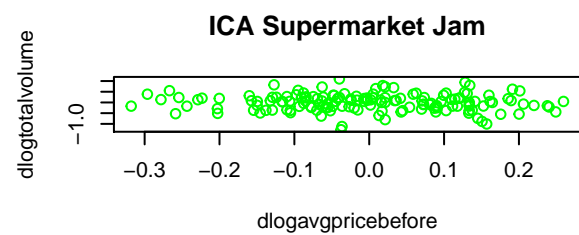
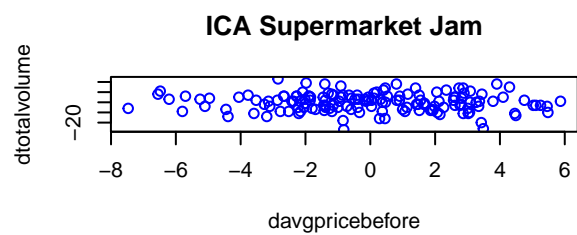


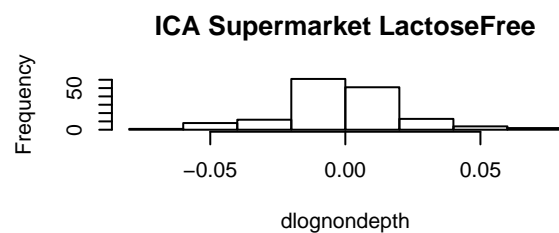
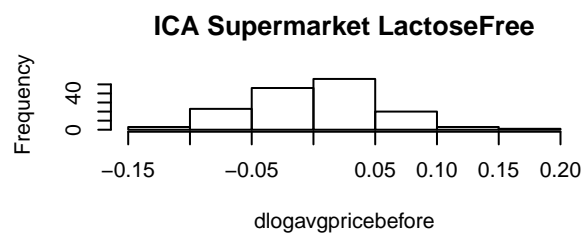
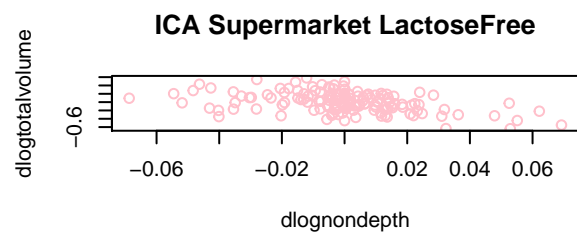
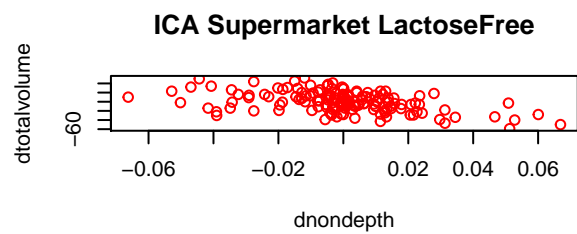
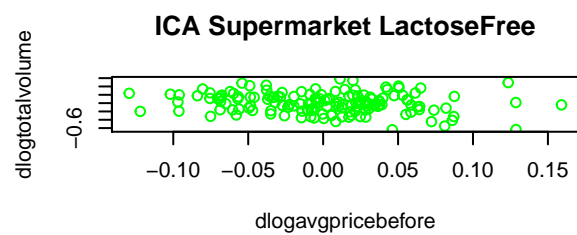
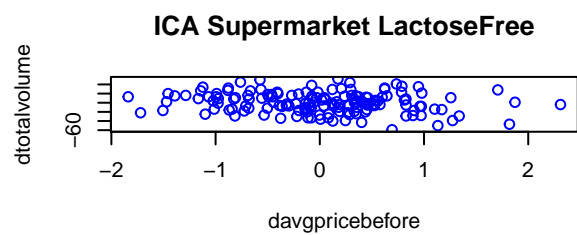


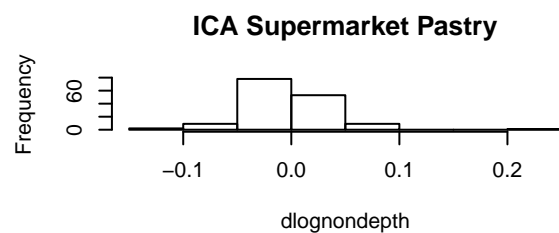
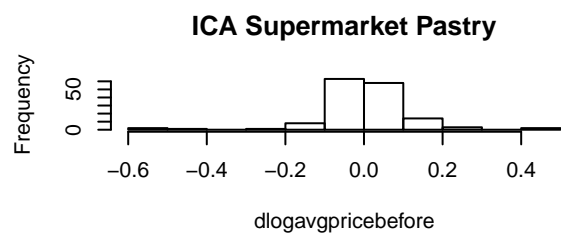
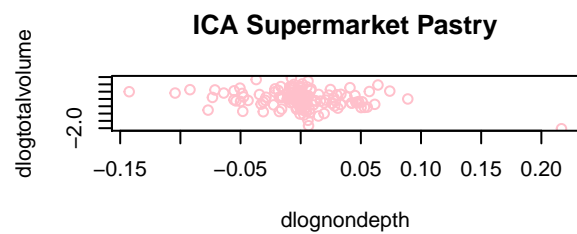
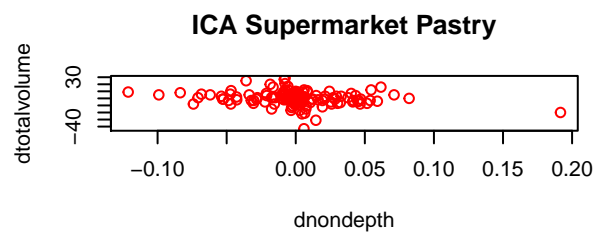
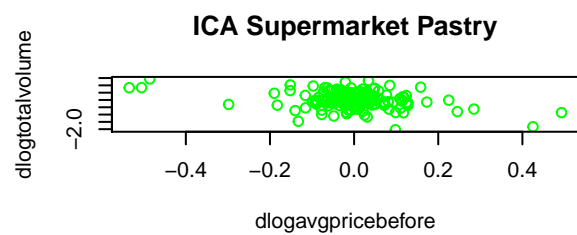
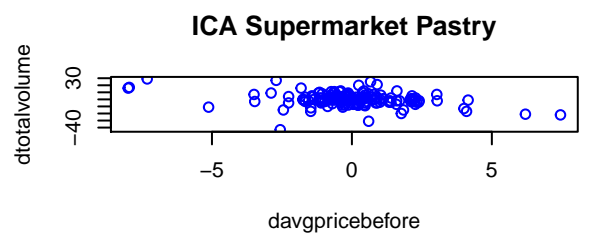


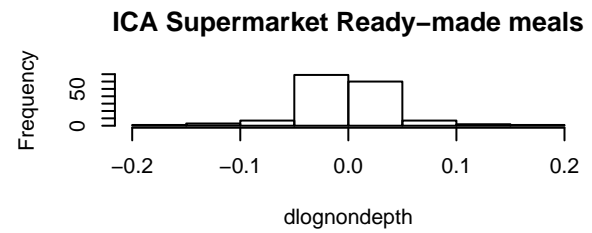
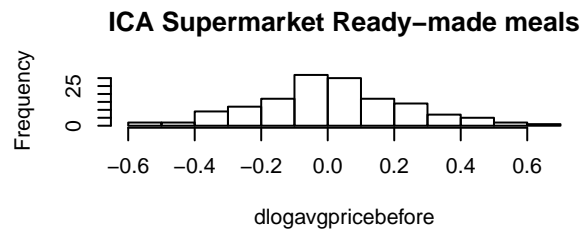
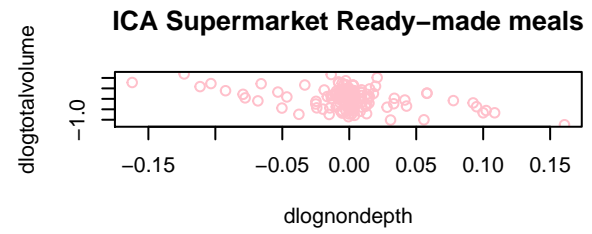
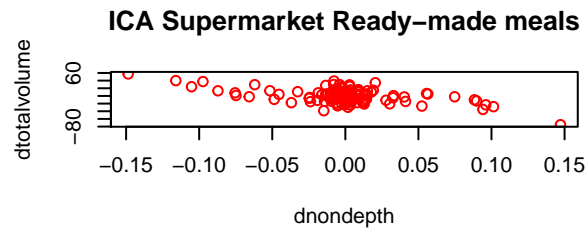
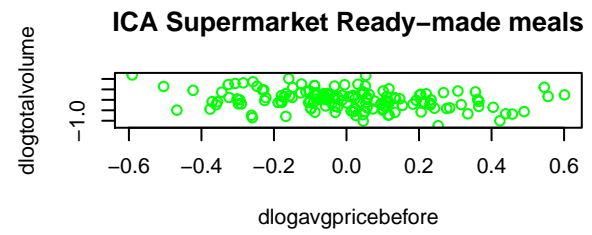
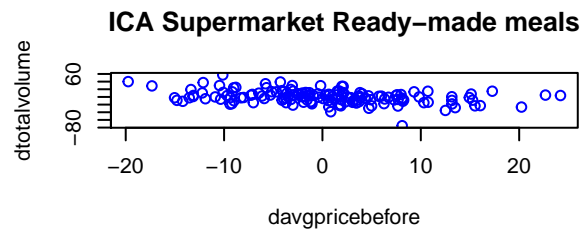


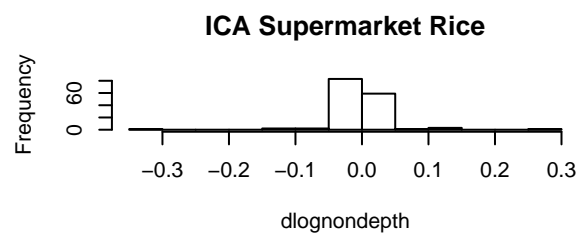
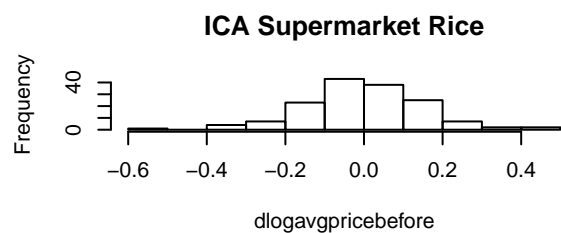
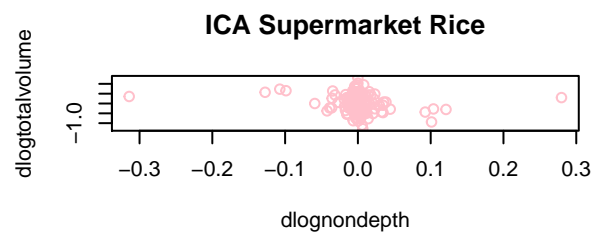
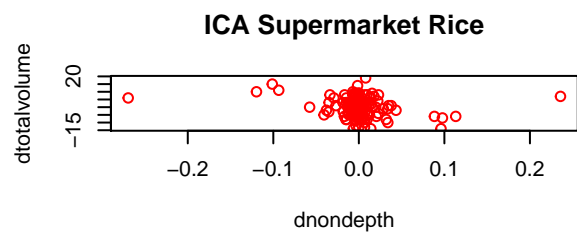
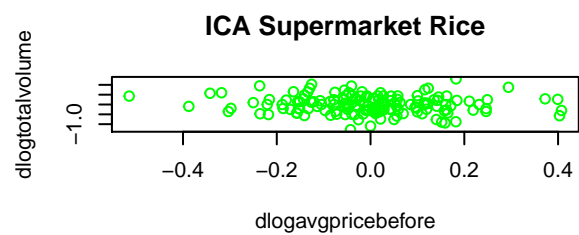
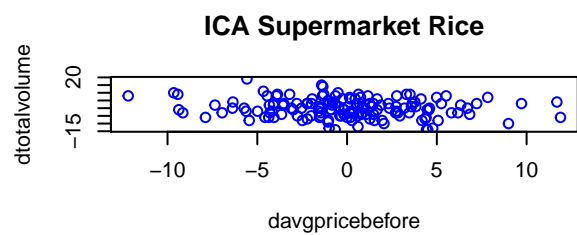


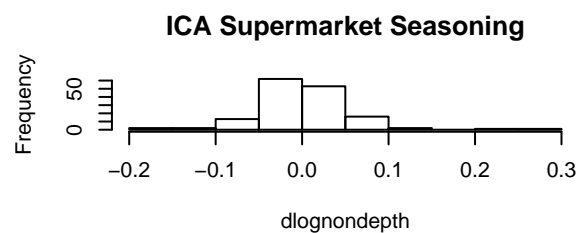
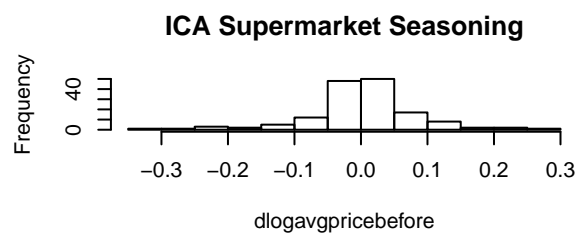
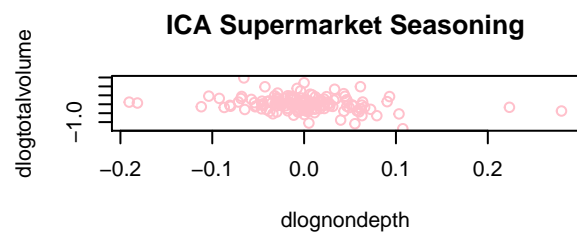
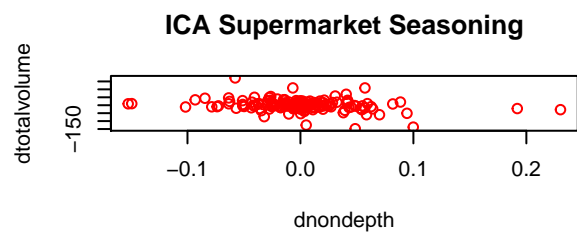
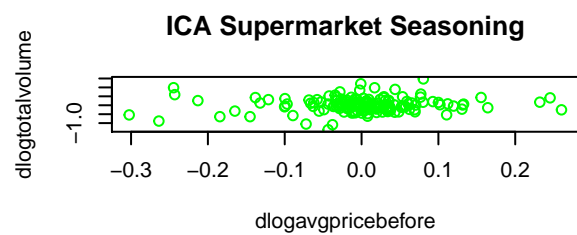
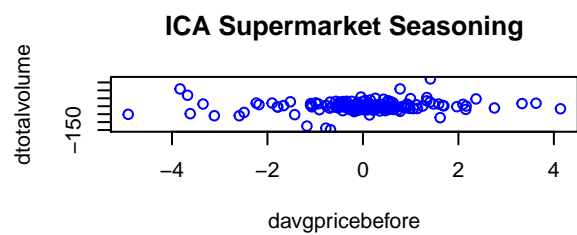




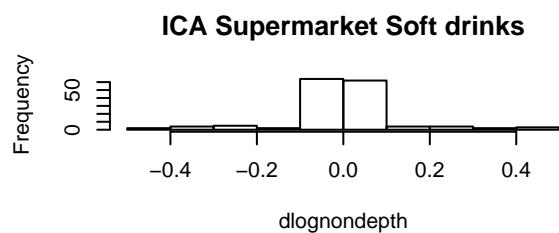
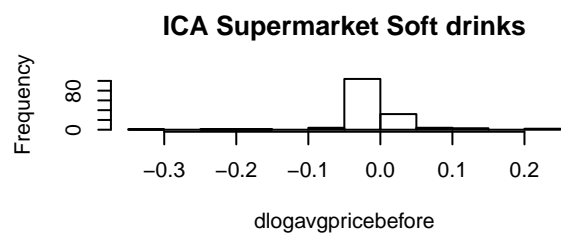
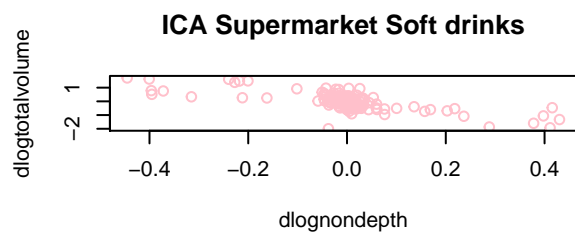
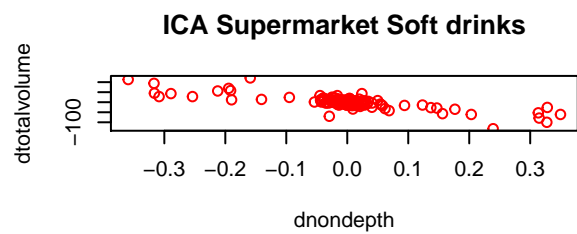
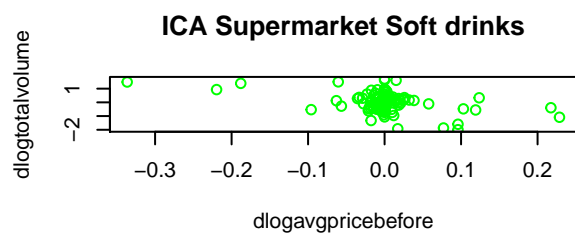
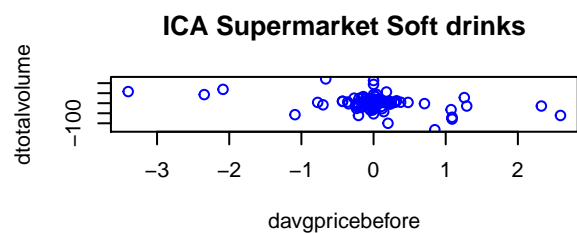


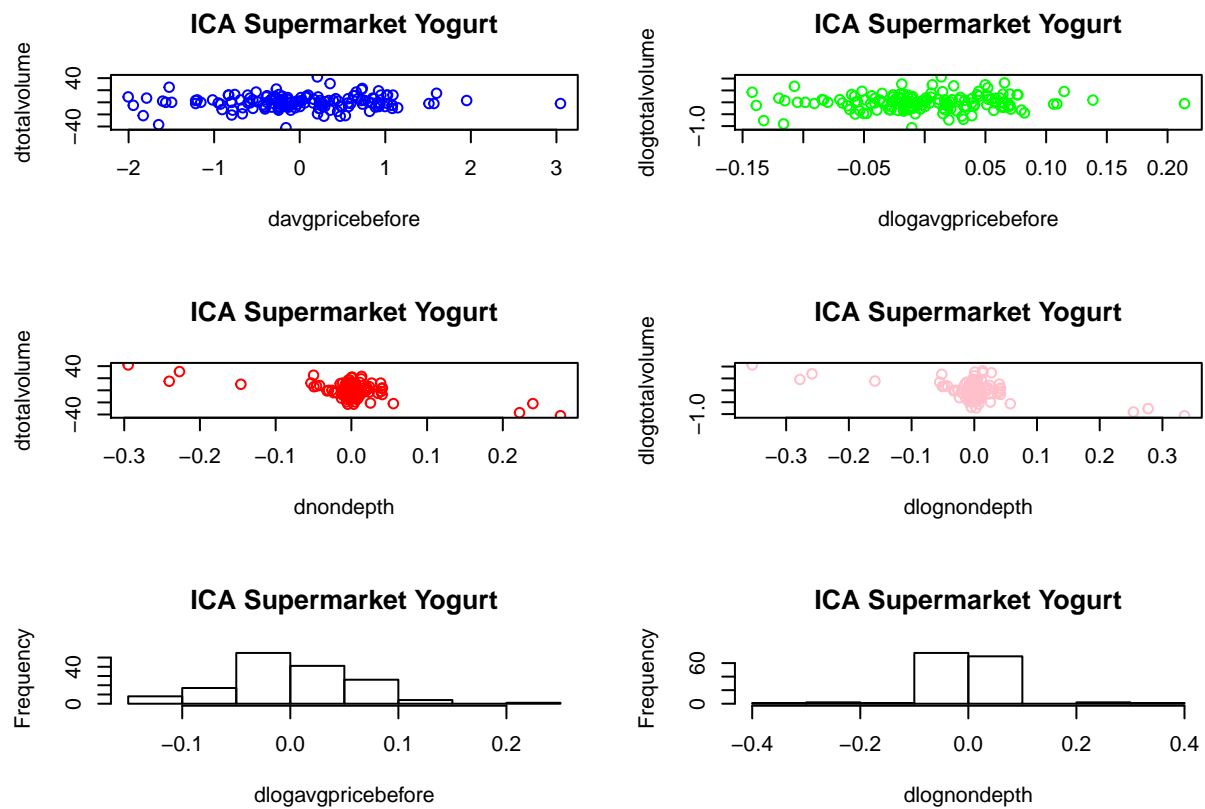












```
for (i in 1:length(distinctcategory_conve)){
  plot(dttotalvolume ~ davgpricebefore, data=data_PL_conve[data_PL_conve$category == distinctcategory_conve[i],])
  plot(dlogtotalvolume ~ dlogavgpricebefore, data=data_PL_conve[data_PL_conve$category == distinctcategory_conve[i],])
  plot(dttotalvolume ~ dnondepth, data=data_PL_conve[data_PL_conve$category == distinctcategory_conve[i],])
  plot(dlogtotalvolume ~ dlognondepth, data=data_PL_conve[data_PL_conve$category == distinctcategory_conve[i],])
  hist(data_PL_conve[data_PL_conve$category == distinctcategory_conve[i],]$dlogavgpricebefore,main = paste("ICA Supermarket Yogurt",distinctcategory_conve[i]))
  hist(data_PL_conve[data_PL_conve$category == distinctcategory_conve[i],]$dlognondepth,main = paste("ICA Supermarket Yogurt",distinctcategory_conve[i]))
}
```

