

Influence of economic factors on cross-sectional equity factors

Data Preparation

```
library(tidyverse)
library(lubridate)
```

```
inflation <- read.csv("CPIAUCSL.csv")
predictor_df <- read.csv("PredictorLSretWide.csv")
predictor_df$date <- as.character(seq(as.Date("1926/01/01"), as.Date("2020/12/01"), by = "month"))
inflation <-inflation %>% rename(date=DATE)
data_inflation_1 <- inner_join(predictor_df,inflation)
data_inflation_1 <- data_inflation_1 %>% select(-date)

library(data.table)
inflation_2 <- data.frame( inflation= shift(inflation$CPIAUCSL_PC1,n=1,type="lag")[2:(length(inflation$CPIAUCSL_PC1)-1)],date=inflation$date[2:(length(inflation$date)-1)])
data_inflation_2 <- inner_join(predictor_df,inflation_2)
data_inflation_2 <- data_inflation_2 %>% select(-date)

library(data.table)
M2 <- read.csv("WM2NS.csv")
M2 <- data.frame( M2= shift(M2$WM2NS_PC1,n=1,type="lag")[2:(length(M2$WM2NS_PC1)-1)],date=M2$DATE[2:(length(M2$DATE)-1)])
M2$M2<-as.numeric(M2$M2)
data_m2 <- inner_join(predictor_df,M2)
data_m2<- data_m2 %>% select(-date)
interest_rate_spreads <- read.csv("T10Y2Y.csv")
interest_rate_spreads <- data.frame( interest_rate_spreads= shift(interest_rate_spreads$T10Y2Y,n=1,type="lag")[2:(length(interest_rate_spreads$T10Y2Y)-1)],date=interest_rate_spreads$DATE[2:(length(interest_rate_spreads$DATE)-1)])
interest_rate_spreads$interest_rate_spreads<-as.numeric(interest_rate_spreads$interest_rate_spreads)
data_interest_rate <- inner_join(predictor_df,interest_rate_spreads)
data_interest_rate <- data_interest_rate %>% select(-date)
```

```
correlation_inflation_1_func <- function(a) {
  correlation <- cor(data_inflation_1[a],data_inflation_1$CPIAUCSL_PC1,use = "pairwise.complete.obs")
}
correlation_inflation_2_func <- function(a) {
  correlation <- cor(data_inflation_2[a],data_inflation_2$inflation,use = "pairwise.complete.obs")
}
correlation_m2_func <- function(a) {
  correlation <- cor(data_m2[a],data_m2$M2,use = "pairwise.complete.obs")
}
correlation_interest_rate_func <- function(a) {
  correlation <- cor(data_interest_rate[a],data_interest_rate$interest_rate_spreads,use = "pairwise.complete.obs")
}
```

Analyses

Inflation

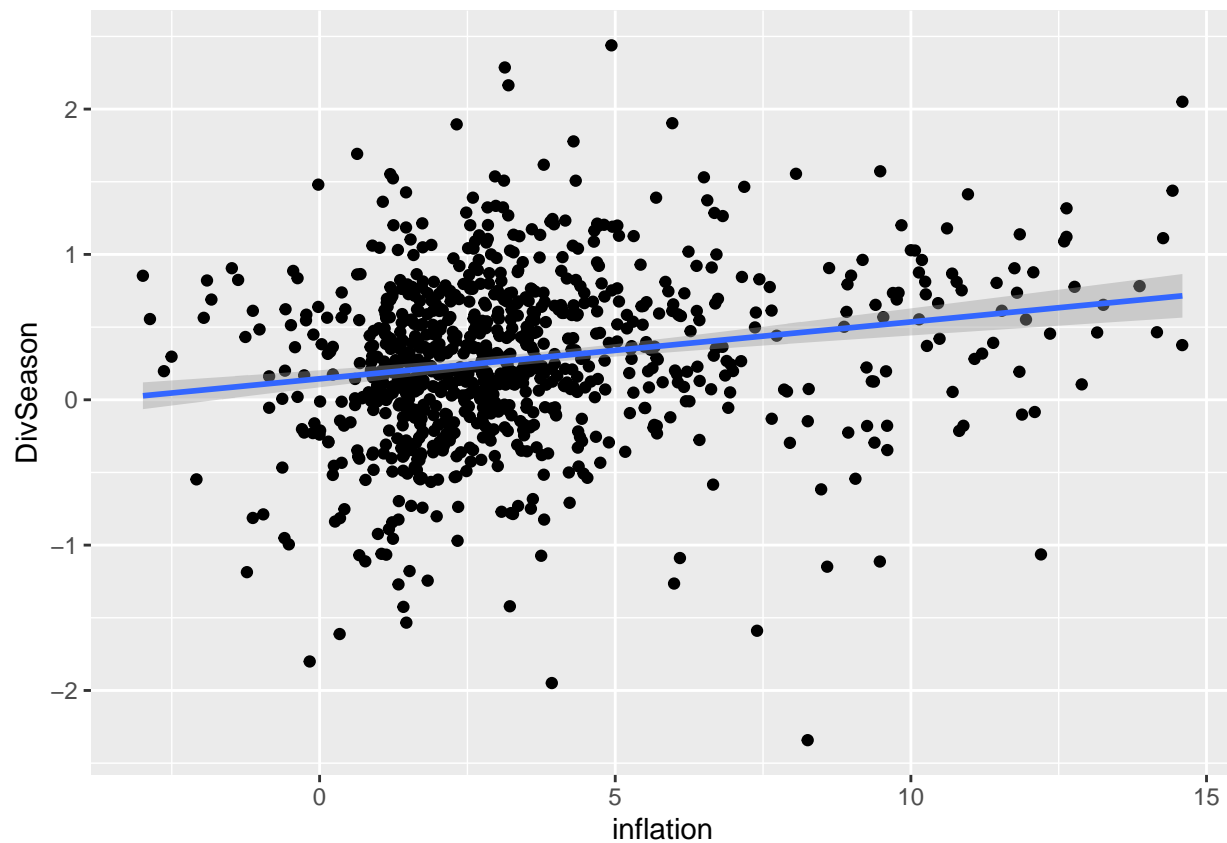
```
correlation_inflation_1 <-data.frame(factor=names(data_inflation_1),correlation = sapply(c(1:length(data_inflation_1$DivSeason)),function(x){correlation_inflation_1 %>% filter(abs(correlation)>0.1)%>% arrange(desc(abs(correlation)))
```

##	factor	correlation
## 1	CPIAUCSL_PC1	1.0000000
## 2	DivSeason	0.1938446
## 3	EarningsSurprise	0.1916709
## 4	AnalystRevision	0.1820322
## 5	FR	0.1704862
## 6	MomSeasonShort	0.1277794
## 7	STreversal	0.1270485
## 8	Activism2	0.1256408
## 9	NumEarnIncrease	0.1197880
## 10	ReturnSkew	0.1173312
## 11	ReturnSkew3F	0.1122606
## 12	EarningsStreak	0.1121078
## 13	CredRatDG	0.1096766
## 14	DivYieldST	0.1091406
## 15	ChTax	0.1012756

```
correlation_inflation_2 <-data.frame(factor=names(data_inflation_2),correlation = sapply(c(1:length(data_inflation_2$DivSeason)),function(x){correlation_inflation_2 %>% filter(abs(correlation)>0.1)%>% arrange(desc(abs(correlation)))
```

##	factor	correlation
## 1	inflation	1.0000000
## 2	DivSeason	0.1955348
## 3	FR	0.1888087
## 4	AnalystRevision	0.1794760
## 5	EarningsSurprise	0.1786618
## 6	STreversal	0.1262385
## 7	Activism2	0.1259888
## 8	MomSeasonShort	0.1241877
## 9	ReturnSkew	0.1236737
## 10	ReturnSkew3F	0.1166965
## 11	EarningsStreak	0.1119150
## 12	NumEarnIncrease	0.1096010
## 13	DivYieldST	0.1081515
## 14	CredRatDG	0.1074987
## 15	ChTax	0.1008057
## 16	DelDRC	0.1000434

```
data_inflation_2 %>% ggplot(aes(inflation,DivSeason))+geom_point()+geom_smooth(method = "lm")
```



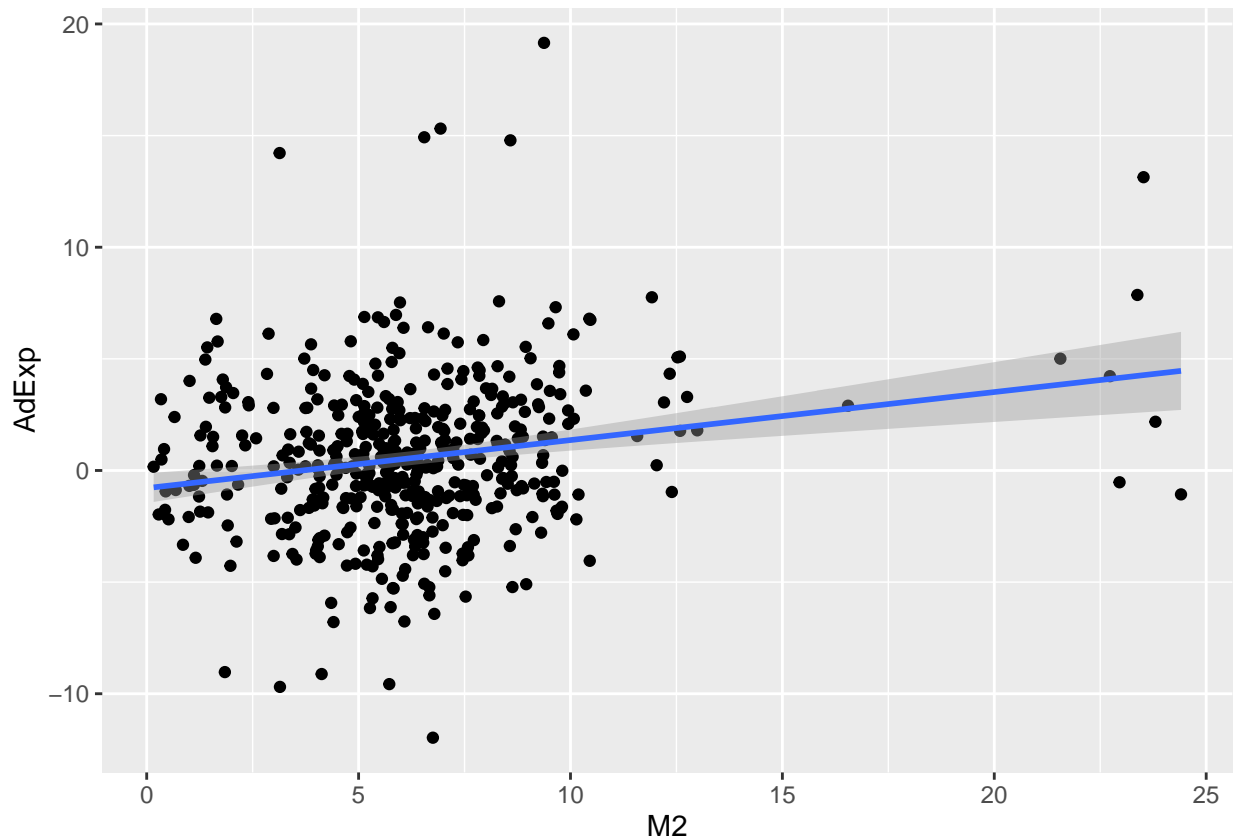
M2

```
correlation_m2 <-data.frame(factor=names(data_m2),correlation = sapply(c(1:length(data_m2)), correlation_m2 %>% filter(abs(correlation)>0.1)%>% arrange(desc(abs(correlation)))
```

```
##           factor correlation
## 1             M2  1.0000000
## 2           AdExp  0.2023819
## 3      OPLeverage  0.1693250
## 4 CustomerMomentum -0.1684040
## 5 RevenueSurprise -0.1582092
## 6              EP  0.1565430
## 7              FR -0.1496109
## 8         IntanSP  0.1404809
## 9              EBM  0.1385046
## 10          VarCF -0.1327214
## 11 MeanRankRevGrowth  0.1261648
## 12 MomOffSeason06YrPlus  0.1226592
## 13          std_turn -0.1173937
## 14      BetaTailRisk  0.1153190
## 15          Frontier  0.1086659
## 16      ShareIss5Y  0.1074886
## 17          IntanCFP  0.1032580
## 18          SmileSlope  0.1013940
```

```
## 19 IndMom 0.1012270
```

```
data_m2 %>% ggplot(aes(M2,AdExp))+geom_point()+geom_smooth(method = "lm")
```



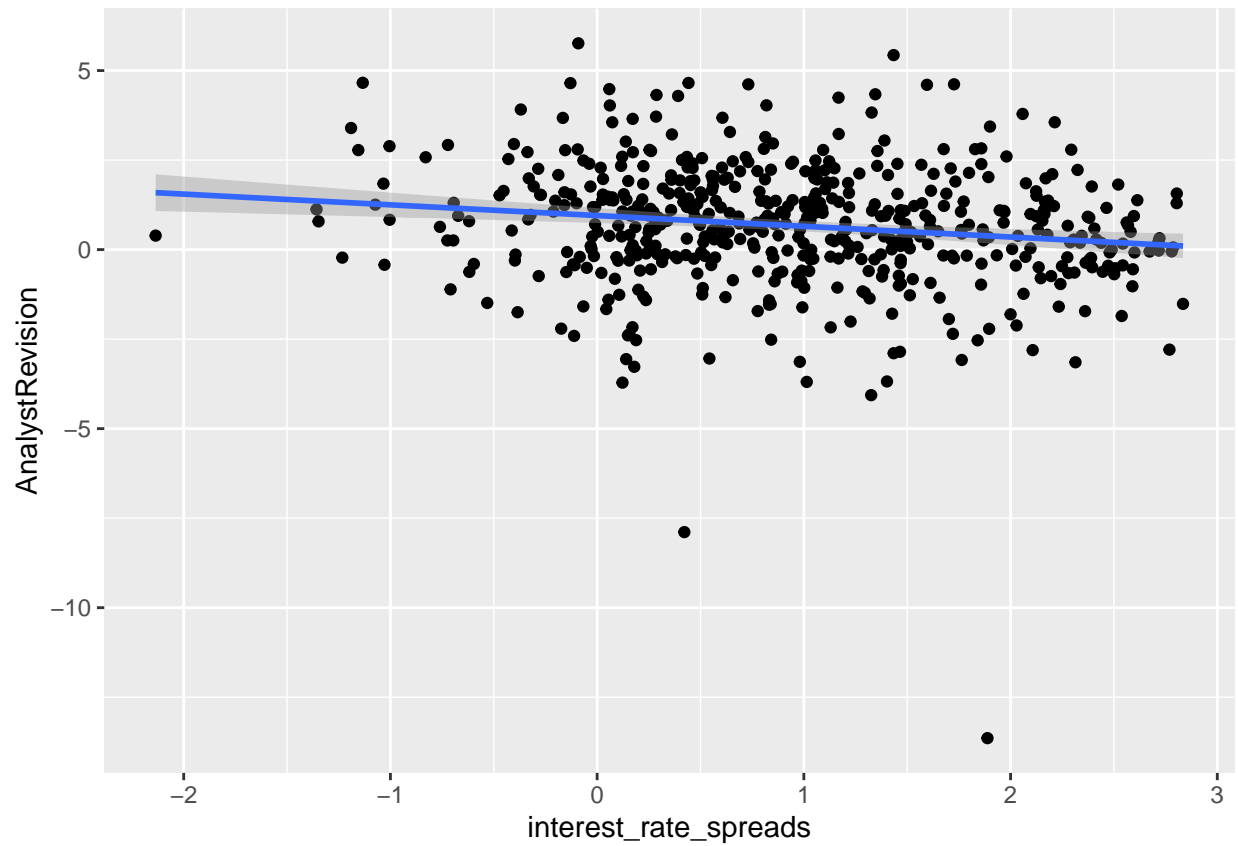
interest_rate_spreads

```
correlation_interest_rate <-data.frame(factor=names(data_interest_rate),correlation = sapply(c(1:length  
correlation_interest_rate %>% filter(abs(correlation)>0.1)%>% arrange(desc(abs(correlation)))
```

```
##           factor correlation
## 1 interest_rate_spreads  1.0000000
## 2 AnalystRevision    -0.1583384
## 3 AccrualsBM         0.1398347
## 4 ChangeInRecommendation -0.1274885
## 5 UpRecomm          -0.1259445
## 6 CredRatDG         -0.1247468
## 7 OrderBacklog       0.1165798
## 8 retConglomerate    -0.1112282
## 9 MomOffSeason06YrPlus 0.1082684
## 10 DelNetFin        -0.1068272
## 11 MS               -0.1052920
## 12 ExchSwitch        0.1024326
## 13 MomVol           -0.1014080
```

```
## 14      EarningsSurprise -0.1004595
## 15      AdExp          0.1004381
## 16      SP            0.1000648
```

```
data_interest_rate %>% ggplot(aes(interest_rate_spreads,AnalystRevision))+geom_point()+geom_smooth(method="lm")
```



References

Data

@article{ChenZimmermann2021, title={Open Source Cross Sectional Asset Pricing}, author={Chen, Andrew Y. and Tom Zimmermann}, journal={Critical Finance Review}, year={Forthcoming} }