

Human Freedom Index Project

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```
library(tidyverse)
hfi <- read_csv("data/hfi_cc_2019.csv")

glimpse(hfi)

## Rows: 1,620
## Columns: 120
## $ year                <dbl> 2017, 2017, 2017, 2017, 2017, 20...
## $ ISO_code             <chr> "ALB", "DZA", "AGO", "ARG", "ARM...
## $ countries            <chr> "Albania", "Algeria", "Angola", ...
## $ region              <chr> "Eastern Europe", "Middle East &...
## $ hf_score             <chr> "7.84", "4.99", "5.4", "6.86", "...
## $ hf_rank             <chr> "38", "155", "151", "77", "54", ...
## $ hf_quartile          <chr> "1", "4", "4", "2", "2", "1", "1...
## $ pf_rol_procedural    <chr> "6.7", "-", "-", "7.1", "-", "8....
## $ pf_rol_civil         <chr> "4.5", "-", "-", "5.8", "-", "7....
## $ pf_rol_criminal      <chr> "4.7", "-", "-", "4.3", "-", "7....
## $ pf_rol              <chr> "5.3", "3.8", "3.4", "5.7", "4.9...
## $ pf_ss_homicide       <chr> "9.1", "9.5", "8.1", "8", "9", "...
## $ pf_ss_disappearances_disap <chr> "10", "10", "10", "5", "10", "10...
## $ pf_ss_disappearances_violent <chr> "10", "9.5", "9.7", "10", "10", ...
## $ pf_ss_disappearances_organized <chr> "10", "5", "7.5", "7.5", "7.5", ...
## $ pf_ss_disappearances_fatalities <chr> "10", "9.9", "9.9", "10", "10", ...
## $ pf_ss_disappearances_injuries <chr> "10", "9.9", "7.2", "10", "10", ...
## $ pf_ss_disappearances <chr> "10", "8.9", "8.9", "8.5", "9.5"...
## $ pf_ss_women_fgm      <chr> "10", "10", "10", "10", "10", "1...
## $ pf_ss_women_inheritance_widows <chr> "-", "-", "-", "-", "-", "-", ...
## $ pf_ss_women_inheritance_daughters <chr> "-", "-", "-", "-", "-", "-", ...
## $ pf_ss_women_inheritance <chr> "7.5", "0", "5", "10", "7.5", "1...
## $ pf_ss_women          <chr> "8.8", "5", "7.5", "10", "8.8", ...
## $ pf_ss                <chr> "9.3", "7.8", "8.1", "8.8", "9.1...
## $ pf_movement_domestic <chr> "10", "10", "5", "10", "10", "10...
## $ pf_movement_foreign  <chr> "10", "5", "5", "10", "5", "10",...
## $ pf_movement_women    <chr> "10", "2.5", "10", "10", "10", "...
## $ pf_movement          <chr> "10", "5.8", "6.7", "10", "8.3",...
## $ pf_religion_estop_establish <chr> "-", "-", "-", "-", "-", "-", ...
## $ pf_religion_estop_operate <chr> "-", "-", "-", "-", "-", "-", ...
## $ pf_religion_estop     <chr> "10", "5", "10", "7.5", "5", "10...
## $ pf_religion_harassment <chr> "9.6", "6.9", "8.9", "9", "8.6",...
## $ pf_religion_restrictions <chr> "8", "3", "7.5", "6.9", "5.1", "...
## $ pf_religion          <chr> "9.2", "4.9", "8.8", "7.8", "6.2...
## $ pf_association_association <chr> "10", "5", "2.5", "7.5", "7.5", ...
## $ pf_association_assembly <chr> "10", "5", "2.5", "10", "7.5", "...
## $ pf_association_political_establish <chr> "-", "-", "-", "-", "-", "-", ...
```

## \$ pf_association_political_operate	<chr> "-", "-", "-", "-", "-", "-", "-...
## \$ pf_association_political	<chr> "10", "5", "2.5", "5", "5", "10"...
## \$ pf_association_prof_establish	<chr> "-", "-", "-", "-", "-", "-", "-...
## \$ pf_association_prof_operate	<chr> "-", "-", "-", "-", "-", "-", "-...
## \$ pf_association_prof	<chr> "10", "5", "5", "7.5", "5", "10"...
## \$ pf_association_sport_establish	<chr> "-", "-", "-", "-", "-", "-", "-...
## \$ pf_association_sport_operate	<chr> "-", "-", "-", "-", "-", "-", "-...
## \$ pf_association_sport	<chr> "10", "5", "7.5", "7.5", "7.5", ...
## \$ pf_association	<chr> "10", "5", "4", "7.5", "6.5", "1..."
## \$ pf_expression_killed	<chr> "10", "10", "10", "10", "10", "1..."
## \$ pf_expression_jailed	<chr> "10", "9.5", "10", "10", "10", "...
## \$ pf_expression_influence	<chr> "5", "2.7", "2.7", "5.7", "3.3",...
## \$ pf_expression_control	<chr> "5.3", "4", "2.5", "5.5", "4.3",...
## \$ pf_expression_cable	<chr> "10", "10", "7.5", "10", "7.5", ...
## \$ pf_expression_newspapers	<chr> "10", "7.5", "5", "10", "7.5", "...
## \$ pf_expression_internet	<chr> "10", "7.5", "7.5", "10", "7.5",...
## \$ pf_expression	<chr> "8.6", "7.3", "6.5", "8.7", "7.2..."
## \$ pf_identity_legal	<chr> "0", "-", "10", "10", "7", "7", ...
## \$ pf_identity_sex_male	<chr> "10", "0", "0", "10", "10", "10"...
## \$ pf_identity_sex_female	<chr> "10", "0", "0", "10", "10", "10"...
## \$ pf_identity_sex	<chr> "10", "0", "0", "10", "10", "10"...
## \$ pf_identity_divorce	<chr> "7.5", "0", "5", "10", "7.5", "1..."
## \$ pf_identity	<chr> "5.8", "0", "5", "10", "8.2", "9..."
## \$ pf_score	<chr> "8.01", "5.2", "5.98", "8.04", "...
## \$ pf_rank	<chr> "46", "146", "121", "41", "72", ...
## \$ ef_government_consumption	<chr> "8.1", "2.7", "6.3", "5.4", "7.2..."
## \$ ef_government_transfers	<chr> "7.3", "7.8", "8.9", "6.3", "7.3..."
## \$ ef_government_enterprises	<chr> "8", "0", "6", "6", "8", "10", "...
## \$ ef_government_tax_income	<chr> "9", "7", "10", "7", "5", "6", "...
## \$ ef_government_tax_payroll	<chr> "7", "2", "9", "1", "5", "5", "3..."
## \$ ef_government_tax	<chr> "8", "4.5", "9.5", "4", "5", "5....
## \$ ef_government_soa	<chr> "6.2", "2.9", "3.1", "6.9", "9.5..."
## \$ ef_government	<chr> "7.5", "3.6", "6.8", "5.7", "7.4..."
## \$ ef_legal_judicial	<chr> "2.5", "4.3", "1.4", "3.6", "4",...
## \$ ef_legal_courts	<chr> "3.1", "4.3", "1.7", "3", "4.2",...
## \$ ef_legal_protection	<chr> "4.6", "4.8", "3.3", "4.4", "5.8..."
## \$ ef_legal_military	<chr> "8.3", "4.2", "3.3", "7.5", "5.8..."
## \$ ef_legal_integrity	<chr> "4.2", "5", "4.2", "3.3", "5", "...
## \$ ef_legal_enforcement	<chr> "4.4", "4.4", "2.3", "3.6", "5.2..."
## \$ ef_legal_restrictions	<chr> "6.6", "6.6", "5.5", "6.9", "9.8..."
## \$ ef_legal_police	<chr> "6.8", "6.1", "3.4", "3.7", "5.8..."
## \$ ef_legal_crime	<chr> "6.2", "6.7", "4.3", "4.1", "7",...
## \$ ef_legal_gender	<chr> "1", "0.8", "0.8", "0.8", "1", "...
## \$ ef_legal	<chr> "5.1", "4.7", "3", "4", "5.9", "...
## \$ ef_money_growth	<dbl> 9.3, 7.0, 9.4, 5.0, 8.6, 9.0, 8....
## \$ ef_money_sd	<chr> "9.7", "8.5", "4.2", "6", "9.5",...
## \$ ef_money_inflation	<dbl> 9.6, 8.9, 3.7, 4.9, 9.8, 9.6, 9....
## \$ ef_money_currency	<chr> "10", "5", "5", "10", "10", "10"...
## \$ ef_money	<chr> "9.6", "7.3", "5.6", "6.5", "9.5..."
## \$ ef_trade_tariffs_revenue	<chr> "9.6", "8.5", "9.2", "6.7", "9",...
## \$ ef_trade_tariffs_mean	<chr> "9.3", "6.2", "7.7", "7.3", "8.8..."
## \$ ef_trade_tariffs_sd	<chr> "8.1", "5.9", "4.3", "5.9", "8.1..."
## \$ ef_trade_tariffs	<chr> "9", "6.9", "7.1", "6.6", "8.6",...
## \$ ef_trade_regulatory_nontariff	<chr> "6", "4.8", "4.9", "4.6", "5.7",...

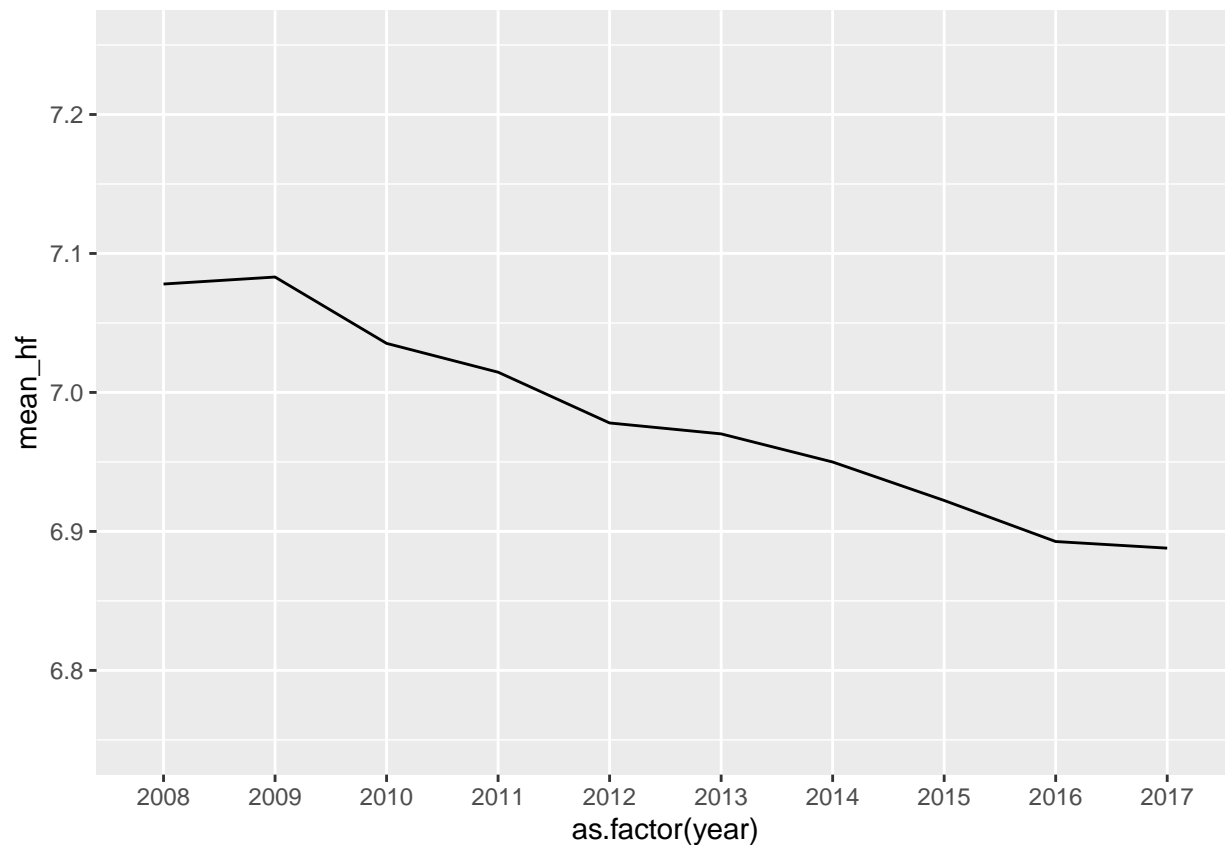
```
## $ ef_trade_regulatory_compliance <chr> "9.4", "0.5", "2.5", "5.2", "9",...
## $ ef_trade_regulatory <chr> "7.7", "2.6", "3.7", "4.9", "7.4...
## $ ef_trade_black <chr> "10", "0", "0", "10", "10", "10"...
## $ ef_trade_movement_foreign <chr> "6.3", "3.7", "2.9", "5.4", "5.1...
## $ ef_trade_movement_capital <chr> "5.4", "0", "3.1", "0.8", "5.4",...
## $ ef_trade_movement_visit <chr> "8.3", "1.1", "0.1", "8", "10", ...
## $ ef_trade_movement <chr> "6.7", "1.6", "2", "4.7", "6.8",...
## $ ef_trade <chr> "8.3", "2.8", "3.2", "6.5", "8.2...
## $ ef_regulation_credit_ownership <chr> "10", "0", "5", "5", "10", "10",...
## $ ef_regulation_credit_private <chr> "9.1", "5.3", "9.2", "4.3", "7.8...
## $ ef_regulation_credit_interest <chr> "10", "10", "6", "9", "10", "10"...
## $ ef_regulation_credit <chr> "9.7", "5.1", "6.7", "6.1", "9.3...
## $ ef_regulation_labor_minwage <chr> "5.6", "5.6", "10", "2.8", "6.7"...
## $ ef_regulation_labor_firing <chr> "5.4", "4.1", "4.4", "2.2", "5.7...
## $ ef_regulation_labor_bargain <chr> "6.4", "6", "7.2", "3.3", "6.8",...
## $ ef_regulation_labor_hours <chr> "8", "6", "4", "10", "10", "10",...
## $ ef_regulation_labor_dismissal <chr> "6.3", "7.8", "6.6", "2.5", "9.3...
## $ ef_regulation_labor_conscription <chr> "10", "3", "0", "10", "0", "10",...
## $ ef_regulation_labor <chr> "6.9", "5.4", "5.4", "5.1", "6.4...
## $ ef_regulation_business_adm <chr> "6.3", "3.7", "2.4", "2.5", "4.6...
## $ ef_regulation_business_bureaucracy <chr> "6.7", "1.8", "1.3", "7.1", "6.2...
## $ ef_regulation_business_start <chr> "9.7", "9.3", "8.7", "9.6", "9.9...
## $ ef_regulation_business_bribes <chr> "4.1", "3.8", "1.9", "3.3", "4.6...
## $ ef_regulation_business_licensing <chr> "6", "8.7", "8.1", "5.4", "9.3",...
## $ ef_regulation_business_compliance <chr> "7.2", "7", "6.8", "6.5", "7.1",...
## $ ef_regulation_business <chr> "6.7", "5.7", "4.9", "5.7", "6.9...
## $ ef_regulation <chr> "7.8", "5.4", "5.7", "5.6", "7.5...
## $ ef_score <chr> "7.67", "4.77", "4.83", "5.67", ...
## $ ef_rank <chr> "30", "159", "158", "147", "27",...
```

Question 1

How has overall freedom around the world changed over time?

```
hfscore_by_year <- hfi %>%
  filter(hf_score != "-") %>%
  group_by(year) %>%
  summarize(mean_hf = mean(as.numeric(hf_score)))

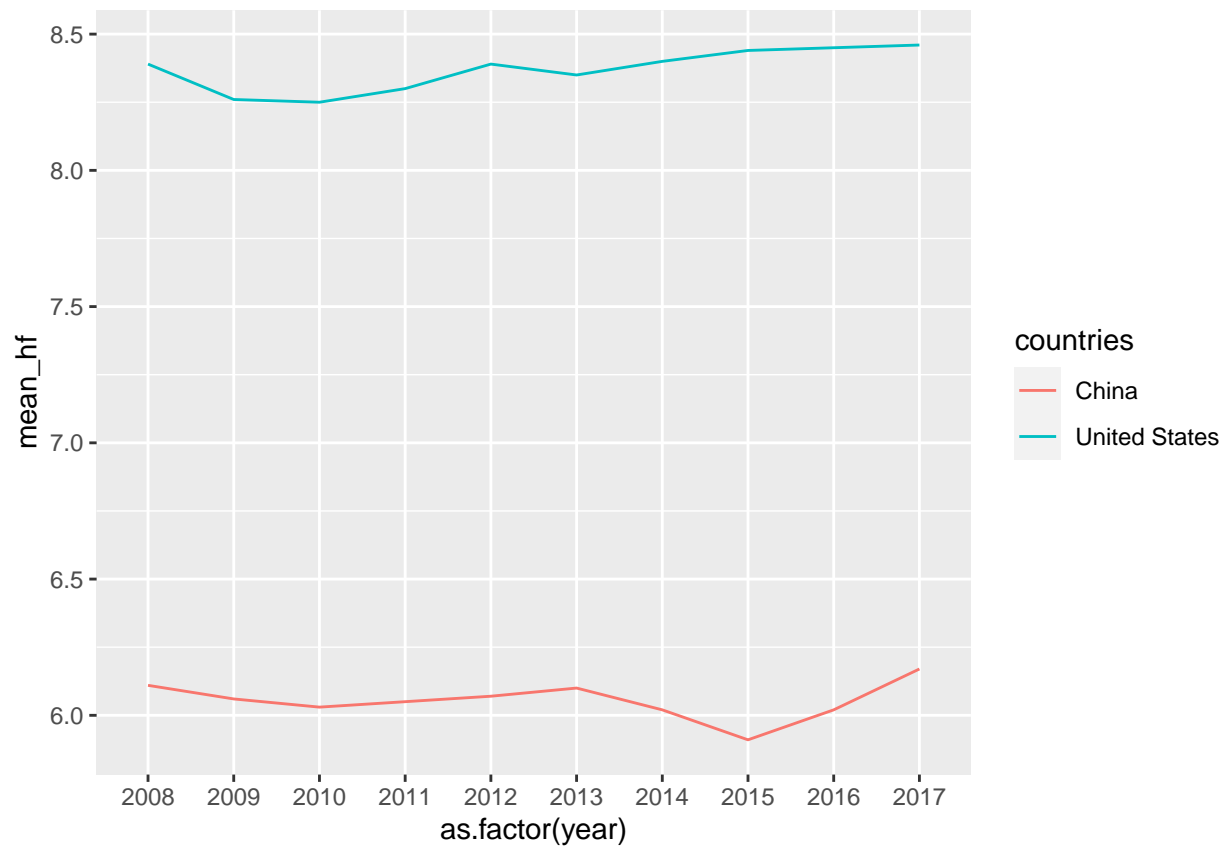
ggplot(data = hfscore_by_year,
  aes(x = as.factor(year), y = mean_hf, group = 1)) +
  geom_line(stat = "identity") +
  ylim(6.75, 7.25)
```



Question 2

How has overall freedom in the U.S. and China changed over time?

```
hfscore_china_us <- hfi %>%  
  filter(hf_score != "-" &  
         (countries == "China" | countries == "United States")) %>%  
  group_by(year, countries) %>%  
  summarize(mean_hf = mean(as.numeric(hf_score)))  
  
ggplot(data = hfscore_china_us,  
       aes(x = as.factor(year), y = mean_hf, group = countries, color = countries)) +  
  geom_line(stat = "identity")
```



Question 3