

Data Analysis

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Load Merged Data and Clean it

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##
## Attaching package: 'dplyr'

## The following object is masked from 'package:MASS':
##
##      select

## The following objects are masked from 'package:stats':
##
##      filter, lag

## The following objects are masked from 'package:base':
##
##      intersect, setdiff, setequal, union

names(mydata)

## [1] "X"                                "cowcode"
## [3] "year"                            "country"
## [5] "v2x_delibdem"                   "v2dlreason"
## [7] "v2dlcommon"                     "v2dlcountr"
## [9] "v2dlconslt"                     "v2dlengage"
## [11] "v2xeg_eqprotec"                 "v2xeg_eqdr"
## [13] "v2x_jucon"                      "v2xlg_legcon"
## [15] "v2cscnsult"                     "v2xps_party"
## [17] "v2lgqstexp"                     "v2lginvstp"
## [19] "v2lgotovst"                     "e_competition"
## [21] "e_democ"                        "e_autoc"
## [23] "v2x_corr"                       "v2x_pubcorr"
## [25] "v2x_execorr"                    "v2elvotbuy"
## [27] "v2elirreg"                      "v2psprlnks"
## [29] "v2exbribe"                      "v2exembez"
## [31] "v2excrptps"                     "v2dlencmps"
## [33] "e_wbgi_gee"                     "e_wbgi_rle"
## [35] "v2pepwrres"                     "v2pepwrsoc"
## [37] "v2elreggov"                     "v2elrgpwr"
## [39] "v2ellocgov"                     "v2ellocpwr"
## [41] "v2x_feduni"                     "e_dpi_author"
## [43] "v2mecenefm"                     "v2mecenefi"
## [45] "e_peaveduc"                     "e_migdppln"
## [47] "e_migdpgro"                     "e_peginiwi"
## [49] "e_reserves_billions"            "e_Total_Oil_Income_PC"
## [51] "e_Fiscal_Reliance"              "e_miinteco"
## [53] "e_miinterc"                     "e_Civil_War"
## [55] "expnd_security_EXP"              "expnddefence_EXP"
## [57] "exp_public_order_EXP"            "wagessalaries_EXP"
```

```
## [59] "subpentrans_EXP"      "pensions_EXP"
## [61] "total_welfare_EXP"    "education_EXP"
## [63] "health_EXP"           "social_protection_EXP"
## [65] "housing_EXP"          "owelfarespend_EXP"
## [67] "expend_security_GDPGSRE" "expenddefence_GDPGSRE"
## [69] "exp_public_order_GDPGSRE" "wagessalaries_GDPGSRE"
## [71] "subpentrans_GDPGSRE"   "pensions_GDPGSRE"
## [73] "total_welfare_GDPGSRE" "education_GDPGSRE"
## [75] "health_GDPGSRE"       "social_protection_GDPGSRE"
## [77] "housing_GDPGSRE"      "owelfarespend_GDPGSRE"
```

```
summary(mydata) #tons of missing data
```

```
##           X           cowcode           year           country
## Min.      : 1      Min.      : 31.0      Min.      :1946      Afghanistan: 61
## 1st Qu.:1775      1st Qu.:310.0      1st Qu.:1969      Albania      : 61
## Median :3549      Median :490.0      Median :1983      Argentina    : 61
## Mean      :3549      Mean      :473.2      Mean      :1981      Bhutan       : 61
## 3rd Qu.:5323      3rd Qu.:678.0      3rd Qu.:1995      Bolivia      : 61
## Max.      :7097      Max.      :990.0      Max.      :2006      Brazil       : 61
##                                     (Other)      :6731
## v2x_delibdem      v2dlreason      v2dlcommon      v2dlcountr
## Min.      :0.0008      Min.      :-3.1248      Min.      :-3.3935      Min.      :-3.2567
## 1st Qu.:0.0294      1st Qu.: -0.9934      1st Qu.: -0.8513      1st Qu.: -1.5221
## Median :0.1065      Median : -0.0140      Median : 0.1956      Median : -0.4479
## Mean      :0.2008      Mean      :-0.0674      Mean      : 0.0829      Mean      :-0.5257
## 3rd Qu.:0.3004      3rd Qu.: 0.8213      3rd Qu.: 0.9680      3rd Qu.: 0.3957
## Max.      :0.8814      Max.      : 3.4146      Max.      : 2.8681      Max.      : 2.7256
## NA's      :722      NA's      :713      NA's      :713      NA's      :713
## v2dlconslt      v2dlengage      v2xeg_eqprotec      v2xeg_eqdr
## Min.      :-3.2106      Min.      :-3.2440      Min.      :0.0125      Min.      :0.0062
## 1st Qu.: -1.0871      1st Qu.: -1.2753      1st Qu.:0.2965      1st Qu.:0.2732
## Median : -0.2838      Median : -0.2781      Median :0.5032      Median :0.4910
## Mean      :-0.1931      Mean      :-0.2658      Mean      :0.4941      Mean      :0.4915
## 3rd Qu.: 0.6594      3rd Qu.: 0.7475      3rd Qu.:0.6984      3rd Qu.:0.6976
## Max.      : 3.7133      Max.      : 3.1593      Max.      :0.9798      Max.      :0.9825
## NA's      :713      NA's      :713      NA's      :877      NA's      :713
## v2x_jucon      v2xlg_legcon      v2cscnsult      v2xps_party
## Min.      :0.0056      Min.      :0.0241      Min.      :-2.3916      Min.      :0.0057
## 1st Qu.:0.2310      1st Qu.:0.1165      1st Qu.: -1.1885      1st Qu.:0.2642
## Median :0.4478      Median :0.3392      Median : -0.3389      Median :0.5270
## Mean      :0.4499      Mean      :0.3847      Mean      :-0.1999      Mean      :0.4917
## 3rd Qu.:0.6569      3rd Qu.:0.6229      3rd Qu.: 0.6911      3rd Qu.:0.7218
## Max.      :0.9795      Max.      :0.9594      Max.      : 3.2552      Max.      :0.9863
## NA's      :713      NA's      :741      NA's      :713      NA's      :714
## v2lgqstexp      v2lginvstp      v2lgotovst      e_competition
## Min.      :-2.1626      Min.      :-3.0931      Min.      :-3.1464      Min.      :0.0000
## 1st Qu.: -1.2590      1st Qu.: -1.6877      1st Qu.: -1.5880      1st Qu.:0.0000
## Median : 0.0091      Median : -0.5123      Median : -0.6937      Median :0.0000
## Mean      :-0.0771      Mean      :-0.4999      Mean      :-0.5125      Mean      :0.3139
## 3rd Qu.: 0.9722      3rd Qu.: 0.5694      3rd Qu.: 0.5240      3rd Qu.:1.0000
## Max.      : 2.3319      Max.      : 2.6126      Max.      : 2.8516      Max.      :1.0000
## NA's      :1429      NA's      :1430      NA's      :1426      NA's      :723
## e_democ      e_autoc      v2x_corr      v2x_pubcorr
## Min.      :-88.000      Min.      :-88.000      Min.      :0.0282      Min.      :0.0239
```

##	1st Qu.: 0.000	1st Qu.: 0.000	1st Qu.:0.3682	1st Qu.:0.3616
##	Median : 0.000	Median : 5.000	Median :0.5794	Median :0.5740
##	Mean : -1.334	Mean : 0.116	Mean :0.5519	Mean :0.5548
##	3rd Qu.: 6.000	3rd Qu.: 7.000	3rd Qu.:0.7571	3rd Qu.:0.7749
##	Max. : 10.000	Max. : 10.000	Max. :0.9462	Max. :0.9721
##	NA's :875	NA's :875	NA's :713	NA's :713
##	v2x_execorr	v2elvotbuy	v2elirreg	v2psprlnks
##	Min. :0.0183	Min. :-3.033	Min. :-3.095	Min. :-3.0295
##	1st Qu.:0.3530	1st Qu.: -1.133	1st Qu.: -1.184	1st Qu.: -1.1458
##	Median :0.5761	Median :-0.167	Median :-0.226	Median :-0.3054
##	Mean :0.5640	Mean :-0.092	Mean :-0.175	Mean :-0.2274
##	3rd Qu.:0.8019	3rd Qu.: 0.820	3rd Qu.: 0.799	3rd Qu.: 0.6933
##	Max. :0.9788	Max. : 3.228	Max. : 3.290	Max. : 3.0134
##	NA's :713	NA's :5565	NA's :5565	NA's :726
##	v2exbribe	v2exembez	v2excrtps	v2dlencmps
##	Min. :-2.9623	Min. :-3.2439	Min. :-3.1558	Min. :-3.1871
##	1st Qu.: -1.3156	1st Qu.: -1.3191	1st Qu.: -1.3662	1st Qu.: -0.6873
##	Median :-0.4579	Median :-0.2994	Median :-0.6467	Median : 0.4163
##	Mean :-0.3956	Mean :-0.3264	Mean :-0.5601	Mean : 0.2231
##	3rd Qu.: 0.4485	3rd Qu.: 0.5589	3rd Qu.: 0.2348	3rd Qu.: 1.0793
##	Max. : 2.7405	Max. : 3.2923	Max. : 2.6986	Max. : 2.9290
##	NA's :713	NA's :713	NA's :713	NA's :713
##	e_wbgi_gee	e_wbgi_rle	v2pepwrses	v2pepwrsoc
##	Min. :-2.325	Min. :-2.553	Min. :-3.5275	Min. :-3.0070
##	1st Qu.: -0.884	1st Qu.: -1.007	1st Qu.: -0.9285	1st Qu.: -0.8132
##	Median :-0.465	Median :-0.561	Median : 0.0121	Median : 0.0200
##	Mean :-0.396	Mean :-0.476	Mean : 0.0041	Mean : 0.0513
##	3rd Qu.: 0.027	3rd Qu.: 0.006	3rd Qu.: 0.8410	3rd Qu.: 0.9753
##	Max. : 1.899	Max. : 1.451	Max. : 3.2522	Max. : 3.0506
##	NA's :6004	NA's :6003	NA's :713	NA's :713
##	v2elreggov	v2elrgpwr	v2ellocgov	v2ellocpwr
##	Min. :0.0000	Min. :-2.6636	Min. :0.0000	Min. :-2.7333
##	1st Qu.:1.0000	1st Qu.: -1.4437	1st Qu.:1.0000	1st Qu.: -0.9271
##	Median :1.0000	Median :-0.5271	Median :1.0000	Median : 0.1312
##	Mean :0.9348	Mean :-0.3261	Mean :0.9715	Mean : 0.0123
##	3rd Qu.:1.0000	3rd Qu.: 0.6847	3rd Qu.:1.0000	3rd Qu.: 1.0993
##	Max. :1.0000	Max. : 2.7746	Max. :1.0000	Max. : 2.3258
##	NA's :810	NA's :1313	NA's :848	NA's :1243
##	v2x_feduni	e_dpi_author	v2mecenefm	v2mecenefi
##	Min. :0.0000	Min. :0.000	Min. :-3.0356	Min. :-4.817
##	1st Qu.:0.0000	1st Qu.:0.000	1st Qu.: -1.4755	1st Qu.: -0.075
##	Median :0.1971	Median :0.000	Median :-0.3869	Median : 0.986
##	Mean :0.3040	Mean :0.355	Mean :-0.3110	Mean : 0.566
##	3rd Qu.:0.4792	3rd Qu.:1.000	3rd Qu.: 0.7615	3rd Qu.: 1.551
##	Max. :0.9907	Max. :1.000	Max. : 3.3164	Max. : 2.188
##	NA's :1321	NA's :5952	NA's :713	NA's :5427
##	e_peaveduc	e_migdppln	e_migdpgro	e_peginiwi
##	Min. : 0.0039	Min. : 5.315	Min. :-61.4935	Min. :15.00
##	1st Qu.: 2.2345	1st Qu.: 6.904	1st Qu.: -0.7666	1st Qu.:34.81
##	Median : 4.1705	Median : 7.624	Median : 2.0160	Median :43.00
##	Mean : 4.4707	Mean : 7.630	Mean : 1.7642	Mean :42.72
##	3rd Qu.: 6.5866	3rd Qu.: 8.298	3rd Qu.: 4.5942	3rd Qu.:50.38
##	Max. :13.2855	Max. :10.667	Max. : 86.9460	Max. :73.90
##	NA's :911	NA's :1256	NA's :1288	NA's :2958

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## e_reserves_billions e_Total_Oil_Income_PC e_Fiscal_Reliance
## Min. : 0.000 Min. : 0.00 Min. : 0.00
## 1st Qu.: 0.000 1st Qu.: 0.00 1st Qu.:11.08
## Median : 0.000 Median : 0.00 Median :37.80
## Mean : 4.342 Mean : 347.32 Mean :38.72
## 3rd Qu.: 0.300 3rd Qu.: 28.12 3rd Qu.:62.44
## Max. :266.810 Max. :78588.80 Max. :94.20
## NA's :1168 NA's :931 NA's :6437
## e_miinteco e_miinterc e_Civil_War expend_security_EXP
## Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. : 0.000
## 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.: 0.080
## Median :0.0000 Median :0.0000 Median :0.0000 Median : 0.133
## Mean :0.0518 Mean :0.1789 Mean :0.0898 Mean : 0.223
## 3rd Qu.:0.0000 3rd Qu.:0.0000 3rd Qu.:0.0000 3rd Qu.: 0.227
## Max. :1.0000 Max. :1.0000 Max. :1.0000 Max. :172.691
## NA's :1440 NA's :2290 NA's :895 NA's :4061
## expenddefence_EXP exp_public_order_EXP wagessalaries_EXP subpentrans_EXP
## Min. :0.000 Min. :0.000 Min. : 0.0000 Min. :0.026
## 1st Qu.:0.060 1st Qu.:0.035 1st Qu.: 0.2001 1st Qu.:0.064
## Median :0.108 Median :0.053 Median : 0.2843 Median :0.115
## Mean :0.143 Mean :0.059 Mean : 0.4594 Mean :0.120
## 3rd Qu.:0.192 3rd Qu.:0.075 3rd Qu.: 0.3701 3rd Qu.:0.151
## Max. :0.712 Max. :0.248 Max. :343.0595 Max. :0.259
## NA's :4677 NA's :5795 NA's :3114 NA's :7066
## pensions_EXP total_welfare_EXP education_EXP health_EXP
## Min. :0.000 Min. : 0.000 Min. :0.000 Min. :0.000
## 1st Qu.:0.020 1st Qu.: 0.151 1st Qu.:0.092 1st Qu.:0.034
## Median :0.037 Median : 0.223 Median :0.131 Median :0.055
## Mean :0.058 Mean : 0.485 Mean :0.133 Mean :0.058
## 3rd Qu.:0.060 3rd Qu.: 0.311 3rd Qu.:0.175 3rd Qu.:0.076
## Max. :0.392 Max. :382.322 Max. :0.388 Max. :0.212
## NA's :5966 NA's :4168 NA's :4471 NA's :4758
## social_protection_EXP housing_EXP owelfarespend_EXP
## Min. :0.000 Min. :0.000 Min. :0.000
## 1st Qu.:0.010 1st Qu.:0.008 1st Qu.:0.013
## Median :0.030 Median :0.021 Median :0.036
## Mean :0.055 Mean :0.035 Mean :0.067
## 3rd Qu.:0.068 3rd Qu.:0.054 3rd Qu.:0.096
## Max. :0.599 Max. :0.420 Max. :0.510
## NA's :5644 NA's :6011 NA's :5763
## expend_security_GDPGSRE expenddefence_GDPGSRE exp_public_order_GDPGSRE
## Min. : 0.000 Min. : 0.000 Min. :0.000
## 1st Qu.: 0.015 1st Qu.: 0.012 1st Qu.:0.008
## Median : 0.030 Median : 0.021 Median :0.014
## Mean : 0.062 Mean : 0.058 Mean :0.017
## 3rd Qu.: 0.051 3rd Qu.: 0.037 3rd Qu.:0.021
## Max. :41.279 Max. :41.279 Max. :0.079
## NA's :4903 NA's :5348 NA's :6130
## wagessalaries_GDPGSRE subpentrans_GDPGSRE pensions_GDPGSRE
## Min. : 0.000 Min. :0.004 Min. :0.000
## 1st Qu.: 0.046 1st Qu.:0.005 1st Qu.:0.005
## Median : 0.069 Median :0.006 Median :0.011
## Mean : 0.081 Mean :0.005 Mean :0.019
## 3rd Qu.: 0.098 3rd Qu.:0.006 3rd Qu.:0.020

```

```

## Max.      :10.094      Max.      :0.006      Max.      :0.171
## NA's      :3706       NA's      :7094       NA's      :6169
## total_welfare_GDPGSRE education_GDPGSRE health_GDPGSRE
## Min.      : 0.000      Min.      :0.000      Min.      :0.000
## 1st Qu.   : 0.035      1st Qu.   :0.022      1st Qu.   :0.008
## Median    : 0.059      Median    :0.034      Median    :0.014
## Mean      : 0.078      Mean      :0.042      Mean      :0.020
## 3rd Qu.   : 0.094      3rd Qu.   :0.049      3rd Qu.   :0.022
## Max.      :12.209      Max.      :7.558      Max.      :2.907
## NA's      :4918       NA's      :5110       NA's      :5268
## social_protection_GDPGSRE housing_GDPGSRE owelfarespend_GDPGSRE
## Min.      :0.000      Min.      :0.000      Min.      :0.000
## 1st Qu.   :0.002      1st Qu.   :0.002      1st Qu.   :0.003
## Median    :0.008      Median    :0.005      Median    :0.008
## Mean      :0.020      Mean      :0.010      Mean      :0.020
## 3rd Qu.   :0.023      3rd Qu.   :0.015      3rd Qu.   :0.024
## Max.      :1.744      Max.      :0.074      Max.      :0.242
## NA's      :5969       NA's      :6211       NA's      :6111

```

Get ready for the dependent variables:

I measure the budget stability as the simple euclidean distance of the between-year percentage differences. It can be written in the following equation : S_t is the stability index of a certain year t

$$S_t = \sqrt{\sum_{i=1}^i (p_{it} - p_{it-1})^2}$$

(1)