

Model_v2.0

Yuemin Li and Yimang Zhou

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- A final version close to the paper.
- Rmarkdown for the paper should use model results from this version.
- The last version is Model_v1.8

```
if (!require("pacman")) install.packages("pacman")

## Loading required package: pacman
p_load(data.table, tidyverse, Hmisc, Matrix, lfe, plm, dynlm, car, lmtest, tseries, broom, knitr,
       pcse, ecm)
```

0. Data Preprocessing

Read the data and drop obs prior to 1960 (this step is not necessary).

```
df <- read.csv("../data_processing/financialization_df.csv")
df$X <- NULL
df <- df %>%
  filter(Year >= 1960)
colnames(df)

## [1] "Country" "Year"
## [3] "C_cpi" "IV_fdi_net"
## [5] "IV_lending." "OECD_gdp"
## [7] "IV_trade_balance" "C_REER"
## [9] "DV_RVA_pc" "DV_VA."
## [11] "DV_nfc_ls." "DV_hh_ls."
## [13] "IMF_gdp" "IV_gov_exp."
## [15] "C_wgdp" "C_wgini"
## [17] "DV_VA" "IV_lending"
## [19] "DV_nfc_ls" "DV_hh_ls"
## [21] "IV_gov_exp" "C_wgdp_log"
## [23] "IV_trade_balance_log" "IV_fdi_net_log"
## [25] "DV_VA._lag1" "DV_nfc_ls._lag1"
## [27] "DV_hh_ls._lag1" "DV_VA_lag1"
## [29] "DV_nfc_ls_lag1" "DV_hh_ls_lag1"
## [31] "DV_RVA_pc_lag1" "IV_lending._lag1"
## [33] "IV_gov_exp._lag1" "IV_lending._lag2"
## [35] "IV_gov_exp._lag2" "IV_lending_lag1"
## [37] "IV_gov_exp_lag1" "IV_trade_balance_log_lag1"
## [39] "IV_fdi_net_lag1" "IV_lending_lag2"
## [41] "IV_gov_exp_lag2" "IV_trade_balance_log_lag2"
## [43] "IV_fdi_net_lag2" "DV_VA._pc"
## [45] "DV_nfc_ls._pc" "DV_hh_ls._pc"
## [47] "DV_VA_pc" "DV_nfc_ls_pc"
```

```
## [49] "DV_hh_ls_pc" "DV_VA._pc_lag1"
## [51] "DV_nfc_ls._pc_lag1" "DV_hh_ls._pc_lag1"
## [53] "DV_VA_pc_lag1" "DV_nfc_ls_pc_lag1"
## [55] "DV_hh_ls_pc_lag1" "IV_lending._pc"
## [57] "IV_gov_exp._pc" "IV_lending_pc"
## [59] "IV_gov_exp_pc" "IV_trade_balance_pc"
## [61] "IV_lending._pc_lag1" "IV_gov_exp._pc_lag1"
## [63] "IV_lending._pc_lag2" "IV_gov_exp._pc_lag2"
## [65] "IV_lending_pc_lag1" "IV_gov_exp_pc_lag1"
## [67] "IV_trade_balance_pc_lag1" "IV_lending_pc_lag2"
## [69] "IV_gov_exp_pc_lag2" "IV_trade_balance_pc_lag2"
```

```
df[df==0] <- NA
df <- df[order(df$Country, df$Year),]
```

The data has already been preprocessed in other documents but requires further preprocessing.

```
# generate IV_fdi_net_pc and its lagged variables
df <- df %>%
  group_by(Country) %>%
  mutate(IV_fdi_net_lag1 = dplyr::lag(IV_fdi_net,k=1)) %>%
  mutate(IV_fdi_net_pc = (IV_fdi_net-IV_fdi_net_lag1)/IV_fdi_net_lag1*100) %>%
  mutate(IV_fdi_net_pc_lag1 = dplyr::lag(IV_fdi_net_pc,k=1)) %>%
  mutate(IV_fdi_net_pc_lag2 = dplyr::lag(IV_fdi_net_pc,k=2)) %>%
  ungroup()
# drop the inf values
turn_na <- function(a){
  a[abs(a)>10^10] <- NA
  a
}
for(i in 2:length(df)){
  df[,i] <- lapply(df[,i], turn_na)
}

model_country <- c("Australia", "Austria", "Belgium", "Brazil", "Canada",
  "Chile", "China", "Denmark", "Finland", "France",
  "Germany", "Greece", "Hungary", "Iceland", "Ireland",
  "Israel", "Italy", "Japan", "Korea", "Mexico",
  "Netherlands", "New Zealand", "Norway", "Poland", "Portugal",
  "Spain", "Sweden", "Switzerland", "Turkey", "United Kingdom",
  "United States")
df_model <- df[df$Country %in% model_country,]
```

We also make the dataframes including only the obs for each model.

```
va_df <- df_model %>%
  select(DV_VA_pc,DV_VA_pc_lag1,
    IV_lending_pc, IV_lending_pc_lag1,
    IV_gov_exp_pc, IV_gov_exp_pc_lag1,
    IV_trade_balance_pc, IV_trade_balance_pc_lag1,
    IV_fdi_net_pc, IV_fdi_net_pc_lag1,
    C_REER, C_wgdp, C_cpi, C_wgini,
    Country, Year)
va_df <- na.omit(va_df)

nfc_df <- df_model %>%
```

```

select(DV_nfc_ls_pc,DV_nfc_ls_pc_lag1,
       IV_lending_pc, IV_lending_pc_lag1,
       IV_gov_exp_pc, IV_gov_exp_pc_lag1,
       IV_trade_balance_pc, IV_trade_balance_pc_lag1,
       IV_fdi_net_pc, IV_fdi_net_pc_lag1,
       C_REER, C_wgdp, C_cpi, C_wgini,
       Country, Year)
nfc_df <- na.omit(nfc_df)

hh_df <- df_model %>%
  select(DV_hh_ls_pc,DV_hh_ls_pc_lag1,
         IV_lending_pc, IV_lending_pc_lag1,
         IV_gov_exp_pc, IV_gov_exp_pc_lag1,
         IV_trade_balance_pc, IV_trade_balance_pc_lag1,
         IV_fdi_net_pc, IV_fdi_net_pc_lag1,
         C_REER, C_wgdp, C_cpi, C_wgini,
         Country, Year)
hh_df <- na.omit(hh_df)

```

1. Do the three levels of financialization co-occur and in the US only ?

This part attempts to select countries experience financialization since 1960. We determine it by test if an indicator of financialization (i.e., a dependent variable) is stationary by ADF tests. If the indicator is stationary in a country, it indicates that the country is not financialized during the period in this dimension.

“The Dickey-Fuller test tests the null hypothesis that a unit root is present in an autoregressive model. The alternative hypothesis is different depending on which version of the test is used, but is usually stationarity and trend-stationary.” (wikipeda)

A unit root is present if $\rho = 1$ in $y_t = \rho y_{t-1} + u_t$. If the null hypothesis is not rejected, a unit root is present and the variable is not stationary. Instead, a variable is stationary if the null hypothesis is reject.

Define adf function (http://www.econ.uiuc.edu/~econ508/R/e-ta8_R.html)

```

"adf" <- function(x,k = 0, int = TRUE, trend = FALSE){
# NB: returns conventional lm summary so p-values for adf test are wrong!
  require(dynlm)
  dx <- diff(x)
  formula <- paste("dx ~ L(x)")
  if(k > 0)
    formula <- paste(formula," + L(dx,1:k)")
  if(trend){
    s <- time(x)
    t <- ts(s - s[1],start = s[1],freq = frequency(x))
    formula <- paste(formula," + t")
  }
  if(!int) formula <- paste(formula," - 1")
  summary(dynlm(as.formula(formula)))
}

```

ADF test for each country Generate adf_test() function, the strategy is: 1. extract the column of independent variable X from df 2. for a certain country C, use adf() function to calculate the augmented Dickey-Fuller statistic for rejecting non-stationarity 3. combine the results from all countries together and report

```

adf_test <- function(df, x, k = k){
  result <- data.frame(country = c(),

```

```

        lx_t = c(),
        lx_p = c(),
        stationarity = c())

df %>%
  select(Country, Year, x) -> iv
iv <- na.omit(iv)
iv$Country <- as.character(iv$Country)
country <- data.frame(table(iv$Country))[,1]
for(i in 1:length(country)){
  countryname = as.character(country[i])
  temp <- iv %>%
    filter(Country == countryname)
  adf_iv <- ts(temp[,3])
  adf(adf_iv, k = k, int = T, trend = T) -> adf_model
  adf_model$coefficient[2,3] -> lx_t
  adf_model$coefficient[2,4] -> lx_p
  stationarity = c()
  stationarity[lx_p < 0.05] <- "stationarity"
  stationarity[lx_p > 0.05] <- "non-stationarity"
  newrow <- c(countryname, lx_t, lx_p, stationarity)
  result <- rbind(result, newrow)
}
colnames(result) <- c("country", "lx_t", "lx_p", "stationarity")
print(result)
}

```

```
VA_adf <- adf_test(df, all_of("DV_VA"), 1)
```

```

## Note: Using an external vector in selections is ambiguous.
## i Use `all_of(x)` instead of `x` to silence this message.
## i See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This message is displayed once per session.

```

	country	lx_t	lx_p	stationarity
## 1	Australia	-1.74068259917516	0.0951030688417656	non-stationarity
## 2	Austria	-1.25258728233285	0.218215298792293	non-stationarity
## 3	Belgium	-3.03761682450319	0.00708108390527036	stationarity
## 4	Brazil	-3.96113653738821	0.00222970829981027	stationarity
## 5	Canada	-2.37942079161448	0.0333439906456122	stationarity
## 6	Chile	-2.89842022471018	0.00999598090637113	stationarity
## 7	China	3.96987546613731	0.000283200122630845	stationarity
## 8	Czech Republic	-2.83407515315976	0.0102532164134657	stationarity
## 9	Denmark	-1.91255398771213	0.0624809290821965	non-stationarity
## 10	Estonia	-2.17508968971441	0.0431963519522893	stationarity
## 11	Finland	-1.76055070188994	0.0863615286165386	non-stationarity
## 12	France	-2.51437519338556	0.015746278867975	stationarity
## 13	Germany	-2.13576448252832	0.0440772509106265	stationarity
## 14	Greece	-0.220813989027429	0.827722614673009	non-stationarity
## 15	Hungary	-1.36385178290556	0.189427782303405	non-stationarity
## 16	Iceland	-0.749468964280156	0.465982503148229	non-stationarity
## 17	Ireland	-1.59770622992396	0.127514358493917	non-stationarity
## 18	Israel	-1.4962552796551	0.152921500399837	non-stationarity
## 19	Italy	-1.19593673885701	0.243905649580559	non-stationarity
## 20	Japan	-1.77599738673864	0.0926408643732112	non-stationarity
## 21	Korea	-2.40886017306815	0.0204668949586326	stationarity

```
## 22      Latvia -2.77331150230865  0.0125325749685371  stationarity
## 23      Lithuania -2.08896415014238  0.0511840531558823 non-stationarity
## 24      Luxembourg -3.42049539889458  0.0030498417130961  stationarity
## 25      Mexico -3.83101398215947  0.0011270854282584  stationarity
## 26      Netherlands -3.12914169961879  0.00314521301447203  stationarity
## 27      New Zealand -1.13475169456375  0.264416299582415 non-stationarity
## 28      Norway -2.49477530303922  0.0165236473962369  stationarity
## 29      Poland -3.85748501615158  0.00115370666557965  stationarity
## 30      Portugal -1.55975088036831  0.136227646262418 non-stationarity
## 31 Slovak Republic -1.35725323870747  0.19147655983172 non-stationarity
## 32      Slovenia -1.80346356899676  0.08808024137126 non-stationarity
## 33      South Africa -0.727535281984767  0.475329573788569 non-stationarity
## 34      Spain -1.90576316410125  0.0727794233474921 non-stationarity
## 35      Sweden -2.974309994682  0.00545505654371818  stationarity
## 36      Switzerland -1.8666272210212  0.0747544118857261 non-stationarity
## 37      Turkey -1.75562413431953  0.100997639515117 non-stationarity
## 38      United Kingdom -0.86133065002727  0.397946956419074 non-stationarity
## 39      United States -1.98549061396982  0.0670358322624782 non-stationarity
```

```
nfc_adf <- adf_test(df,all_of("DV_nfc_ls"),1)
```

```
##          country          lx_t          lx_p
## 1      Afghanistan -2.30221548496144  0.0548118636696421
## 2      Albania 0.290067167181243  0.777690654517207
## 3      Argentina 5.11715546637941 6.12387907601405e-05
## 4      Australia -1.3104132046572  0.198355449465486
## 5      Austria -2.73715328357365  0.01353816453711
## 6      Bangladesh -6.72350319540739 5.21033653097951e-05
## 7      Belgium -2.12535279327721  0.0411312118268235
## 8      Brazil -1.67831072671717  0.109658914898903
## 9      Bulgaria -2.2954067982768  0.0339421077983644
## 10     Cameroon -1.90516514859971  0.0809968873489752
## 11     Canada 2.26062408111246  0.0287809353490877
## 12 Central African Republic -1.71538689831133  0.111955998771989
## 13      Chad -1.85754152478726  0.0879334949596672
## 14      Chile -1.87468600235598  0.0876189129441431
## 15      China -1.94290413919673  0.0931358427934004
## 16     Colombia -1.6855567579551  0.110147148422669
## 17     Congo, Rep. -2.08686249798028  0.0589021195693531
## 18     Costa Rica -2.33927421116998  0.0374349329285304
## 19     Croatia -1.57171464068376  0.141997971483366
## 20     Cyprus -1.72100981619799  0.102391818979528
## 21     Czech Republic -1.78969669920757  0.0924452773397906
## 22     Denmark -2.12309539898671  0.0471049246722846
## 23     El Salvador -0.718151036881806  0.486411521775494
## 24     Estonia -2.45209435780987  0.0246366235022649
## 25     Finland -1.70913083762193  0.0946358206160784
## 26     France -0.639503303006627  0.526544394951509
## 27     Germany -2.73928612405129  0.0089262872390417
## 28     Greece -0.471447117104002  0.642689873099798
## 29     Honduras 0.454829625425983  0.657350440283889
## 30     Hong Kong SAR 0.279206824950743  0.782581393944746
## 31     Hungary -1.30085030465025  0.200081359812142
## 32     Iceland -2.74711281301345  0.00874758134531273
## 33     India -1.57944835191319  0.135085790346195
```

## 34	Indonesia	-1.77020481846376	0.102070750909974
## 35	Ireland	-3.4097348171697	0.00582797169974546
## 36	Israel	-1.59735884935034	0.125124913980506
## 37	Italy	-1.93726693777201	0.0580502070727623
## 38	Japan	-2.14104018293052	0.0372711798943061
## 39	Kazakhstan	-4.59057979344108	0.000994366093109686
## 40	Korea	-0.428835531174611	0.669848920944187
## 41	Latvia	-1.47141507002291	0.158446303598124
## 42	Lesotho	-5.16357475111486	0.000235639037314095
## 43	Lithuania	-2.92074372064921	0.00912687578037874
## 44	Luxembourg	-2.77223477815664	0.0181542894397388
## 45	Macedonia, FYR	-3.61128705838882	0.00686883745285845
## 46	Malaysia	-0.963641650449452	0.367326165708453
## 47	Malta	-1.20488706770623	0.243849979254842
## 48	Mauritius	0.376018510446025	0.71983973121921
## 49	Mexico	-0.400611596532846	0.693175077974198
## 50	Morocco	-1.7735674717036	0.101490623709068
## 51	Myanmar	-0.79178388590991	0.443856971728392
## 52	Nepal	3.12201910138433	0.00971494320366184
## 53	Netherlands	-1.92604548189058	0.0665470029111167
## 54	New Zealand	-2.36006051767886	0.0271305041260379
## 55	Nicaragua	-0.395794190975445	0.699203528427049
## 56	Norway	-1.48068482320783	0.146935035806856
## 57	Pakistan	0.253691197896605	0.807024146336957
## 58	Peru	-0.114769990158282	0.910899205023536
## 59	Poland	-1.62789312287263	0.120924438382114
## 60	Portugal	-1.33392846815548	0.191094294035572
## 61	Romania	-2.13950036689563	0.0536388290309742
## 62	Russia	-2.45381194231393	0.026839594356067
## 63	Samoa	-2.25753254149939	0.036636329425064
## 64	Sao Tome and Principe	-0.415887572073443	0.689945947630816
## 65	Saudi Arabia	-2.97464070010262	0.0100437130694614
## 66	Sierra Leone	-2.0678237995501	0.0609221418239062
## 67	Singapore	-1.39906360386023	0.175735129518871
## 68	Slovak Republic	-2.05618722983264	0.0545611396284306
## 69	Slovenia	-1.73350175032519	0.100101944299339
## 70	Solomon Islands	-2.89223411911337	0.0135199166989546
## 71	South Africa	-2.87165432460311	0.0349270017718234
## 72	Spain	-3.01110323836114	0.00496331448601159
## 73	Sri Lanka	-1.01361051720352	0.332545179174835
## 74	Sweden	-0.116428766634839	0.907761236758526
## 75	Switzerland	-2.60546955391828	0.0207551725955859
## 76	Tajikistan	-4.45274652815917	0.000789074401218797
## 77	Thailand	-1.77679455654657	0.105977311363457
## 78	Turkey	7.92750384087092	1.6026713883321e-08
## 79	Ukraine	-1.96605242269774	0.064909755223287
## 80	United Arab Emirates	-2.11995679340828	0.0875103755846605
## 81	United Kingdom	-2.04563948471821	0.0464112378506869
## 82	United States	-0.163627128257657	0.870647061890792
## 83	Vanuatu	-1.56955764424351	0.142497994604333
##	stationarity		
## 1	non-stationarity		
## 2	non-stationarity		
## 3	stationarity		

```
## 4 non-stationarity
## 5 stationarity
## 6 stationarity
## 7 stationarity
## 8 non-stationarity
## 9 stationarity
## 10 non-stationarity
## 11 stationarity
## 12 non-stationarity
## 13 non-stationarity
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## 25 non-stationarity
## 26 non-stationarity
## 27 stationarity
## 28 non-stationarity
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## 32 stationarity
## 33 non-stationarity
## 34 non-stationarity
## 35 stationarity
## 36 non-stationarity
## 37 non-stationarity
## 38 stationarity
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## 40 non-stationarity
## 41 non-stationarity
## 42 stationarity
## 43 stationarity
## 44 stationarity
## 45 stationarity
## 46 non-stationarity
## 47 non-stationarity
## 48 non-stationarity
## 49 non-stationarity
## 50 non-stationarity
## 51 non-stationarity
## 52 stationarity
## 53 non-stationarity
## 54 stationarity
## 55 non-stationarity
## 56 non-stationarity
## 57 non-stationarity
```

```
## 58 non-stationarity
## 59 non-stationarity
## 60 non-stationarity
## 61 non-stationarity
## 62      stationarity
## 63      stationarity
## 64 non-stationarity
## 65      stationarity
## 66 non-stationarity
## 67 non-stationarity
## 68 non-stationarity
## 69 non-stationarity
## 70      stationarity
## 71      stationarity
## 72      stationarity
## 73 non-stationarity
## 74 non-stationarity
## 75      stationarity
## 76      stationarity
## 77 non-stationarity
## 78      stationarity
## 79 non-stationarity
## 80 non-stationarity
## 81      stationarity
## 82 non-stationarity
## 83 non-stationarity
```

```
hh_adf <- adf_test(df,all_of("DV_hh_ls"),1)
```

##	country	lx_t	lx_p
## 1	Afghanistan	-5.63691670923508	0.000785100011513734
## 2	Albania	-3.48649177879532	0.00585726387856818
## 3	Argentina	9.55348706298158	1.09282461812452e-08
## 4	Australia	-1.49269681154874	0.14422938360064
## 5	Austria	-1.73823495865795	0.099245945902831
## 6	Bangladesh	0.792993999310478	0.457982763050505
## 7	Belgium	-0.748827389282555	0.459265762672494
## 8	Brazil	-1.80355032867302	0.0871830088372455
## 9	Bulgaria	-2.8700668918048	0.0101821406891771
## 10	Cameroon	-1.60983056258596	0.133410005896902
## 11	Canada	-1.18663046779318	0.241741134755555
## 12	Central African Republic	-2.02429770882503	0.0657855319793833
## 13	Chad	-2.00163886010277	0.0684578786939794
## 14	Chile	0.514294021046605	0.617220914056183
## 15	China	1.54627518077641	0.165958386228776
## 16	Colombia	-1.7975556268718	0.0900327608499391
## 17	Congo, Rep.	-1.68221803301515	0.118343055083143
## 18	Costa Rica	-1.73374870239429	0.108553598449475
## 19	Croatia	-1.75882219360094	0.104056631259338
## 20	Cyprus	-1.12829531820394	0.274009992878502
## 21	Czech Republic	-2.5235711171783	0.022576483616811
## 22	Denmark	-2.26064520592321	0.035711366636746
## 23	El Salvador	-3.71819780501894	0.00293651509310084
## 24	Estonia	-4.42812779806014	0.000324634357590054
## 25	Finland	-1.79750014360084	0.0792808930322708

## 26	France	-1.09711544824125	0.279875510134776
## 27	Germany	-3.45517697408554	0.0012491939031656
## 28	Greece	-3.44250808424499	0.00272885041241555
## 29	Honduras	-2.21788889810345	0.0466150304328754
## 30	Hong Kong SAR	0.22237781628801	0.825982650258007
## 31	Hungary	-2.04019002364286	0.0467400406581583
## 32	Iceland	-1.64565528264719	0.107125994276342
## 33	India	1.60633174239069	0.129042982097347
## 34	Indonesia	-2.05038279080354	0.0628292367317442
## 35	Ireland	-6.72127119776653	3.28115181480501e-05
## 36	Israel	-0.685581235616817	0.500476239679987
## 37	Italy	-1.98137306343979	0.0527475698324414
## 38	Japan	-1.63552546297372	0.108347451694166
## 39	Kazakhstan	-4.11694521402607	0.00208725359923645
## 40	Korea	2.81005906929675	0.00700790936117485
## 41	Latvia	-3.18552925558215	0.00512283534220953
## 42	Lesotho	-2.27026956819418	0.0424173415963721
## 43	Lithuania	-3.80790413356712	0.00128849359548133
## 44	Luxembourg	-2.49430836768526	0.0298063540860503
## 45	Macedonia, FYR	-2.10479124661699	0.0684256072004098
## 46	Malaysia	-2.91428100407729	0.0225227373800106
## 47	Malta	-3.04207957207954	0.00701252972902171
## 48	Mauritius	-1.37173142075251	0.219228246731094
## 49	Mexico	-0.703870900150764	0.490050407875788
## 50	Morocco	-2.44570051548071	0.0308347392114241
## 51	Myanmar	-1.15729606232786	0.269668890822163
## 52	Nepal	0.45433726546623	0.658420369064251
## 53	Netherlands	-2.49086541701205	0.0204007581022099
## 54	New Zealand	-2.57434873715491	0.0169543359606931
## 55	Nicaragua	-4.31356876793653	0.00100747566484599
## 56	Norway	-0.556593251944777	0.581068697215457
## 57	Pakistan	-0.890910028408217	0.402559254492126
## 58	Peru	-2.07325074886398	0.0603398388044628
## 59	Poland	-2.34048573293769	0.0309750715818088
## 60	Portugal	-4.27636313155544	0.000145663052559089
## 61	Romania	-2.50673296987355	0.0275726499406824
## 62	Russia	-2.05878300840107	0.057319459340018
## 63	Samoa	-2.23576084481331	0.0382731669003055
## 64	Sao Tome and Principe	-1.75734839444577	0.122274702791163
## 65	Saudi Arabia	-5.14502784117334	0.000119724894675153
## 66	Sierra Leone	-2.52193332367	0.026813822607529
## 67	Singapore	-2.0954664105359	0.0478570095765289
## 68	Slovak Republic	-1.03729198204682	0.313334557082314
## 69	Slovenia	-3.1619552001382	0.0053949725760651
## 70	Solomon Islands	-2.29034819691586	0.0409057627930862
## 71	South Africa	-2.00330142207299	0.101510642252377
## 72	Spain	-4.74725578832492	3.87728862550914e-05
## 73	Sri Lanka	-1.41549865410409	0.184606114878406
## 74	Sweden	0.16765748131743	0.867490853774883
## 75	Switzerland	-2.87007469775875	0.01235087800415
## 76	Tajikistan	-2.51324153950881	0.0272452105455505
## 77	Thailand	-2.57860057520592	0.0274822039598047
## 78	Turkey	0.373513278503156	0.711683274654062
## 79	Ukraine	-2.3554907511925	0.0300422157029073

## 80	United Arab Emirates	-2.85421505405399	0.0356471902832685
## 81	United Kingdom	-2.06987772527871	0.0439844191497197
## 82	United States	-2.52088238154896	0.0147506966817608
## 83	Vanuatu	-1.66990553632755	0.120794821810924
##	stationarity		
## 1	stationarity		
## 2	stationarity		
## 3	stationarity		
## 4	non-stationarity		
## 5	non-stationarity		
## 6	non-stationarity		
## 7	non-stationarity		
## 8	non-stationarity		
## 9	stationarity		
## 10	non-stationarity		
## 11	non-stationarity		
## 12	non-stationarity		
## 13	non-stationarity		
## 14	non-stationarity		
## 15	non-stationarity		
## 16	non-stationarity		
## 17	non-stationarity		
## 18	non-stationarity		
## 19	non-stationarity		
## 20	non-stationarity		
## 21	stationarity		
## 22	stationarity		
## 23	stationarity		
## 24	stationarity		
## 25	non-stationarity		
## 26	non-stationarity		
## 27	stationarity		
## 28	stationarity		
## 29	stationarity		
## 30	non-stationarity		
## 31	stationarity		
## 32	non-stationarity		
## 33	non-stationarity		
## 34	non-stationarity		
## 35	stationarity		
## 36	non-stationarity		
## 37	non-stationarity		
## 38	non-stationarity		
## 39	stationarity		
## 40	stationarity		
## 41	stationarity		
## 42	stationarity		
## 43	stationarity		
## 44	stationarity		
## 45	non-stationarity		
## 46	stationarity		
## 47	stationarity		
## 48	non-stationarity		
## 49	non-stationarity		

```
## 50      stationarity
## 51 non-stationarity
## 52 non-stationarity
## 53      stationarity
## 54      stationarity
## 55      stationarity
## 56 non-stationarity
## 57 non-stationarity
## 58 non-stationarity
## 59      stationarity
## 60      stationarity
## 61      stationarity
## 62 non-stationarity
## 63      stationarity
## 64 non-stationarity
## 65      stationarity
## 66      stationarity
## 67      stationarity
## 68 non-stationarity
## 69      stationarity
## 70      stationarity
## 71 non-stationarity
## 72      stationarity
## 73 non-stationarity
## 74 non-stationarity
## 75      stationarity
## 76      stationarity
## 77      stationarity
## 78 non-stationarity
## 79      stationarity
## 80      stationarity
## 81      stationarity
## 82      stationarity
## 83 non-stationarity
```

Hypothesis 1: The three levels of financialization do not co-occur in all countries.

Compare the varieties of financialization among different countries

First, many countries find some kind of financialization. Only a few countries do not witness financialization in all the three levels (Estonia, Germany, Luxembourg).

Second, only a few countries find all the three levels of financialization (Australia, Israel, Italy, Slovak). Even in the U.S., financialization shows only in the level of the market and corporation. In most countries, the three levels of financialization do not co-occur.

```
variety <- merge(VA_adf, nfc_adf, by = "country", all.y = T)
variety <- merge(variety, hh_adf, by = "country", all.y = T)
variety <- select(variety,
                  country, stationarity.x, stationarity.y, stationarity)
variety <- variety[,c("country", "stationarity.x", "stationarity.y", "stationarity")]
colnames(variety) <- c("country", "va", "nfc", "hh")
variety
```

##	country	va	nfc	hh
## 1	Afghanistan	<NA> non-stationarity		stationarity
## 2	Albania	<NA> non-stationarity		stationarity

## 3	Argentina	<NA>	stationarity	stationarity
## 4	Australia	non-stationarity	non-stationarity	non-stationarity
## 5	Austria	non-stationarity	stationarity	non-stationarity
## 6	Bangladesh	<NA>	stationarity	non-stationarity
## 7	Belgium	stationarity	stationarity	non-stationarity
## 8	Brazil	stationarity	non-stationarity	non-stationarity
## 9	Bulgaria	<NA>	stationarity	stationarity
## 10	Cameroon	<NA>	non-stationarity	non-stationarity
## 11	Canada	stationarity	stationarity	non-stationarity
## 12	Central African Republic	<NA>	non-stationarity	non-stationarity
## 13	Chad	<NA>	non-stationarity	non-stationarity
## 14	Chile	stationarity	non-stationarity	non-stationarity
## 15	China	stationarity	non-stationarity	non-stationarity
## 16	Colombia	<NA>	non-stationarity	non-stationarity
## 17	Congo, Rep.	<NA>	non-stationarity	non-stationarity
## 18	Costa Rica	<NA>	stationarity	non-stationarity
## 19	Croatia	<NA>	non-stationarity	non-stationarity
## 20	Cyprus	<NA>	non-stationarity	non-stationarity
## 21	Czech Republic	stationarity	non-stationarity	stationarity
## 22	Denmark	non-stationarity	stationarity	stationarity
## 23	El Salvador	<NA>	non-stationarity	stationarity
## 24	Estonia	stationarity	stationarity	stationarity
## 25	Finland	non-stationarity	non-stationarity	non-stationarity
## 26	France	stationarity	non-stationarity	non-stationarity
## 27	Germany	stationarity	stationarity	stationarity
## 28	Greece	non-stationarity	non-stationarity	stationarity
## 29	Honduras	<NA>	non-stationarity	stationarity
## 30	Hong Kong SAR	<NA>	non-stationarity	non-stationarity
## 31	Hungary	non-stationarity	non-stationarity	stationarity
## 32	Iceland	non-stationarity	stationarity	non-stationarity
## 33	India	<NA>	non-stationarity	non-stationarity
## 34	Indonesia	<NA>	non-stationarity	non-stationarity
## 35	Ireland	non-stationarity	stationarity	stationarity
## 36	Israel	non-stationarity	non-stationarity	non-stationarity
## 37	Italy	non-stationarity	non-stationarity	non-stationarity
## 38	Japan	non-stationarity	stationarity	non-stationarity
## 39	Kazakhstan	<NA>	stationarity	stationarity
## 40	Korea	stationarity	non-stationarity	stationarity
## 41	Latvia	stationarity	non-stationarity	stationarity
## 42	Lesotho	<NA>	stationarity	stationarity
## 43	Lithuania	non-stationarity	stationarity	stationarity
## 44	Luxembourg	stationarity	stationarity	stationarity
## 45	Macedonia, FYR	<NA>	stationarity	non-stationarity
## 46	Malaysia	<NA>	non-stationarity	stationarity
## 47	Malta	<NA>	non-stationarity	stationarity
## 48	Mauritius	<NA>	non-stationarity	non-stationarity
## 49	Mexico	stationarity	non-stationarity	non-stationarity
## 50	Morocco	<NA>	non-stationarity	stationarity
## 51	Myanmar	<NA>	non-stationarity	non-stationarity
## 52	Nepal	<NA>	stationarity	non-stationarity
## 53	Netherlands	stationarity	non-stationarity	stationarity
## 54	New Zealand	non-stationarity	stationarity	stationarity
## 55	Nicaragua	<NA>	non-stationarity	stationarity
## 56	Norway	stationarity	non-stationarity	non-stationarity

```

## 57          Pakistan          <NA> non-stationarity non-stationarity
## 58             Peru          <NA> non-stationarity non-stationarity
## 59          Poland      stationarity non-stationarity      stationarity
## 60          Portugal non-stationarity non-stationarity      stationarity
## 61          Romania          <NA> non-stationarity      stationarity
## 62          Russia          <NA>      stationarity non-stationarity
## 63          Samoa          <NA>      stationarity      stationarity
## 64 Sao Tome and Principe <NA> non-stationarity non-stationarity
## 65          Saudi Arabia <NA>      stationarity      stationarity
## 66          Sierra Leone <NA> non-stationarity      stationarity
## 67          Singapore <NA> non-stationarity      stationarity
## 68      Slovak Republic non-stationarity non-stationarity non-stationarity
## 69          Slovenia non-stationarity non-stationarity      stationarity
## 70      Solomon Islands          <NA>      stationarity      stationarity
## 71          South Africa non-stationarity      stationarity non-stationarity
## 72          Spain non-stationarity      stationarity      stationarity
## 73          Sri Lanka          <NA> non-stationarity non-stationarity
## 74          Sweden      stationarity non-stationarity non-stationarity
## 75      Switzerland non-stationarity      stationarity      stationarity
## 76          Tajikistan          <NA>      stationarity      stationarity
## 77          Thailand          <NA> non-stationarity      stationarity
## 78          Turkey non-stationarity      stationarity non-stationarity
## 79          Ukraine          <NA> non-stationarity      stationarity
## 80      United Arab Emirates <NA> non-stationarity      stationarity
## 81          United Kingdom non-stationarity      stationarity      stationarity
## 82          United States non-stationarity non-stationarity      stationarity
## 83          Vanuatu          <NA> non-stationarity non-stationarity

```

2. PCSE Models

Correlation matrix

```

cor_df <- df_model %>%
  select(DV_VA_pc, DV_nfc_ls_pc, DV_hh_ls_pc,
         IV_lending_pc, IV_gov_exp_pc, IV_trade_balance_pc, IV_fdi_net_pc)
cor_mat <- cor(cor_df, use = 'na')
cor_mat[upper.tri(cor_mat)] <- NA
cor_mat

```

```

##          DV_VA_pc DV_nfc_ls_pc DV_hh_ls_pc IV_lending_pc
## DV_VA_pc      1.000000000      NA          NA          NA
## DV_nfc_ls_pc  0.111585534  1.000000000      NA          NA
## DV_hh_ls_pc   0.152704241  0.6275949763  1.000000000      NA
## IV_lending_pc  0.170543021 -0.0581282828 -0.009445194  1.000000000
## IV_gov_exp_pc -0.167822361 -0.2937105364 -0.323721202 -0.001727352
## IV_trade_balance_pc 0.001468526 -0.0322307673 0.025596943 0.005893560
## IV_fdi_net_pc  0.015322560 0.0004603914 0.038016416 0.009223962
##          IV_gov_exp_pc IV_trade_balance_pc IV_fdi_net_pc
## DV_VA_pc              NA              NA              NA
## DV_nfc_ls_pc           NA              NA              NA
## DV_hh_ls_pc           NA              NA              NA
## IV_lending_pc          NA              NA              NA
## IV_gov_exp_pc          1.000000000      NA              NA
## IV_trade_balance_pc -0.002609608      1.000000000      NA
## IV_fdi_net_pc         0.001925459      0.02270551      1

```

```
write.csv(cor_mat, '../table_and_figure/cor_mat.csv')
```

Three PCSE models

```
# model 1
va_df$Country <- as.factor(va_df$Country)
m1_lm <- lm(DV_VA_pc ~ DV_VA_pc_lag1 +
            IV_lending_pc + IV_lending_pc_lag1 +
            IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
            IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
            IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
            C_REER + C_wgdp + C_cpi + C_wgini +
            as.factor(Year) + as.factor(Country),
            data = va_df)
m1_pcse <- pcse(m1_lm, groupN = va_df$Country, groupT = va_df$Year, pairwise = TRUE)

# model 2
nfc_df$Country <- as.factor(nfc_df$Country)
m2_lm <- lm(DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 +
            IV_lending_pc + IV_lending_pc_lag1 +
            IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
            IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
            IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
            C_REER + C_wgdp + C_cpi + C_wgini +
            as.factor(Year) + as.factor(Country),
            data = nfc_df)
m2_pcse <- pcse(m2_lm, groupN = nfc_df$Country, groupT = nfc_df$Year, pairwise = TRUE)

# model 3
hh_df$Country <- as.factor(hh_df$Country)
m3_lm <- lm(DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 +
            IV_lending_pc + IV_lending_pc_lag1 +
            IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
            IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
            IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
            C_REER + C_wgdp + C_cpi + C_wgini +
            as.factor(Year) + as.factor(Country),
            data = hh_df)
m3_pcse <- pcse(m3_lm, groupN = hh_df$Country, groupT = hh_df$Year, pairwise = TRUE)

summary(m1_pcse)
```

```
##
## Results:
##
##              Estimate      PCSE      t value
## (Intercept) -1.834287e-03 1.627333e-01 -0.011271743
## DV_VA_pc_lag1 1.930694e-02 2.078305e-02 0.928975173
## IV_lending_pc -1.141239e-03 1.185315e-03 -0.962815341
## IV_lending_pc_lag1 -1.713387e-03 9.212780e-04 -1.859793178
## IV_gov_exp_pc 3.991089e-01 9.142551e-02 4.365400081
## IV_gov_exp_pc_lag1 3.215859e-05 7.892870e-05 0.407438526
## IV_trade_balance_pc -2.541258e-04 1.755719e-03 -0.144741687
## IV_trade_balance_pc_lag1 5.679459e-04 1.883695e-03 0.301506280
```

## IV_fdi_net_pc	2.169008e-06	2.151684e-06	1.008051313
## IV_fdi_net_pc_lag1	2.712417e-06	2.174349e-06	1.247461292
## C_REER	6.367936e-04	5.550214e-04	1.147331569
## C_wgdp	-8.088325e-07	2.905882e-06	-0.278343235
## C_cpi	1.568857e-05	2.170562e-03	0.007227882
## C_wgini	5.238501e-05	2.150303e-03	0.024361690
## as.factor(Year)1979	1.610916e-02	9.836704e-02	0.163765862
## as.factor(Year)1981	-2.281733e-02	8.661779e-02	-0.263425464
## as.factor(Year)1982	-4.492027e-01	9.570786e-02	-4.693477161
## as.factor(Year)1984	4.792513e-02	8.456473e-02	0.566727168
## as.factor(Year)1985	1.392904e-01	7.295451e-02	1.909277889
## as.factor(Year)1986	2.373405e-02	9.285552e-02	0.255601977
## as.factor(Year)1987	6.669896e-02	9.170256e-02	0.727340200
## as.factor(Year)1988	9.433292e-02	7.880704e-02	1.197011382
## as.factor(Year)1989	7.557087e-02	8.280393e-02	0.912648323
## as.factor(Year)1990	3.533117e-02	8.177176e-02	0.432070562
## as.factor(Year)1991	-9.321377e-02	7.837228e-02	-1.189371659
## as.factor(Year)1992	3.364781e-02	7.498733e-02	0.448713266
## as.factor(Year)1993	5.852127e-02	7.998357e-02	0.731666167
## as.factor(Year)1994	1.849217e-03	8.176811e-02	0.022615385
## as.factor(Year)1995	3.135083e-02	7.951476e-02	0.394276896
## as.factor(Year)1996	1.320609e-02	8.159682e-02	0.161845680
## as.factor(Year)1997	3.259586e-02	8.329205e-02	0.391344186
## as.factor(Year)1998	-2.783227e-03	8.491880e-02	-0.032775159
## as.factor(Year)1999	6.712067e-03	8.857538e-02	0.075778025
## as.factor(Year)2000	3.121562e-02	8.959371e-02	0.348413039
## as.factor(Year)2001	-2.015177e-02	9.034013e-02	-0.223065486
## as.factor(Year)2002	-1.237028e-02	9.148674e-02	-0.135213919
## as.factor(Year)2003	2.966834e-02	9.324430e-02	0.318178628
## as.factor(Year)2004	3.655961e-02	9.445213e-02	0.387070283
## as.factor(Year)2005	3.731883e-02	9.577363e-02	0.389656625
## as.factor(Year)2006	2.112110e-02	9.867207e-02	0.214053490
## as.factor(Year)2007	5.913900e-02	1.005334e-01	0.588252453
## as.factor(Year)2008	-6.772965e-02	9.897063e-02	-0.684340896
## as.factor(Year)2009	2.203647e-02	9.830198e-02	0.224171135
## as.factor(Year)2010	-1.687429e-02	9.895928e-02	-0.170517510
## as.factor(Year)2011	6.467168e-03	9.949112e-02	0.065002459
## as.factor(Country)Austria	-3.482701e-02	4.380477e-02	-0.795050676
## as.factor(Country)Belgium	-2.692363e-02	3.524858e-02	-0.763821664
## as.factor(Country)Brazil	-8.972086e-02	9.751076e-02	-0.920112351
## as.factor(Country)Canada	-2.912998e-02	1.952482e-02	-1.491945997
## as.factor(Country)Chile	-8.072594e-02	9.861900e-02	-0.818563773
## as.factor(Country)China	-9.585764e-03	1.044327e-01	-0.091788953
## as.factor(Country)Denmark	-3.066563e-02	3.706348e-02	-0.827381233
## as.factor(Country)Finland	-5.864075e-02	2.899604e-02	-2.022370991
## as.factor(Country)France	-5.823558e-02	2.561199e-02	-2.273762844
## as.factor(Country)Germany	-3.811826e-02	2.898618e-02	-1.315049504
## as.factor(Country)Greece	-4.803430e-02	3.685159e-02	-1.303452716
## as.factor(Country)Hungary	-7.774237e-02	6.792222e-02	-1.144579378
## as.factor(Country)Iceland	-1.113646e-02	6.416175e-02	-0.173568534
## as.factor(Country)Ireland	-7.184443e-02	3.968790e-02	-1.810235052
## as.factor(Country)Israel	-3.096824e-02	3.410805e-02	-0.907945311
## as.factor(Country)Italy	-3.123689e-02	2.288477e-02	-1.364963927
## as.factor(Country)Japan	-1.012743e-01	4.005332e-02	-2.528487404

```

## as.factor(Country)Korea -3.249465e-02 4.779372e-02 -0.679893788
## as.factor(Country)Mexico -4.424876e-02 9.142124e-02 -0.484009646
## as.factor(Country)Netherlands -2.196754e-02 3.431546e-02 -0.640164520
## as.factor(Country)New Zealand -2.210416e-02 4.334658e-02 -0.509940069
## as.factor(Country)Norway -3.493460e-02 6.310146e-02 -0.553625893
## as.factor(Country)Poland -1.131226e-02 7.570520e-02 -0.149425185
## as.factor(Country)Portugal -3.966738e-02 4.046905e-02 -0.980190671
## as.factor(Country)Spain -5.452481e-02 2.580084e-02 -2.113295621
## as.factor(Country)Sweden -2.610202e-02 3.320457e-02 -0.786097400
## as.factor(Country)Switzerland -1.812880e-02 6.413414e-02 -0.282670117
## as.factor(Country)Turkey -1.683021e-01 9.779641e-02 -1.720943079
## as.factor(Country)United Kingdom -2.191441e-02 2.088147e-02 -1.049467089
## as.factor(Country)United States -3.763220e-02 3.957191e-02 -0.950982701
## Pr(>|t|)
## (Intercept) 9.910135e-01
## DV_VA_pc_lag1 3.535810e-01
## IV_lending_pc 3.363452e-01
## IV_lending_pc_lag1 6.380444e-02
## IV_gov_exp_pc 1.700054e-05
## IV_gov_exp_pc_lag1 6.839501e-01
## IV_trade_balance_pc 8.850032e-01
## IV_trade_balance_pc_lag1 7.632184e-01
## IV_fdi_net_pc 3.141684e-01
## IV_fdi_net_pc_lag1 2.131129e-01
## C_REER 2.520757e-01
## C_wgdp 7.809232e-01
## C_cpi 9.942374e-01
## C_wgini 9.805788e-01
## as.factor(Year)1979 8.700157e-01
## as.factor(Year)1981 7.923871e-01
## as.factor(Year)1982 3.942645e-06
## as.factor(Year)1984 5.712848e-01
## as.factor(Year)1985 5.709329e-02
## as.factor(Year)1986 7.984174e-01
## as.factor(Year)1987 4.675333e-01
## as.factor(Year)1988 2.321613e-01
## as.factor(Year)1989 3.620938e-01
## as.factor(Year)1990 6.659723e-01
## as.factor(Year)1991 2.351485e-01
## as.factor(Year)1992 6.539330e-01
## as.factor(Year)1993 4.648916e-01
## as.factor(Year)1994 9.819707e-01
## as.factor(Year)1995 6.936313e-01
## as.factor(Year)1996 8.715264e-01
## as.factor(Year)1997 6.957954e-01
## as.factor(Year)1998 9.738737e-01
## as.factor(Year)1999 9.396416e-01
## as.factor(Year)2000 7.277522e-01
## as.factor(Year)2001 8.236226e-01
## as.factor(Year)2002 8.925252e-01
## as.factor(Year)2003 7.505507e-01
## as.factor(Year)2004 6.989537e-01
## as.factor(Year)2005 6.970418e-01
## as.factor(Year)2006 8.306375e-01

```



```
## as.factor(Year)2007      5.567652e-01
## as.factor(Year)2008      4.942402e-01
## as.factor(Year)2009      8.227629e-01
## as.factor(Year)2010      8.647077e-01
## as.factor(Year)2011      9.482114e-01
## as.factor(Country)Austria 4.271555e-01
## as.factor(Country)Belgium 4.455193e-01
## as.factor(Country)Brazil  3.581861e-01
## as.factor(Country)Canada  1.366686e-01
## as.factor(Country)Chile   4.136260e-01
## as.factor(Country)China   9.269214e-01
## as.factor(Country)Denmark 4.086189e-01
## as.factor(Country)Finland 4.394435e-02
## as.factor(Country)France  2.362219e-02
## as.factor(Country)Germany 1.894063e-01
## as.factor(Country)Greece  1.933289e-01
## as.factor(Country)Hungary 2.532129e-01
## as.factor(Country)Iceland 8.623110e-01
## as.factor(Country)Ireland 7.116882e-02
## as.factor(Country)Israel  3.645697e-01
## as.factor(Country)Italy   1.731943e-01
## as.factor(Country)Japan   1.192130e-02
## as.factor(Country)Korea   4.970484e-01
## as.factor(Country)Mexico  6.287001e-01
## as.factor(Country)Netherlands 5.225099e-01
## as.factor(Country)New Zealand 6.104343e-01
## as.factor(Country)Norway  5.802098e-01
## as.factor(Country)Poland  8.813094e-01
## as.factor(Country)Portugal 3.277101e-01
## as.factor(Country)Spain   3.532576e-02
## as.factor(Country)Sweden  4.323745e-01
## as.factor(Country)Switzerland 7.776069e-01
## as.factor(Country)Turkey  8.619845e-02
## as.factor(Country)United Kingdom 2.947312e-01
## as.factor(Country)United States 3.423091e-01
##
## -----
##
## # Valid Obs = 405; # Missing Obs = 587; Degrees of Freedom = 330.
```

```
summary(m2_pcse)
```

```
##
## Results:
##
##              Estimate      PCSE      t value
## (Intercept) -2.586145e-01 9.999663e-02 -2.58623186
## DV_nfc_ls_pc_lag1 1.377579e-01 5.621627e-02 2.45049955
## IV_lending_pc -2.073923e-03 9.907680e-04 -2.09324805
## IV_lending_pc_lag1 -2.076863e-03 7.775374e-04 -2.67107837
## IV_gov_exp_pc 6.093256e-02 1.156403e-01 0.52691468
## IV_gov_exp_pc_lag1 1.537258e-04 6.244194e-05 2.46189965
## IV_trade_balance_pc -8.334628e-04 1.296587e-03 -0.64281279
## IV_trade_balance_pc_lag1 7.090965e-04 1.279342e-03 0.55426638
## IV_fdi_net_pc -1.400688e-06 1.778320e-06 -0.78764687
```

## IV_fdi_net_pc_lag1	2.419881e-06	1.825427e-06	1.32565237
## C_REER	1.953828e-03	5.265785e-04	3.71042171
## C_wgdp	6.008415e-06	2.606523e-06	2.30514594
## C_cpi	6.502675e-03	2.770131e-03	2.34742529
## C_wgini	1.351352e-03	1.774948e-03	0.76134754
## as.factor(Year)1973	7.446742e-03	4.298657e-02	0.17323416
## as.factor(Year)1974	-3.842828e-02	4.750679e-02	-0.80890077
## as.factor(Year)1975	-1.017995e-01	4.430384e-02	-2.29775838
## as.factor(Year)1976	-4.198567e-02	4.418587e-02	-0.95020568
## as.factor(Year)1977	-4.820528e-02	4.446883e-02	-1.08402398
## as.factor(Year)1978	-2.709141e-02	4.474286e-02	-0.60549137
## as.factor(Year)1979	-8.290015e-02	4.680382e-02	-1.77122606
## as.factor(Year)1980	-1.060836e-01	5.024044e-02	-2.11151733
## as.factor(Year)1981	-8.960776e-02	4.640444e-02	-1.93101699
## as.factor(Year)1982	-6.185922e-02	4.474706e-02	-1.38241970
## as.factor(Year)1983	-7.167618e-02	4.484528e-02	-1.59829926
## as.factor(Year)1984	-6.746134e-02	4.288909e-02	-1.57292521
## as.factor(Year)1985	-1.185788e-01	4.065957e-02	-2.91638138
## as.factor(Year)1986	-9.424083e-02	4.792530e-02	-1.96641095
## as.factor(Year)1987	-1.039159e-01	4.895106e-02	-2.12285354
## as.factor(Year)1988	-1.153143e-01	4.794111e-02	-2.40533142
## as.factor(Year)1989	-1.254882e-01	5.311201e-02	-2.36270764
## as.factor(Year)1990	-1.120528e-01	5.235125e-02	-2.14040244
## as.factor(Year)1991	-2.133731e-01	4.840118e-02	-4.40842707
## as.factor(Year)1992	-1.119063e-01	4.754039e-02	-2.35392050
## as.factor(Year)1993	-1.529629e-01	4.955019e-02	-3.08702945
## as.factor(Year)1994	-1.583348e-01	5.283028e-02	-2.99704550
## as.factor(Year)1995	-1.439828e-01	5.232089e-02	-2.75191743
## as.factor(Year)1996	-1.455708e-01	5.686520e-02	-2.55992792
## as.factor(Year)1997	-1.174260e-01	5.779755e-02	-2.03167854
## as.factor(Year)1998	-1.367452e-01	5.960189e-02	-2.29430931
## as.factor(Year)1999	-1.152634e-01	6.412015e-02	-1.79761574
## as.factor(Year)2000	-1.045716e-01	6.553001e-02	-1.59578244
## as.factor(Year)2001	-1.665107e-01	6.681224e-02	-2.49221869
## as.factor(Year)2002	-2.060752e-01	6.796444e-02	-3.03210319
## as.factor(Year)2003	-2.000406e-01	6.965756e-02	-2.87177187
## as.factor(Year)2004	-2.166783e-01	7.104723e-02	-3.04977866
## as.factor(Year)2005	-1.964585e-01	7.365029e-02	-2.66745026
## as.factor(Year)2006	-1.828693e-01	7.676406e-02	-2.38222509
## as.factor(Year)2007	-1.662416e-01	7.852881e-02	-2.11694986
## as.factor(Year)2008	-1.896711e-01	7.760017e-02	-2.44420961
## as.factor(Year)2009	-2.704322e-01	7.482881e-02	-3.61401141
## as.factor(Year)2010	-2.604539e-01	7.648398e-02	-3.40533911
## as.factor(Year)2011	-2.399758e-01	7.939696e-02	-3.02248140
## as.factor(Country)Austria	-4.050424e-02	3.723371e-02	-1.08783790
## as.factor(Country)Belgium	-1.931945e-02	2.463283e-02	-0.78429691
## as.factor(Country)Brazil	1.928396e-01	1.069358e-01	1.80332147
## as.factor(Country)Canada	-2.770133e-02	1.463550e-02	-1.89274956
## as.factor(Country)Chile	1.427138e-01	8.527529e-02	1.67356543
## as.factor(Country)China	3.907994e-01	9.801633e-02	3.98708420
## as.factor(Country)Denmark	-3.819162e-02	3.744341e-02	-1.01998243
## as.factor(Country)Finland	-1.931158e-02	2.487661e-02	-0.77629478
## as.factor(Country)France	-3.335048e-02	1.757576e-02	-1.89752700
## as.factor(Country)Germany	-6.388407e-02	2.281739e-02	-2.79979683

```

## as.factor(Country)Greece      5.589782e-02 3.178190e-02 1.75879423
## as.factor(Country)Hungary     1.602300e-01 5.674619e-02 2.82362615
## as.factor(Country)Iceland     1.154744e-01 6.794223e-02 1.69959724
## as.factor(Country)Ireland     -6.134167e-02 3.649214e-02 -1.68095563
## as.factor(Country)Israel      6.184333e-02 3.366895e-02 1.83680593
## as.factor(Country)Italy       -2.541060e-02 1.811103e-02 -1.40304589
## as.factor(Country)Japan       -5.687139e-02 3.134239e-02 -1.81451985
## as.factor(Country)Korea       1.302946e-01 4.391551e-02 2.96693837
## as.factor(Country)Mexico      1.184301e-01 9.227008e-02 1.28351527
## as.factor(Country)Netherlands -6.223619e-02 2.965779e-02 -2.09847726
## as.factor(Country)New Zealand 4.119938e-02 2.225413e-02 1.85131420
## as.factor(Country)Norway      -8.980915e-02 5.008522e-02 -1.79312659
## as.factor(Country)Poland      1.702645e-01 6.361687e-02 2.67640502
## as.factor(Country)Portugal    6.910645e-02 3.138283e-02 2.20204648
## as.factor(Country)Spain       6.033131e-02 2.200243e-02 2.74202918
## as.factor(Country)Sweden      -2.525565e-02 3.679087e-02 -0.68646513
## as.factor(Country)Switzerland -8.352575e-02 5.765701e-02 -1.44866601
## as.factor(Country)Turkey      3.569802e-01 6.619665e-02 5.39272372
## as.factor(Country)United Kingdom 3.035310e-04 1.397534e-02 0.02171904
## as.factor(Country)United States -7.890254e-02 2.767748e-02 -2.85078492
##                               Pr(>|t|)
## (Intercept)                  1.012589e-02
## DV_nfc_ls_pc_lag1            1.477823e-02
## IV_lending_pc                 3.708094e-02
## IV_lending_pc_lag1            7.931025e-03
## IV_gov_exp_pc                 5.986026e-01
## IV_gov_exp_pc_lag1            1.432501e-02
## IV_trade_balance_pc           5.207866e-01
## IV_trade_balance_pc_lag1      5.797675e-01
## IV_fdi_net_pc                 4.314619e-01
## IV_fdi_net_pc_lag1            1.858608e-01
## C_REER                        2.422866e-04
## C_wgdp                        2.177097e-02
## C_cpi                          1.948697e-02
## C_wgini                        4.469867e-01
## as.factor(Year)1973           8.625723e-01
## as.factor(Year)1974           4.191480e-01
## as.factor(Year)1975           2.219322e-02
## as.factor(Year)1976           3.426948e-01
## as.factor(Year)1977           2.791360e-01
## as.factor(Year)1978           5.452638e-01
## as.factor(Year)1979           7.743500e-02
## as.factor(Year)1980           3.547028e-02
## as.factor(Year)1981           5.432697e-02
## as.factor(Year)1982           1.677665e-01
## as.factor(Year)1983           1.109219e-01
## as.factor(Year)1984           1.166829e-01
## as.factor(Year)1985           3.780693e-03
## as.factor(Year)1986           5.007891e-02
## as.factor(Year)1987           3.450131e-02
## as.factor(Year)1988           1.670112e-02
## as.factor(Year)1989           1.871471e-02
## as.factor(Year)1990           3.304612e-02
## as.factor(Year)1991           1.405449e-05

```

```

## as.factor(Year)1992      1.915539e-02
## as.factor(Year)1993      2.190896e-03
## as.factor(Year)1994      2.930256e-03
## as.factor(Year)1995      6.248205e-03
## as.factor(Year)1996      1.090901e-02
## as.factor(Year)1997      4.297744e-02
## as.factor(Year)1998      2.239279e-02
## as.factor(Year)1999      7.314102e-02
## as.factor(Year)2000      1.114831e-01
## as.factor(Year)2001      1.317904e-02
## as.factor(Year)2002      2.618546e-03
## as.factor(Year)2003      4.342508e-03
## as.factor(Year)2004      2.473213e-03
## as.factor(Year)2005      8.015322e-03
## as.factor(Year)2006      1.776762e-02
## as.factor(Year)2007      3.500306e-02
## as.factor(Year)2008      1.503369e-02
## as.factor(Year)2009      3.479065e-04
## as.factor(Year)2010      7.413678e-04
## as.factor(Year)2011      2.700917e-03
## as.factor(Country)Austria 2.774510e-01
## as.factor(Country)Belgium 4.334218e-01
## as.factor(Country)Brazil  7.223882e-02
## as.factor(Country)Canada  5.925558e-02
## as.factor(Country)Chile   9.515225e-02
## as.factor(Country)China   8.220105e-05
## as.factor(Country)Denmark 3.084750e-01
## as.factor(Country)Finland 4.381243e-01
## as.factor(Country)France  5.862061e-02
## as.factor(Country)Germany 5.410897e-03
## as.factor(Country)Greece  7.952817e-02
## as.factor(Country)Hungary 5.033315e-03
## as.factor(Country)Iceland 9.013775e-02
## as.factor(Country)Ireland 9.370638e-02
## as.factor(Country)Israel  6.712699e-02
## as.factor(Country)Italy   1.615321e-01
## as.factor(Country)Japan   7.049474e-02
## as.factor(Country)Korea   3.224716e-03
## as.factor(Country)Mexico  2.002014e-01
## as.factor(Country)Netherlands 3.661366e-02
## as.factor(Country)New Zealand 6.500691e-02
## as.factor(Country)Norway  7.385734e-02
## as.factor(Country)Poland  7.808706e-03
## as.factor(Country)Portugal 2.834510e-02
## as.factor(Country)Spain   6.435087e-03
## as.factor(Country)Sweden  4.928961e-01
## as.factor(Country)Switzerland 1.483690e-01
## as.factor(Country)Turkey  1.315702e-07
## as.factor(Country)United Kingdom 9.826850e-01
## as.factor(Country)United States 4.632265e-03
##
## -----
##
## # Valid Obs = 417; # Missing Obs = 823; Degrees of Freedom = 334.

```

```
summary(m3_pcse)
```

```
##
## Results:
##
##              Estimate          PCSE      t value
## (Intercept)    -9.276604e-02  1.110846e-01 -0.83509350
## DV_hh_ls_pc_lag1    1.763609e-02  1.066917e-01  0.16529953
## IV_lending_pc      -8.385351e-04  9.156611e-04 -0.91577022
## IV_lending_pc_lag1 -1.602411e-03  6.923348e-04 -2.31450377
## IV_gov_exp_pc      1.643231e-01  1.319525e-01  1.24532041
## IV_gov_exp_pc_lag1  4.461631e-04  1.283021e-04  3.47744074
## IV_trade_balance_pc 2.535078e-03  1.717257e-03  1.47623677
## IV_trade_balance_pc_lag1 6.365468e-05  1.693172e-03  0.03759494
## IV_fdi_net_pc      -6.470481e-07  4.368455e-06 -0.14811831
## IV_fdi_net_pc_lag1 -2.189169e-06  4.376016e-06 -0.50026523
## C_REER           7.099454e-04  4.677639e-04  1.51774296
## C_wgdp            6.795152e-06  3.297108e-06  2.06094305
## C_cpi             -1.907428e-03  4.182252e-03 -0.45607677
## C_wgini            1.866820e-03  1.665280e-03  1.12102442
## as.factor(Year)1973    1.932994e-03  4.603874e-02  0.04198626
## as.factor(Year)1974   -3.452131e-02  5.545677e-02 -0.62249035
## as.factor(Year)1975   -1.979274e-02  5.266838e-02 -0.37579920
## as.factor(Year)1976    9.867578e-03  4.790060e-02  0.20600114
## as.factor(Year)1977    1.518598e-02  4.549020e-02  0.33382976
## as.factor(Year)1978    3.564099e-02  4.735582e-02  0.75262114
## as.factor(Year)1979    6.316153e-02  5.222902e-02  1.20931859
## as.factor(Year)1980   -2.903958e-02  6.249144e-02 -0.46469701
## as.factor(Year)1981   -2.726831e-02  5.110659e-02 -0.53355749
## as.factor(Year)1982   -1.649613e-02  5.202455e-02 -0.31708350
## as.factor(Year)1983   -5.816257e-02  4.861575e-02 -1.19637292
## as.factor(Year)1984   -5.362762e-02  5.286294e-02 -1.01446534
## as.factor(Year)1985   -4.314896e-02  4.853141e-02 -0.88909349
## as.factor(Year)1986   -7.362111e-02  4.959242e-02 -1.48452343
## as.factor(Year)1987   -6.022652e-02  5.081083e-02 -1.18530870
## as.factor(Year)1988    1.695162e-02  5.163714e-02  0.32828337
## as.factor(Year)1989   -1.086800e-01  5.873788e-02 -1.85025425
## as.factor(Year)1990   -1.371662e-01  6.010052e-02 -2.28227907
## as.factor(Year)1991   -1.708069e-01  5.505988e-02 -3.10220213
## as.factor(Year)1992   -1.640821e-01  5.521215e-02 -2.97184798
## as.factor(Year)1993   -1.659454e-01  5.808733e-02 -2.85682702
## as.factor(Year)1994   -1.726287e-01  6.320311e-02 -2.73133266
## as.factor(Year)1995   -1.772138e-01  6.360932e-02 -2.78597264
## as.factor(Year)1996   -1.718097e-01  6.924739e-02 -2.48110080
## as.factor(Year)1997   -1.521897e-01  6.926063e-02 -2.19734791
## as.factor(Year)1998   -1.598447e-01  7.370658e-02 -2.16866300
## as.factor(Year)1999   -1.628024e-01  7.813349e-02 -2.08364454
## as.factor(Year)2000   -1.643563e-01  8.201446e-02 -2.00399203
## as.factor(Year)2001   -1.912795e-01  8.043705e-02 -2.37800304
## as.factor(Year)2002   -1.604503e-01  8.357840e-02 -1.91975765
## as.factor(Year)2003   -1.881483e-01  8.452203e-02 -2.22602638
## as.factor(Year)2004   -1.941394e-01  9.143646e-02 -2.12321706
## as.factor(Year)2005   -1.895760e-01  9.572881e-02 -1.98034371
## as.factor(Year)2006   -2.114547e-01  9.610761e-02 -2.20018674
```

```

## as.factor(Year)2007      -1.995254e-01  1.003276e-01 -1.98873839
## as.factor(Year)2008      -2.726199e-01  9.592707e-02 -2.84194942
## as.factor(Year)2009      -2.937959e-01  9.596138e-02 -3.06160570
## as.factor(Year)2010      -2.914269e-01  9.865215e-02 -2.95408532
## as.factor(Year)2011      -2.994383e-01  1.001012e-01 -2.99135434
## as.factor(Country)Austria -8.713816e-02  3.240366e-02 -2.68914598
## as.factor(Country)Belgium -4.278042e-02  2.319017e-02 -1.84476509
## as.factor(Country)Brazil   2.251261e-01  1.048414e-01  2.14730084
## as.factor(Country)Canada  -3.559380e-02  1.247779e-02 -2.85257279
## as.factor(Country)Chile    1.688097e-01  8.351114e-02  2.02140311
## as.factor(Country)China    5.915879e-01  1.939944e-01  3.04951104
## as.factor(Country)Denmark  -8.815442e-02  3.198828e-02 -2.75583526
## as.factor(Country)Finland  -4.450224e-02  2.018896e-02 -2.20428565
## as.factor(Country)France   -6.199897e-02  1.942564e-02 -3.19160533
## as.factor(Country)Germany  -1.148353e-01  2.492483e-02 -4.60726495
## as.factor(Country)Greece    1.493699e-01  4.864613e-02  3.07054147
## as.factor(Country)Hungary   2.851961e-01  9.768375e-02  2.91958610
## as.factor(Country)Iceland  -2.537088e-02  2.890945e-02 -0.87759846
## as.factor(Country)Ireland  -1.616919e-01  4.051712e-02 -3.99070597
## as.factor(Country)Israel    3.808604e-02  3.963641e-02  0.96088508
## as.factor(Country)Italy     -3.459422e-02  1.644770e-02 -2.10328671
## as.factor(Country)Japan     -6.544989e-02  3.133515e-02 -2.08870537
## as.factor(Country)Korea     1.053868e-01  5.768617e-02  1.82689894
## as.factor(Country)Mexico    1.547045e-01  8.434031e-02  1.83428892
## as.factor(Country)Netherlands -8.198750e-02  2.927871e-02 -2.80024288
## as.factor(Country)New Zealand 2.764146e-02  2.684587e-02  1.02963534
## as.factor(Country)Norway    -1.427862e-01  5.832091e-02 -2.44828478
## as.factor(Country)Poland     3.046825e-01  9.799731e-02  3.10909040
## as.factor(Country)Portugal   6.659779e-02  4.258421e-02  1.56390829
## as.factor(Country)Spain      3.171524e-02  2.264866e-02  1.40031403
## as.factor(Country)Sweden     -5.088499e-02  2.194097e-02 -2.31917693
## as.factor(Country)Switzerland -1.960974e-01  7.147896e-02 -2.74342896
## as.factor(Country)Turkey     3.771161e-01  9.396928e-02  4.01318467
## as.factor(Country)United Kingdom -4.091497e-02  9.824552e-03 -4.16456313
## as.factor(Country)United States -1.360573e-01  3.999230e-02 -3.40208846
##                               Pr(>|t|)
## (Intercept)                 4.042620e-01
## DV_hh_ls_pc_lag1            8.688082e-01
## IV_lending_pc                3.604481e-01
## IV_lending_pc_lag1           2.124620e-02
## IV_gov_exp_pc                2.138869e-01
## IV_gov_exp_pc_lag1           5.731827e-04
## IV_trade_balance_pc          1.408225e-01
## IV_trade_balance_pc_lag1     9.700331e-01
## IV_fdi_net_pc                8.823388e-01
## IV_fdi_net_pc_lag1           6.172178e-01
## C_REER                       1.300251e-01
## C_wgdp                       4.008228e-02
## C_cpi                        6.486312e-01
## C_wgini                      2.630828e-01
## as.factor(Year)1973          9.665347e-01
## as.factor(Year)1974          5.340442e-01
## as.factor(Year)1975          7.073048e-01
## as.factor(Year)1976          8.369155e-01

```

## as.factor(Year)1977	7.387175e-01
## as.factor(Year)1978	4.522077e-01
## as.factor(Year)1979	2.273958e-01
## as.factor(Year)1980	6.424512e-01
## as.factor(Year)1981	5.940026e-01
## as.factor(Year)1982	7.513784e-01
## as.factor(Year)1983	2.323996e-01
## as.factor(Year)1984	3.110951e-01
## as.factor(Year)1985	3.745927e-01
## as.factor(Year)1986	1.386132e-01
## as.factor(Year)1987	2.367381e-01
## as.factor(Year)1988	7.429031e-01
## as.factor(Year)1989	6.515990e-02
## as.factor(Year)1990	2.310122e-02
## as.factor(Year)1991	2.084657e-03
## as.factor(Year)1992	3.174920e-03
## as.factor(Year)1993	4.547092e-03
## as.factor(Year)1994	6.642919e-03
## as.factor(Year)1995	5.641544e-03
## as.factor(Year)1996	1.358945e-02
## as.factor(Year)1997	2.868184e-02
## as.factor(Year)1998	3.081362e-02
## as.factor(Year)1999	3.795241e-02
## as.factor(Year)2000	4.587805e-02
## as.factor(Year)2001	1.796884e-02
## as.factor(Year)2002	5.574010e-02
## as.factor(Year)2003	2.667929e-02
## as.factor(Year)2004	3.447062e-02
## as.factor(Year)2005	4.848517e-02
## as.factor(Year)2006	2.847798e-02
## as.factor(Year)2007	4.754574e-02
## as.factor(Year)2008	4.759429e-03
## as.factor(Year)2009	2.380148e-03
## as.factor(Year)2010	3.358482e-03
## as.factor(Year)2011	2.983954e-03
## as.factor(Country)Austria	7.522990e-03
## as.factor(Country)Belgium	6.595695e-02
## as.factor(Country)Brazil	3.248871e-02
## as.factor(Country)Canada	4.606913e-03
## as.factor(Country)Chile	4.403525e-02
## as.factor(Country)China	2.475357e-03
## as.factor(Country)Denmark	6.175528e-03
## as.factor(Country)Finland	2.818583e-02
## as.factor(Country)France	1.549228e-03
## as.factor(Country)Germany	5.812342e-06
## as.factor(Country)Greece	2.311981e-03
## as.factor(Country)Hungary	3.743006e-03
## as.factor(Country)Iceland	3.807925e-01
## as.factor(Country)Ireland	8.101223e-05
## as.factor(Country)Israel	3.373050e-01
## as.factor(Country)Italy	3.618834e-02
## as.factor(Country)Japan	3.749101e-02
## as.factor(Country)Korea	6.860729e-02
## as.factor(Country)Mexico	6.750056e-02

```
## as.factor(Country)Netherlands      5.403599e-03
## as.factor(Country)New Zealand      3.039263e-01
## as.factor(Country)Norway           1.486774e-02
## as.factor(Country)Poland           2.038009e-03
## as.factor(Country)Portugal         1.187861e-01
## as.factor(Country)Spain            1.623476e-01
## as.factor(Country)Sweden           2.098831e-02
## as.factor(Country)Switzerland      6.408328e-03
## as.factor(Country)Turkey           7.399100e-05
## as.factor(Country)United Kingdom   3.975383e-05
## as.factor(Country)United States    7.499406e-04
##
## -----
##
## # Valid Obs = 417; # Missing Obs = 823; Degrees of Freedom = 334.
```

3. Diagnosis

3.1 Phillips-Ouliaris test of Cointegration

“Cointegration is a technique used to find a possible correlation between time series processes in the long term. Nobel laureates Robert Engle and Clive Granger introduced the concept of cointegration in 1987. The most popular cointegration tests include Engle-Granger, the Johansen Test, and the Phillips-Ouliaris test.”

The null hypothesis of Phillips-Ouliaris test is that x not cointegrated. In all tests.

In all tests below, null hypotheses are rejected and suggest that the cointegration exists between dependent and independent variables.

```
library(tseries)
po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_lending_pc), demean=FALSE)) -> po_va_lending

## Warning in po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_lending_pc), : p-
## value smaller than printed p-value

po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_gov_exp_pc), demean=FALSE)) -> po_va_exp

## Warning in po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_gov_exp_pc), : p-
## value smaller than printed p-value

po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_trade_balance_pc), demean=FALSE)) -> po_va_trade

## Warning in po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_trade_balance_pc), :
## p-value smaller than printed p-value

po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_fdi_net_pc), demean=FALSE)) -> po_va_fdi

## Warning in po.test(as.matrix(cbind(va_df$DV_VA_pc, va_df$IV_fdi_net_pc), : p-
## value smaller than printed p-value

po_va <- rbind(as.numeric(po_va_lending[1]), as.numeric(po_va_exp[1]),
               as.numeric(po_va_trade[1]), as.numeric(po_va_fdi[1]))
po_va

##           [,1]
## [1,] -374.0847
## [2,] -371.8855
## [3,] -372.5825
## [4,] -375.7334
```



```

po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_lending_pc), demean=FALSE)) -> po_nfc_lending

## Warning in po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_lending_pc), :
## p-value smaller than printed p-value
po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_gov_exp_pc), demean=FALSE)) -> po_nfc_exp

## Warning in po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_gov_exp_pc), :
## p-value smaller than printed p-value
po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_trade_balance_pc), demean=FALSE)) -> po_nfc_trade

## Warning in po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc,
## nfc_df$IV_trade_balance_pc), : p-value smaller than printed p-value
po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_fdi_net_pc), demean=FALSE)) -> po_nfc_fdi

## Warning in po.test(as.matrix(cbind(nfc_df$DV_nfc_ls_pc, nfc_df$IV_fdi_net_pc), :
## p-value smaller than printed p-value
po_nfc <- rbind(as.numeric(po_nfc_lending[1]), as.numeric(po_nfc_exp[1]),
               as.numeric(po_nfc_trade[1]), as.numeric(po_nfc_fdi[1]))

po_nfc

##           [,1]
## [1,] -227.5647
## [2,] -282.5763
## [3,] -222.4460
## [4,] -223.1598

po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_lending_pc), demean=FALSE)) -> po_hh_lending

## Warning in po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_lending_pc), : p-
## value smaller than printed p-value
po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_gov_exp_pc), demean=FALSE)) -> po_hh_exp

## Warning in po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_gov_exp_pc), : p-
## value smaller than printed p-value
po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_trade_balance_pc), demean=FALSE)) -> po_hh_trade

## Warning in po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc,
## hh_df$IV_trade_balance_pc), : p-value smaller than printed p-value
po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_fdi_net_pc), demean=FALSE)) -> po_hh_fdi

## Warning in po.test(as.matrix(cbind(hh_df$DV_hh_ls_pc, hh_df$IV_fdi_net_pc), : p-
## value smaller than printed p-value
po_hh <- rbind(as.numeric(po_hh_lending[1]), as.numeric(po_hh_exp[1]),
               as.numeric(po_hh_trade[1]), as.numeric(po_hh_fdi[1]))

po_hh

##           [,1]
## [1,] -204.5699
## [2,] -256.2583
## [3,] -206.0080

```

```
## [4,] -209.4384
```

3.2 Test of Cross-sectional Dependence (Contemporaneous Correlations) Panel data can be subject to pervasive cross-sectional dependence, whereby all units in the same cross-section are correlated. This is usually attributed to the effect of some unobserved common factors, common to all units and affecting each of them, although possibly in different ways.

"According to Baltagi, cross-sectional dependence is a problem in macro panels with long time series. This is not much of a problem in micro panels (few years and large number of cases). The null hypothesis in the B-P/LM and Pasaran CD tests of independence is that residuals across entities are not correlated. B-P/LM and Pasaran CD (cross-sectional dependence) tests are used to test whether the residuals are correlated across entities*. Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). "

Package 'panelAR' is used here to test the cross-sectional dependency but the package is problematic.

The below tests suggest heteroskedasticity exists for fixed-effect models.

```
m1_fe <- plm(DV_VA_pc ~ DV_VA_pc_lag1 +
             IV_lending_pc + IV_lending_pc_lag1 +
             IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
             IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
             IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
             C_REER + C_wgdp + C_cpi + C_wgini,
             data = va_df, model = 'within',
             effect = 'twoways', index = c('Country', 'Year'))

m2_fe <- plm(DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 +
             IV_lending_pc + IV_lending_pc_lag1 +
             IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
             IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
             IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
             C_REER + C_wgdp + C_cpi + C_wgini,
             data = nfc_df, model = 'within',
             effect = 'twoways', index = c('Country', 'Year'))

m3_fe <- plm(DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 +
             IV_lending_pc + IV_lending_pc_lag1 +
             IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
             IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
             IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
             C_REER + C_wgdp + C_cpi + C_wgini,
             data = hh_df, model = 'within',
             effect = 'twoways', index = c('Country', 'Year'))

pcdtest(m1_fe, test = c("lm"))
```

```
## Warning in pcdres(tres = tres, n = n, w = w, form = paste(deparse(x$formula)), :
## Some pairs of individuals (2.2 percent) do not have any or just one time period
## in common and have been omitted from calculation
```

```
##
```

```
## Breusch-Pagan LM test for cross-sectional dependence in panels
```

```
##
```

```
## data: DV_VA_pc ~ DV_VA_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
```

```
## chisq = 616.16, df = 460, p-value = 1.427e-06
```

```
## alternative hypothesis: cross-sectional dependence
```

```
pcdtest(m2_fe, test = c("lm"))
```

```
## Warning in pcdres(tres = tres, n = n, w = w, form = paste(deparse(x$formula)), :  
## Some pairs of individuals (2.2 percent) do not have any or just one time period  
## in common and have been omitted from calculation
```

```
##
```

```
## Breusch-Pagan LM test for cross-sectional dependence in panels
```

```
##
```

```
## data: DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_
```

```
## chisq = 597.8, df = 460, p-value = 1.478e-05
```

```
## alternative hypothesis: cross-sectional dependence
```

```
pcdtest(m3_fe, test = c("lm"))
```

```
## Warning in pcdres(tres = tres, n = n, w = w, form = paste(deparse(x$formula)), :  
## Some pairs of individuals (2.2 percent) do not have any or just one time period  
## in common and have been omitted from calculation
```

```
##
```

```
## Breusch-Pagan LM test for cross-sectional dependence in panels
```

```
##
```

```
## data: DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_
```

```
## chisq = 960.89, df = 460, p-value < 2.2e-16
```

```
## alternative hypothesis: cross-sectional dependence
```

3.3 Testing for unit roots/stationarity The result rejects the null hypothesis that non-stationarity exists.

```
p_load(fBasics,fUnitRoots)
```

```
if (!require("punitroots"))install.packages("punitroots", repos="http://R-Forge.R-project.org")
```

```
## Loading required package: punitroots
```

```
## Loading required package: CADFtest
```

```
## Loading required package: sandwich
```

```
##
```

```
## Attaching package: 'sandwich'
```

```
## The following object is masked from 'package:pcse':
```

```
##
```

```
## vcovPC
```

```
## Loading required package: urca
```

```
##
```

```
## Attaching package: 'urca'
```

```
## The following objects are masked from 'package:fUnitRoots':
```

```
##
```

```
## punitroot, qunitroot, unitrootTable
```

```
## Registered S3 methods overwritten by 'CADFtest':
```

```
## method from
```

```
## bread.mlm sandwich
```

```
## estfun.mlm sandwich
```

```

if (!require("CADFtest"))install.packages("CADFtest")
#install.packages("ua")
library(punitroots)

padf <- function(df, x){
  df %>%
    select(Country, Year, x) -> iv
  iv <- na.omit(iv)
  result = pCADFtest(Y=iv, max.lag.y = 5, criterion = "AIC", crosscorr=0.10)
  print(result)
}

padf(va_df, "DV_VA_pc")

```

```

##
## Panel-ADF test
##
## data:
## test statistic.Ht = -11.943, mean.rho2 = NA, p-value < 2.2e-16

```

```
padf(nfc_df, "DV_nfc_ls_pc")
```

```

##
## Panel-ADF test
##
## data:
## test statistic.Ht = -10.455, mean.rho2 = NA, p-value < 2.2e-16

```

```
padf(hh_df, "DV_hh_ls_pc")
```

```

##
## Panel-ADF test
##
## data:
## test statistic.Ht = -9.1168, mean.rho2 = NA, p-value < 2.2e-16

```

3.4 test for heteroskedasticity The null hypothesis for the Breusch-Pagan test is homoskedasticity

The test below rejects the null hypothesis and suggests the presence of heteroskedasticity.

```

library(lmtest)
bptest(DV_VA_pc ~ DV_VA_pc_lag1 +
        IV_lending_pc + IV_lending_pc_lag1 +
        IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
        IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
        IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
        C_REER + C_wgdp + C_cpi + C_wgini + factor(Country), data=va_df, studentize=F)

```

```

##
## Breusch-Pagan test
##
## data: DV_VA_pc ~ DV_VA_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_gov_exp_pc_lag1 + IV_trade_balance_pc + IV_trade_balance_pc_lag1 + IV_fdi_net_pc + IV_fdi_net_pc_lag1 + C_REER + C_wgdp + C_cpi + C_wgini + factor(Country)
## BP = 263.11, df = 43, p-value < 2.2e-16

```

The test below rejects the null hypothesis and suggests the presence of heteroskedasticity.

```

bptest(DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 +
      IV_lending_pc + IV_lending_pc_lag1 +
      IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
      IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
      IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
      C_REER + C_wgdp + C_cpi + C_wgini + factor(Country), data=nfc_df, studentize=F)

##
## Breusch-Pagan test
##
## data: DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_gov_exp_pc_lag1 + IV_trade_balance_pc + IV_trade_balance_pc_lag1 + IV_fdi_net_pc + IV_fdi_net_pc_lag1 + C_REER + C_wgdp + C_cpi + C_wgini + factor(Country)
## BP = 410.62, df = 43, p-value < 2.2e-16

```

The test below rejects the null hypothesis and suggests the presence of heteroskedasticity.

```

bptest(DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 +
      IV_lending_pc + IV_lending_pc_lag1 +
      IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
      IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
      IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
      C_REER + C_wgdp + C_cpi + C_wgini + factor(Country), data=hh_df, studentize=F)

##
## Breusch-Pagan test
##
## data: DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_gov_exp_pc_lag1 + IV_trade_balance_pc + IV_trade_balance_pc_lag1 + IV_fdi_net_pc + IV_fdi_net_pc_lag1 + C_REER + C_wgdp + C_cpi + C_wgini + factor(Country)
## BP = 1834.5, df = 43, p-value < 2.2e-16

```

3.5 Breusch-Godfrey test Test for autocorrelation

```

lmtest::bptest(DV_VA_pc ~ DV_VA_pc_lag1 +
      IV_lending_pc + IV_lending_pc_lag1 +
      IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
      IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
      IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
      C_REER + C_wgdp + C_cpi + C_wgini + factor(Country), data=va_df)

##
## Breusch-Godfrey test for serial correlation of order up to 1
##
## data: DV_VA_pc ~ DV_VA_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_gov_exp_pc_lag1 + IV_trade_balance_pc + IV_trade_balance_pc_lag1 + IV_fdi_net_pc + IV_fdi_net_pc_lag1 + C_REER + C_wgdp + C_cpi + C_wgini + factor(Country)
## LM test = 1.5878, df = 1, p-value = 0.2076

lmtest::bptest(DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 +
      IV_lending_pc + IV_lending_pc_lag1 +
      IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
      IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
      IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
      C_REER + C_wgdp + C_cpi + C_wgini + factor(Country), data=nfc_df)

##
## Breusch-Godfrey test for serial correlation of order up to 1
##
## data: DV_nfc_ls_pc ~ DV_nfc_ls_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_gov_exp_pc_lag1 + IV_trade_balance_pc + IV_trade_balance_pc_lag1 + IV_fdi_net_pc + IV_fdi_net_pc_lag1 + C_REER + C_wgdp + C_cpi + C_wgini + factor(Country)
## LM test = 10.94, df = 1, p-value = 0.0009411

```

```
lmtest::bgtest(DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 +
               IV_lending_pc + IV_lending_pc_lag1 +
               IV_gov_exp_pc + IV_gov_exp_pc_lag1 +
               IV_trade_balance_pc + IV_trade_balance_pc_lag1 +
               IV_fdi_net_pc + IV_fdi_net_pc_lag1 +
               C_REER + C_wgdp + C_cpi + C_wgini + factor(Country), data=hh_df)
```

```
##
## Breusch-Godfrey test for serial correlation of order up to 1
##
## data: DV_hh_ls_pc ~ DV_hh_ls_pc_lag1 + IV_lending_pc + IV_lending_pc_lag1 + IV_gov_exp_pc + IV_fdi_net_pc
## LM test = 53.794, df = 1, p-value = 2.227e-13
```

4. Robustness: ECM

```
p_load('ecm')
xeq <- xtr <- va_df[c('IV_lending_pc', 'IV_gov_exp_pc', 'IV_trade_balance_pc', 'IV_fdi_net_pc', 'C_REER')]
m1_ecm <- ecm(va_df$DV_VA_pc, xeq, xtr, includeIntercept=TRUE)
lmtest::bptest(m1_ecm)
```

```
##
## studentized Breusch-Pagan test
##
## data: m1_ecm
## BP = 80.92, df = 17, p-value = 2.631e-10
```

```
lmtest::bgtest(m1_ecm)
```

```
##
## Breusch-Godfrey test for serial correlation of order up to 1
##
## data: m1_ecm
## LM test = 1.6337, df = 1, p-value = 0.2012
```

```
lmtest::coeftest(m1_ecm, vcov=sandwich::NeweyWest)
```

```
##
## t test of coefficients:
##
##
```

	Estimate	Std. Error	t value	Pr(> t)
## (Intercept)	1.1440e-01	5.7193e-02	2.0003	0.0461699 *
## deltaIV_lending_pc	-5.7397e-04	1.3628e-03	-0.4212	0.6738669
## deltaIV_gov_exp_pc	3.5438e-01	8.8643e-02	3.9978	7.66e-05 ***
## deltaIV_trade_balance_pc	-9.3407e-04	1.2065e-03	-0.7742	0.4393017
## deltaIV_fdi_net_pc	2.6123e-06	1.4736e-06	1.7727	0.0770661 .
## deltaC_REER	-2.2445e-04	6.8345e-04	-0.3284	0.7427856
## deltaC_wgdp	7.7552e-07	1.5927e-06	0.4869	0.6265936
## deltaC_cpi	-3.9826e-04	2.4579e-03	-0.1620	0.8713675
## deltaC_wgini	4.8788e-04	2.0418e-03	0.2389	0.8112720
## IV_lending_pcLag1	-3.3086e-03	1.8823e-03	-1.7577	0.0795882 .
## IV_gov_exp_pcLag1	3.7827e-01	1.2185e-01	3.1043	0.0020479 **
## IV_trade_balance_pcLag1	1.4340e-03	1.3777e-03	1.0409	0.2985813
## IV_fdi_net_pcLag1	4.9707e-06	1.3921e-06	3.5706	0.0004011 ***
## C_REERLag1	-2.7675e-04	3.6288e-04	-0.7627	0.4461331
## C_wgdpLag1	-1.0503e-06	3.6644e-07	-2.8663	0.0043805 **

```

## C_cpiLag1          -1.9766e-03  2.9752e-03  -0.6644  0.5068439
## C_wginiLag1        -9.5259e-04  8.0725e-04  -1.1800  0.2387108
## yLag1              -9.7775e-01  4.4498e-02 -21.9728 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

xeq <- xtr <- nfc_df[c('IV_lending_pc', 'IV_gov_exp_pc', 'IV_trade_balance_pc', 'IV_fdi_net_pc', 'C_REER',
m2_ecm <- ecm(nfc_df$DV_nfc_ls_pc, xeq, xtr, includeIntercept=TRUE)
lmtest::bptest(m2_ecm)

##
## studentized Breusch-Pagan test
##
## data:  m2_ecm
## BP = 23.966, df = 17, p-value = 0.1204

lmtest::bgtest(m2_ecm)

##
## Breusch-Godfrey test for serial correlation of order up to 1
##
## data:  m2_ecm
## LM test = 1.4967, df = 1, p-value = 0.2212

lmtest::coeftest(m2_ecm, vcov=sandwich::NeweyWest)

##
## t test of coefficients:
##
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -4.4383e-02  6.9818e-02 -0.6357  0.525346
## deltaIV_lending_pc -2.5367e-03  1.0073e-03 -2.5184  0.012182 *
## deltaIV_gov_exp_pc  2.2220e-01  1.1663e-01  1.9051  0.057491 .
## deltaIV_trade_balance_pc -4.5386e-05  1.2109e-03 -0.0375  0.970120
## deltaIV_fdi_net_pc -1.5223e-06  7.1610e-07 -2.1258  0.034136 *
## deltaC_REER      9.0892e-04  6.5976e-04  1.3777  0.169085
## deltaC_wgdp      1.2191e-06  1.5194e-06  0.8023  0.422832
## deltaC_cpi       1.4869e-02  2.7383e-03  5.4300  9.822e-08 ***
## deltaC_wgini     2.4003e-03  1.4990e-03  1.6013  0.110105
## IV_lending_pcLag1 -5.0831e-03  1.6532e-03 -3.0748  0.002252 **
## IV_gov_exp_pcLag1  2.4243e-01  1.4779e-01  1.6404  0.101713
## IV_trade_balance_pcLag1 1.1232e-03  2.2751e-03  0.4937  0.621783
## IV_fdi_net_pcLag1  1.5640e-06  9.6768e-07  1.6163  0.106829
## C_REERLag1       1.0099e-03  4.5923e-04  2.1991  0.028442 *
## C_wgdpLag1       -6.1746e-07  4.4853e-07 -1.3766  0.169395
## C_cpiLag1        6.3755e-03  2.8732e-03  2.2189  0.027054 *
## C_wginiLag1      -3.9374e-04  5.8536e-04 -0.6726  0.501563
## yLag1            -6.7460e-01  1.0626e-01 -6.3483  5.939e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

xeq <- xtr <- hh_df[c('IV_lending_pc', 'IV_gov_exp_pc', 'IV_trade_balance_pc', 'IV_fdi_net_pc', 'C_REER',
m3_ecm <- ecm(hh_df$DV_hh_ls_pc, xeq, xtr, includeIntercept=TRUE)
lmtest::bptest(m3_ecm)

##
## studentized Breusch-Pagan test

```

```
##
## data: m3_ecm
## BP = 129.74, df = 17, p-value < 2.2e-16
lmtest::bgtest(m3_ecm)

##
## Breusch-Godfrey test for serial correlation of order up to 1
##
## data: m3_ecm
## LM test = 12.769, df = 1, p-value = 0.0003524
lmtest::coeftest(m3_ecm, vcov=sandwich::NeweyWest)

##
## t test of coefficients:
##
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)      2.4962e-01  8.3139e-02  3.0025 0.0028469 **
## deltaIV_lending_pc -2.7454e-04  7.2688e-04 -0.3777 0.7058578
## deltaIV_gov_exp_pc  4.0059e-01  1.8252e-01  2.1947 0.0287606 *
## deltaIV_trade_balance_pc 1.2393e-03  1.6057e-03  0.7718 0.4406885
## deltaIV_fdi_net_pc -1.7699e-06  2.1392e-06 -0.8274 0.4085269
## deltaC_REER        1.9384e-05  1.4777e-03  0.0131 0.9895406
## deltaC_wgdp        -6.5171e-06  1.9563e-06 -3.3313 0.0009453 ***
## deltaC_cpi         2.4780e-03  4.9687e-03  0.4987 0.6182573
## deltaC_wgini       -3.4042e-03  2.9024e-03 -1.1729 0.2415414
## IV_lending_pcLag1  -2.5333e-03  2.1892e-03 -1.1572 0.2478926
## IV_gov_exp_pcLag1  3.2814e-01  1.9980e-01  1.6423 0.1013111
## IV_trade_balance_pcLag1 1.9451e-03  1.9897e-03  0.9776 0.3288687
## IV_fdi_net_pcLag1  -1.3721e-06  2.8152e-06 -0.4874 0.6262423
## C_REERLag1        -8.4672e-04  3.8877e-04 -2.1779 0.0299973 *
## C_wgdpLag1        -2.0668e-06  7.9779e-07 -2.5906 0.0099328 **
## C_cpiLag1         -1.2832e-04  2.6578e-03 -0.0483 0.9615185
## C_wginiLag1       -1.2243e-03  1.2004e-03 -1.0200 0.3083650
## yLag1             -5.6683e-01  1.4787e-01 -3.8333 0.0001469 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

summary(m1_pcse)

##
## Results:
##
##               Estimate          PCSE          t value
## (Intercept)      -1.834287e-03  1.627333e-01 -0.011271743
## DV_VA_pc_lag1     1.930694e-02  2.078305e-02  0.928975173
## IV_lending_pc     -1.141239e-03  1.185315e-03 -0.962815341
## IV_lending_pc_lag1 -1.713387e-03  9.212780e-04 -1.859793178
## IV_gov_exp_pc      3.991089e-01  9.142551e-02  4.365400081
## IV_gov_exp_pc_lag1 3.215859e-05  7.892870e-05  0.407438526
## IV_trade_balance_pc -2.541258e-04  1.755719e-03 -0.144741687
## IV_trade_balance_pc_lag1 5.679459e-04  1.883695e-03  0.301506280
## IV_fdi_net_pc      2.169008e-06  2.151684e-06  1.008051313
## IV_fdi_net_pc_lag1 2.712417e-06  2.174349e-06  1.247461292
## C_REER            6.367936e-04  5.550214e-04  1.147331569
```


## C_wgdp	-8.088325e-07	2.905882e-06	-0.278343235
## C_cpi	1.568857e-05	2.170562e-03	0.007227882
## C_wgini	5.238501e-05	2.150303e-03	0.024361690
## as.factor(Year)1979	1.610916e-02	9.836704e-02	0.163765862
## as.factor(Year)1981	-2.281733e-02	8.661779e-02	-0.263425464
## as.factor(Year)1982	-4.492027e-01	9.570786e-02	-4.693477161
## as.factor(Year)1984	4.792513e-02	8.456473e-02	0.566727168
## as.factor(Year)1985	1.392904e-01	7.295451e-02	1.909277889
## as.factor(Year)1986	2.373405e-02	9.285552e-02	0.255601977
## as.factor(Year)1987	6.669896e-02	9.170256e-02	0.727340200
## as.factor(Year)1988	9.433292e-02	7.880704e-02	1.197011382
## as.factor(Year)1989	7.557087e-02	8.280393e-02	0.912648323
## as.factor(Year)1990	3.533117e-02	8.177176e-02	0.432070562
## as.factor(Year)1991	-9.321377e-02	7.837228e-02	-1.189371659
## as.factor(Year)1992	3.364781e-02	7.498733e-02	0.448713266
## as.factor(Year)1993	5.852127e-02	7.998357e-02	0.731666167
## as.factor(Year)1994	1.849217e-03	8.176811e-02	0.022615385
## as.factor(Year)1995	3.135083e-02	7.951476e-02	0.394276896
## as.factor(Year)1996	1.320609e-02	8.159682e-02	0.161845680
## as.factor(Year)1997	3.259586e-02	8.329205e-02	0.391344186
## as.factor(Year)1998	-2.783227e-03	8.491880e-02	-0.032775159
## as.factor(Year)1999	6.712067e-03	8.857538e-02	0.075778025
## as.factor(Year)2000	3.121562e-02	8.959371e-02	0.348413039
## as.factor(Year)2001	-2.015177e-02	9.034013e-02	-0.223065486
## as.factor(Year)2002	-1.237028e-02	9.148674e-02	-0.135213919
## as.factor(Year)2003	2.966834e-02	9.324430e-02	0.318178628
## as.factor(Year)2004	3.655961e-02	9.445213e-02	0.387070283
## as.factor(Year)2005	3.731883e-02	9.577363e-02	0.389656625
## as.factor(Year)2006	2.112110e-02	9.867207e-02	0.214053490
## as.factor(Year)2007	5.913900e-02	1.005334e-01	0.588252453
## as.factor(Year)2008	-6.772965e-02	9.897063e-02	-0.684340896
## as.factor(Year)2009	2.203647e-02	9.830198e-02	0.224171135
## as.factor(Year)2010	-1.687429e-02	9.895928e-02	-0.170517510
## as.factor(Year)2011	6.467168e-03	9.949112e-02	0.065002459
## as.factor(Country)Austria	-3.482701e-02	4.380477e-02	-0.795050676
## as.factor(Country)Belgium	-2.692363e-02	3.524858e-02	-0.763821664
## as.factor(Country)Brazil	-8.972086e-02	9.751076e-02	-0.920112351
## as.factor(Country)Canada	-2.912998e-02	1.952482e-02	-1.491945997
## as.factor(Country)Chile	-8.072594e-02	9.861900e-02	-0.818563773
## as.factor(Country)China	-9.585764e-03	1.044327e-01	-0.091788953
## as.factor(Country)Denmark	-3.066563e-02	3.706348e-02	-0.827381233
## as.factor(Country)Finland	-5.864075e-02	2.899604e-02	-2.022370991
## as.factor(Country)France	-5.823558e-02	2.561199e-02	-2.273762844
## as.factor(Country)Germany	-3.811826e-02	2.898618e-02	-1.315049504
## as.factor(Country)Greece	-4.803430e-02	3.685159e-02	-1.303452716
## as.factor(Country)Hungary	-7.774237e-02	6.792222e-02	-1.144579378
## as.factor(Country)Iceland	-1.113646e-02	6.416175e-02	-0.173568534
## as.factor(Country)Ireland	-7.184443e-02	3.968790e-02	-1.810235052
## as.factor(Country)Israel	-3.096824e-02	3.410805e-02	-0.907945311
## as.factor(Country)Italy	-3.123689e-02	2.288477e-02	-1.364963927
## as.factor(Country)Japan	-1.012743e-01	4.005332e-02	-2.528487404
## as.factor(Country)Korea	-3.249465e-02	4.779372e-02	-0.679893788
## as.factor(Country)Mexico	-4.424876e-02	9.142124e-02	-0.484009646
## as.factor(Country)Netherlands	-2.196754e-02	3.431546e-02	-0.640164520

```

## as.factor(Country)New Zealand -2.210416e-02 4.334658e-02 -0.509940069
## as.factor(Country)Norway -3.493460e-02 6.310146e-02 -0.553625893
## as.factor(Country)Poland -1.131226e-02 7.570520e-02 -0.149425185
## as.factor(Country)Portugal -3.966738e-02 4.046905e-02 -0.980190671
## as.factor(Country)Spain -5.452481e-02 2.580084e-02 -2.113295621
## as.factor(Country)Sweden -2.610202e-02 3.320457e-02 -0.786097400
## as.factor(Country)Switzerland -1.812880e-02 6.413414e-02 -0.282670117
## as.factor(Country)Turkey -1.683021e-01 9.779641e-02 -1.720943079
## as.factor(Country)United Kingdom -2.191441e-02 2.088147e-02 -1.049467089
## as.factor(Country)United States -3.763220e-02 3.957191e-02 -0.950982701
## Pr(>|t|)
## (Intercept) 9.910135e-01
## DV_VA_pc_lag1 3.535810e-01
## IV_lending_pc 3.363452e-01
## IV_lending_pc_lag1 6.380444e-02
## IV_gov_exp_pc 1.700054e-05
## IV_gov_exp_pc_lag1 6.839501e-01
## IV_trade_balance_pc 8.850032e-01
## IV_trade_balance_pc_lag1 7.632184e-01
## IV_fdi_net_pc 3.141684e-01
## IV_fdi_net_pc_lag1 2.131129e-01
## C_REER 2.520757e-01
## C_wgdp 7.809232e-01
## C_cpi 9.942374e-01
## C_wgini 9.805788e-01
## as.factor(Year)1979 8.700157e-01
## as.factor(Year)1981 7.923871e-01
## as.factor(Year)1982 3.942645e-06
## as.factor(Year)1984 5.712848e-01
## as.factor(Year)1985 5.709329e-02
## as.factor(Year)1986 7.984174e-01
## as.factor(Year)1987 4.675333e-01
## as.factor(Year)1988 2.321613e-01
## as.factor(Year)1989 3.620938e-01
## as.factor(Year)1990 6.659723e-01
## as.factor(Year)1991 2.351485e-01
## as.factor(Year)1992 6.539330e-01
## as.factor(Year)1993 4.648916e-01
## as.factor(Year)1994 9.819707e-01
## as.factor(Year)1995 6.936313e-01
## as.factor(Year)1996 8.715264e-01
## as.factor(Year)1997 6.957954e-01
## as.factor(Year)1998 9.738737e-01
## as.factor(Year)1999 9.396416e-01
## as.factor(Year)2000 7.277522e-01
## as.factor(Year)2001 8.236226e-01
## as.factor(Year)2002 8.925252e-01
## as.factor(Year)2003 7.505507e-01
## as.factor(Year)2004 6.989537e-01
## as.factor(Year)2005 6.970418e-01
## as.factor(Year)2006 8.306375e-01
## as.factor(Year)2007 5.567652e-01
## as.factor(Year)2008 4.942402e-01
## as.factor(Year)2009 8.227629e-01

```

```

## as.factor(Year)2010      8.647077e-01
## as.factor(Year)2011      9.482114e-01
## as.factor(Country)Austria 4.271555e-01
## as.factor(Country)Belgium 4.455193e-01
## as.factor(Country)Brazil  3.581861e-01
## as.factor(Country)Canada  1.366686e-01
## as.factor(Country)Chile   4.136260e-01
## as.factor(Country)China    9.269214e-01
## as.factor(Country)Denmark  4.086189e-01
## as.factor(Country)Finland  4.394435e-02
## as.factor(Country)France   2.362219e-02
## as.factor(Country)Germany  1.894063e-01
## as.factor(Country)Greece   1.933289e-01
## as.factor(Country)Hungary  2.532129e-01
## as.factor(Country)Iceland  8.623110e-01
## as.factor(Country)Ireland  7.116882e-02
## as.factor(Country)Israel   3.645697e-01
## as.factor(Country)Italy    1.731943e-01
## as.factor(Country)Japan    1.192130e-02
## as.factor(Country)Korea    4.970484e-01
## as.factor(Country)Mexico    6.287001e-01
## as.factor(Country)Netherlands 5.225099e-01
## as.factor(Country)New Zealand 6.104343e-01
## as.factor(Country)Norway    5.802098e-01
## as.factor(Country)Poland    8.813094e-01
## as.factor(Country)Portugal  3.277101e-01
## as.factor(Country)Spain     3.532576e-02
## as.factor(Country)Sweden    4.323745e-01
## as.factor(Country)Switzerland 7.776069e-01
## as.factor(Country)Turkey    8.619845e-02
## as.factor(Country)United Kingdom 2.947312e-01
## as.factor(Country)United States 3.423091e-01
##
## -----
##
## # Valid Obs = 405; # Missing Obs = 587; Degrees of Freedom = 330.

```

```
summary(m2_pcse)
```

```

##
## Results:
##
##              Estimate      PCSE      t value
## (Intercept) -2.586145e-01 9.999663e-02 -2.58623186
## DV_nfc_ls_pc_lag1 1.377579e-01 5.621627e-02 2.45049955
## IV_lending_pc -2.073923e-03 9.907680e-04 -2.09324805
## IV_lending_pc_lag1 -2.076863e-03 7.775374e-04 -2.67107837
## IV_gov_exp_pc 6.093256e-02 1.156403e-01 0.52691468
## IV_gov_exp_pc_lag1 1.537258e-04 6.244194e-05 2.46189965
## IV_trade_balance_pc -8.334628e-04 1.296587e-03 -0.64281279
## IV_trade_balance_pc_lag1 7.090965e-04 1.279342e-03 0.55426638
## IV_fdi_net_pc -1.400688e-06 1.778320e-06 -0.78764687
## IV_fdi_net_pc_lag1 2.419881e-06 1.825427e-06 1.32565237
## C_REER 1.953828e-03 5.265785e-04 3.71042171
## C_wgdp 6.008415e-06 2.606523e-06 2.30514594

```

## C_cpi	6.502675e-03	2.770131e-03	2.34742529
## C_wgini	1.351352e-03	1.774948e-03	0.76134754
## as.factor(Year)1973	7.446742e-03	4.298657e-02	0.17323416
## as.factor(Year)1974	-3.842828e-02	4.750679e-02	-0.80890077
## as.factor(Year)1975	-1.017995e-01	4.430384e-02	-2.29775838
## as.factor(Year)1976	-4.198567e-02	4.418587e-02	-0.95020568
## as.factor(Year)1977	-4.820528e-02	4.446883e-02	-1.08402398
## as.factor(Year)1978	-2.709141e-02	4.474286e-02	-0.60549137
## as.factor(Year)1979	-8.290015e-02	4.680382e-02	-1.77122606
## as.factor(Year)1980	-1.060836e-01	5.024044e-02	-2.11151733
## as.factor(Year)1981	-8.960776e-02	4.640444e-02	-1.93101699
## as.factor(Year)1982	-6.185922e-02	4.474706e-02	-1.38241970
## as.factor(Year)1983	-7.167618e-02	4.484528e-02	-1.59829926
## as.factor(Year)1984	-6.746134e-02	4.288909e-02	-1.57292521
## as.factor(Year)1985	-1.185788e-01	4.065957e-02	-2.91638138
## as.factor(Year)1986	-9.424083e-02	4.792530e-02	-1.96641095
## as.factor(Year)1987	-1.039159e-01	4.895106e-02	-2.12285354
## as.factor(Year)1988	-1.153143e-01	4.794111e-02	-2.40533142
## as.factor(Year)1989	-1.254882e-01	5.311201e-02	-2.36270764
## as.factor(Year)1990	-1.120528e-01	5.235125e-02	-2.14040244
## as.factor(Year)1991	-2.133731e-01	4.840118e-02	-4.40842707
## as.factor(Year)1992	-1.119063e-01	4.754039e-02	-2.35392050
## as.factor(Year)1993	-1.529629e-01	4.955019e-02	-3.08702945
## as.factor(Year)1994	-1.583348e-01	5.283028e-02	-2.99704550
## as.factor(Year)1995	-1.439828e-01	5.232089e-02	-2.75191743
## as.factor(Year)1996	-1.455708e-01	5.686520e-02	-2.55992792
## as.factor(Year)1997	-1.174260e-01	5.779755e-02	-2.03167854
## as.factor(Year)1998	-1.367452e-01	5.960189e-02	-2.29430931
## as.factor(Year)1999	-1.152634e-01	6.412015e-02	-1.79761574
## as.factor(Year)2000	-1.045716e-01	6.553001e-02	-1.59578244
## as.factor(Year)2001	-1.665107e-01	6.681224e-02	-2.49221869
## as.factor(Year)2002	-2.060752e-01	6.796444e-02	-3.03210319
## as.factor(Year)2003	-2.000406e-01	6.965756e-02	-2.87177187
## as.factor(Year)2004	-2.166783e-01	7.104723e-02	-3.04977866
## as.factor(Year)2005	-1.964585e-01	7.365029e-02	-2.66745026
## as.factor(Year)2006	-1.828693e-01	7.676406e-02	-2.38222509
## as.factor(Year)2007	-1.662416e-01	7.852881e-02	-2.11694986
## as.factor(Year)2008	-1.896711e-01	7.760017e-02	-2.44420961
## as.factor(Year)2009	-2.704322e-01	7.482881e-02	-3.61401141
## as.factor(Year)2010	-2.604539e-01	7.648398e-02	-3.40533911
## as.factor(Year)2011	-2.399758e-01	7.939696e-02	-3.02248140
## as.factor(Country)Austria	-4.050424e-02	3.723371e-02	-1.08783790
## as.factor(Country)Belgium	-1.931945e-02	2.463283e-02	-0.78429691
## as.factor(Country)Brazil	1.928396e-01	1.069358e-01	1.80332147
## as.factor(Country)Canada	-2.770133e-02	1.463550e-02	-1.89274956
## as.factor(Country)Chile	1.427138e-01	8.527529e-02	1.67356543
## as.factor(Country)China	3.907994e-01	9.801633e-02	3.98708420
## as.factor(Country)Denmark	-3.819162e-02	3.744341e-02	-1.01998243
## as.factor(Country)Finland	-1.931158e-02	2.487661e-02	-0.77629478
## as.factor(Country)France	-3.335048e-02	1.757576e-02	-1.89752700
## as.factor(Country)Germany	-6.388407e-02	2.281739e-02	-2.79979683
## as.factor(Country)Greece	5.589782e-02	3.178190e-02	1.75879423
## as.factor(Country)Hungary	1.602300e-01	5.674619e-02	2.82362615
## as.factor(Country)Iceland	1.154744e-01	6.794223e-02	1.69959724

```

## as.factor(Country)Ireland      -6.134167e-02  3.649214e-02 -1.68095563
## as.factor(Country)Israel       6.184333e-02  3.366895e-02  1.83680593
## as.factor(Country)Italy        -2.541060e-02  1.811103e-02 -1.40304589
## as.factor(Country)Japan        -5.687139e-02  3.134239e-02 -1.81451985
## as.factor(Country)Korea        1.302946e-01  4.391551e-02  2.96693837
## as.factor(Country)Mexico       1.184301e-01  9.227008e-02  1.28351527
## as.factor(Country)Netherlands -6.223619e-02  2.965779e-02 -2.09847726
## as.factor(Country)New Zealand  4.119938e-02  2.225413e-02  1.85131420
## as.factor(Country)Norway       -8.980915e-02  5.008522e-02 -1.79312659
## as.factor(Country)Poland       1.702645e-01  6.361687e-02  2.67640502
## as.factor(Country)Portugal     6.910645e-02  3.138283e-02  2.20204648
## as.factor(Country)Spain        6.033131e-02  2.200243e-02  2.74202918
## as.factor(Country)Sweden       -2.525565e-02  3.679087e-02 -0.68646513
## as.factor(Country)Switzerland -8.352575e-02  5.765701e-02 -1.44866601
## as.factor(Country)Turkey       3.569802e-01  6.619665e-02  5.39272372
## as.factor(Country)United Kingdom 3.035310e-04  1.397534e-02  0.02171904
## as.factor(Country)United States -7.890254e-02  2.767748e-02 -2.85078492
##                                Pr(>|t|)
## (Intercept)                   1.012589e-02
## DV_nfc_ls_pc_lag1             1.477823e-02
## IV_lending_pc                 3.708094e-02
## IV_lending_pc_lag1            7.931025e-03
## IV_gov_exp_pc                 5.986026e-01
## IV_gov_exp_pc_lag1            1.432501e-02
## IV_trade_balance_pc           5.207866e-01
## IV_trade_balance_pc_lag1      5.797675e-01
## IV_fdi_net_pc                 4.314619e-01
## IV_fdi_net_pc_lag1            1.858608e-01
## C_REER                        2.422866e-04
## C_wgdp                        2.177097e-02
## C_cpi                         1.948697e-02
## C_wgini                       4.469867e-01
## as.factor(Year)1973           8.625723e-01
## as.factor(Year)1974           4.191480e-01
## as.factor(Year)1975           2.219322e-02
## as.factor(Year)1976           3.426948e-01
## as.factor(Year)1977           2.791360e-01
## as.factor(Year)1978           5.452638e-01
## as.factor(Year)1979           7.743500e-02
## as.factor(Year)1980           3.547028e-02
## as.factor(Year)1981           5.432697e-02
## as.factor(Year)1982           1.677665e-01
## as.factor(Year)1983           1.109219e-01
## as.factor(Year)1984           1.166829e-01
## as.factor(Year)1985           3.780693e-03
## as.factor(Year)1986           5.007891e-02
## as.factor(Year)1987           3.450131e-02
## as.factor(Year)1988           1.670112e-02
## as.factor(Year)1989           1.871471e-02
## as.factor(Year)1990           3.304612e-02
## as.factor(Year)1991           1.405449e-05
## as.factor(Year)1992           1.915539e-02
## as.factor(Year)1993           2.190896e-03
## as.factor(Year)1994           2.930256e-03

```

```

## as.factor(Year)1995      6.248205e-03
## as.factor(Year)1996      1.090901e-02
## as.factor(Year)1997      4.297744e-02
## as.factor(Year)1998      2.239279e-02
## as.factor(Year)1999      7.314102e-02
## as.factor(Year)2000      1.114831e-01
## as.factor(Year)2001      1.317904e-02
## as.factor(Year)2002      2.618546e-03
## as.factor(Year)2003      4.342508e-03
## as.factor(Year)2004      2.473213e-03
## as.factor(Year)2005      8.015322e-03
## as.factor(Year)2006      1.776762e-02
## as.factor(Year)2007      3.500306e-02
## as.factor(Year)2008      1.503369e-02
## as.factor(Year)2009      3.479065e-04
## as.factor(Year)2010      7.413678e-04
## as.factor(Year)2011      2.700917e-03
## as.factor(Country)Austria 2.774510e-01
## as.factor(Country)Belgium 4.334218e-01
## as.factor(Country)Brazil  7.223882e-02
## as.factor(Country)Canada  5.925558e-02
## as.factor(Country)Chile    9.515225e-02
## as.factor(Country)China    8.220105e-05
## as.factor(Country)Denmark  3.084750e-01
## as.factor(Country)Finland  4.381243e-01
## as.factor(Country)France    5.862061e-02
## as.factor(Country)Germany   5.410897e-03
## as.factor(Country)Greece    7.952817e-02
## as.factor(Country)Hungary   5.033315e-03
## as.factor(Country)Iceland   9.013775e-02
## as.factor(Country)Ireland   9.370638e-02
## as.factor(Country)Israel    6.712699e-02
## as.factor(Country)Italy     1.615321e-01
## as.factor(Country)Japan     7.049474e-02
## as.factor(Country)Korea     3.224716e-03
## as.factor(Country)Mexico    2.002014e-01
## as.factor(Country)Netherlands 3.661366e-02
## as.factor(Country)New Zealand 6.500691e-02
## as.factor(Country)Norway    7.385734e-02
## as.factor(Country)Poland    7.808706e-03
## as.factor(Country)Portugal  2.834510e-02
## as.factor(Country)Spain     6.435087e-03
## as.factor(Country)Sweden    4.928961e-01
## as.factor(Country)Switzerland 1.483690e-01
## as.factor(Country)Turkey    1.315702e-07
## as.factor(Country)United Kingdom 9.826850e-01
## as.factor(Country)United States 4.632265e-03
##
## -----
##
## # Valid Obs = 417; # Missing Obs = 823; Degrees of Freedom = 334.
summary(m3_pcse)

```

```
##
```

```

## Results:
##
##              Estimate      PCSE      t value
## (Intercept)    -9.276604e-02  1.110846e-01 -0.83509350
## DV_hh_ls_pc_lag1  1.763609e-02  1.066917e-01  0.16529953
## IV_lending_pc    -8.385351e-04  9.156611e-04 -0.91577022
## IV_lending_pc_lag1 -1.602411e-03  6.923348e-04 -2.31450377
## IV_gov_exp_pc    1.643231e-01  1.319525e-01  1.24532041
## IV_gov_exp_pc_lag1  4.461631e-04  1.283021e-04  3.47744074
## IV_trade_balance_pc  2.535078e-03  1.717257e-03  1.47623677
## IV_trade_balance_pc_lag1  6.365468e-05  1.693172e-03  0.03759494
## IV_fdi_net_pc    -6.470481e-07  4.368455e-06 -0.14811831
## IV_fdi_net_pc_lag1 -2.189169e-06  4.376016e-06 -0.50026523
## C_REER          7.099454e-04  4.677639e-04  1.51774296
## C_wgdp           6.795152e-06  3.297108e-06  2.06094305
## C_cpi            -1.907428e-03  4.182252e-03 -0.45607677
## C_wgini          1.866820e-03  1.665280e-03  1.12102442
## as.factor(Year)1973  1.932994e-03  4.603874e-02  0.04198626
## as.factor(Year)1974 -3.452131e-02  5.545677e-02 -0.62249035
## as.factor(Year)1975 -1.979274e-02  5.266838e-02 -0.37579920
## as.factor(Year)1976  9.867578e-03  4.790060e-02  0.20600114
## as.factor(Year)1977  1.518598e-02  4.549020e-02  0.33382976
## as.factor(Year)1978  3.564099e-02  4.735582e-02  0.75262114
## as.factor(Year)1979  6.316153e-02  5.222902e-02  1.20931859
## as.factor(Year)1980 -2.903958e-02  6.249144e-02 -0.46469701
## as.factor(Year)1981 -2.726831e-02  5.110659e-02 -0.53355749
## as.factor(Year)1982 -1.649613e-02  5.202455e-02 -0.31708350
## as.factor(Year)1983 -5.816257e-02  4.861575e-02 -1.19637292
## as.factor(Year)1984 -5.362762e-02  5.286294e-02 -1.01446534
## as.factor(Year)1985 -4.314896e-02  4.853141e-02 -0.88909349
## as.factor(Year)1986 -7.362111e-02  4.959242e-02 -1.48452343
## as.factor(Year)1987 -6.022652e-02  5.081083e-02 -1.18530870
## as.factor(Year)1988  1.695162e-02  5.163714e-02  0.32828337
## as.factor(Year)1989 -1.086800e-01  5.873788e-02 -1.85025425
## as.factor(Year)1990 -1.371662e-01  6.010052e-02 -2.28227907
## as.factor(Year)1991 -1.708069e-01  5.505988e-02 -3.10220213
## as.factor(Year)1992 -1.640821e-01  5.521215e-02 -2.97184798
## as.factor(Year)1993 -1.659454e-01  5.808733e-02 -2.85682702
## as.factor(Year)1994 -1.726287e-01  6.320311e-02 -2.73133266
## as.factor(Year)1995 -1.772138e-01  6.360932e-02 -2.78597264
## as.factor(Year)1996 -1.718097e-01  6.924739e-02 -2.48110080
## as.factor(Year)1997 -1.521897e-01  6.926063e-02 -2.19734791
## as.factor(Year)1998 -1.598447e-01  7.370658e-02 -2.16866300
## as.factor(Year)1999 -1.628024e-01  7.813349e-02 -2.08364454
## as.factor(Year)2000 -1.643563e-01  8.201446e-02 -2.00399203
## as.factor(Year)2001 -1.912795e-01  8.043705e-02 -2.37800304
## as.factor(Year)2002 -1.604503e-01  8.357840e-02 -1.91975765
## as.factor(Year)2003 -1.881483e-01  8.452203e-02 -2.22602638
## as.factor(Year)2004 -1.941394e-01  9.143646e-02 -2.12321706
## as.factor(Year)2005 -1.895760e-01  9.572881e-02 -1.98034371
## as.factor(Year)2006 -2.114547e-01  9.610761e-02 -2.20018674
## as.factor(Year)2007 -1.995254e-01  1.003276e-01 -1.98873839
## as.factor(Year)2008 -2.726199e-01  9.592707e-02 -2.84194942
## as.factor(Year)2009 -2.937959e-01  9.596138e-02 -3.06160570

```

```

## as.factor(Year)2010      -2.914269e-01  9.865215e-02 -2.95408532
## as.factor(Year)2011      -2.994383e-01  1.001012e-01 -2.99135434
## as.factor(Country)Austria -8.713816e-02  3.240366e-02 -2.68914598
## as.factor(Country)Belgium -4.278042e-02  2.319017e-02 -1.84476509
## as.factor(Country)Brazil   2.251261e-01  1.048414e-01  2.14730084
## as.factor(Country)Canada  -3.559380e-02  1.247779e-02 -2.85257279
## as.factor(Country)Chile    1.688097e-01  8.351114e-02  2.02140311
## as.factor(Country)China    5.915879e-01  1.939944e-01  3.04951104
## as.factor(Country)Denmark  -8.815442e-02  3.198828e-02 -2.75583526
## as.factor(Country)Finland  -4.450224e-02  2.018896e-02 -2.20428565
## as.factor(Country)France   -6.199897e-02  1.942564e-02 -3.19160533
## as.factor(Country)Germany  -1.148353e-01  2.492483e-02 -4.60726495
## as.factor(Country)Greece   1.493699e-01  4.864613e-02  3.07054147
## as.factor(Country)Hungary   2.851961e-01  9.768375e-02  2.91958610
## as.factor(Country)Iceland  -2.537088e-02  2.890945e-02 -0.87759846
## as.factor(Country)Ireland  -1.616919e-01  4.051712e-02 -3.99070597
## as.factor(Country)Israel    3.808604e-02  3.963641e-02  0.96088508
## as.factor(Country)Italy     -3.459422e-02  1.644770e-02 -2.10328671
## as.factor(Country)Japan     -6.544989e-02  3.133515e-02 -2.08870537
## as.factor(Country)Korea     1.053868e-01  5.768617e-02  1.82689894
## as.factor(Country)Mexico    1.547045e-01  8.434031e-02  1.83428892
## as.factor(Country)Netherlands -8.198750e-02  2.927871e-02 -2.80024288
## as.factor(Country)New Zealand 2.764146e-02  2.684587e-02  1.02963534
## as.factor(Country)Norway    -1.427862e-01  5.832091e-02 -2.44828478
## as.factor(Country)Poland     3.046825e-01  9.799731e-02  3.10909040
## as.factor(Country)Portugal   6.659779e-02  4.258421e-02  1.56390829
## as.factor(Country)Spain      3.171524e-02  2.264866e-02  1.40031403
## as.factor(Country)Sweden     -5.088499e-02  2.194097e-02 -2.31917693
## as.factor(Country)Switzerland -1.960974e-01  7.147896e-02 -2.74342896
## as.factor(Country)Turkey     3.771161e-01  9.396928e-02  4.01318467
## as.factor(Country)United Kingdom -4.091497e-02  9.824552e-03 -4.16456313
## as.factor(Country)United States -1.360573e-01  3.999230e-02 -3.40208846
##                               Pr(>|t|)
## (Intercept)                  4.042620e-01
## DV_hh_ls_pc_lag1             8.688082e-01
## IV_lending_pc                 3.604481e-01
## IV_lending_pc_lag1           2.124620e-02
## IV_gov_exp_pc                 2.138869e-01
## IV_gov_exp_pc_lag1           5.731827e-04
## IV_trade_balance_pc          1.408225e-01
## IV_trade_balance_pc_lag1     9.700331e-01
## IV_fdi_net_pc                 8.823388e-01
## IV_fdi_net_pc_lag1           6.172178e-01
## C_REER                        1.300251e-01
## C_wgdp                        4.008228e-02
## C_cpi                         6.486312e-01
## C_wgini                       2.630828e-01
## as.factor(Year)1973           9.665347e-01
## as.factor(Year)1974           5.340442e-01
## as.factor(Year)1975           7.073048e-01
## as.factor(Year)1976           8.369155e-01
## as.factor(Year)1977           7.387175e-01
## as.factor(Year)1978           4.522077e-01
## as.factor(Year)1979           2.273958e-01

```


## as.factor(Year)1980	6.424512e-01
## as.factor(Year)1981	5.940026e-01
## as.factor(Year)1982	7.513784e-01
## as.factor(Year)1983	2.323996e-01
## as.factor(Year)1984	3.110951e-01
## as.factor(Year)1985	3.745927e-01
## as.factor(Year)1986	1.386132e-01
## as.factor(Year)1987	2.367381e-01
## as.factor(Year)1988	7.429031e-01
## as.factor(Year)1989	6.515990e-02
## as.factor(Year)1990	2.310122e-02
## as.factor(Year)1991	2.084657e-03
## as.factor(Year)1992	3.174920e-03
## as.factor(Year)1993	4.547092e-03
## as.factor(Year)1994	6.642919e-03
## as.factor(Year)1995	5.641544e-03
## as.factor(Year)1996	1.358945e-02
## as.factor(Year)1997	2.868184e-02
## as.factor(Year)1998	3.081362e-02
## as.factor(Year)1999	3.795241e-02
## as.factor(Year)2000	4.587805e-02
## as.factor(Year)2001	1.796884e-02
## as.factor(Year)2002	5.574010e-02
## as.factor(Year)2003	2.667929e-02
## as.factor(Year)2004	3.447062e-02
## as.factor(Year)2005	4.848517e-02
## as.factor(Year)2006	2.847798e-02
## as.factor(Year)2007	4.754574e-02
## as.factor(Year)2008	4.759429e-03
## as.factor(Year)2009	2.380148e-03
## as.factor(Year)2010	3.358482e-03
## as.factor(Year)2011	2.983954e-03
## as.factor(Country)Austria	7.522990e-03
## as.factor(Country)Belgium	6.595695e-02
## as.factor(Country)Brazil	3.248871e-02
## as.factor(Country)Canada	4.606913e-03
## as.factor(Country)Chile	4.403525e-02
## as.factor(Country)China	2.475357e-03
## as.factor(Country)Denmark	6.175528e-03
## as.factor(Country)Finland	2.818583e-02
## as.factor(Country)France	1.549228e-03
## as.factor(Country)Germany	5.812342e-06
## as.factor(Country)Greece	2.311981e-03
## as.factor(Country)Hungary	3.743006e-03
## as.factor(Country)Iceland	3.807925e-01
## as.factor(Country)Ireland	8.101223e-05
## as.factor(Country)Israel	3.373050e-01
## as.factor(Country)Italy	3.618834e-02
## as.factor(Country)Japan	3.749101e-02
## as.factor(Country)Korea	6.860729e-02
## as.factor(Country)Mexico	6.750056e-02
## as.factor(Country)Netherlands	5.403599e-03
## as.factor(Country)New Zealand	3.039263e-01
## as.factor(Country)Norway	1.486774e-02

```
## as.factor(Country)Poland      2.038009e-03
## as.factor(Country)Portugal    1.187861e-01
## as.factor(Country)Spain       1.623476e-01
## as.factor(Country)Sweden      2.098831e-02
## as.factor(Country)Switzerland 6.408328e-03
## as.factor(Country)Turkey      7.399100e-05
## as.factor(Country)United Kingdom 3.975383e-05
## as.factor(Country)United States 7.499406e-04
##
## -----
##
## # Valid Obs = 417; # Missing Obs = 823; Degrees of Freedom = 334.
```

```
library(car)
durbinWatsonTest(m1_lm)
```

3.5 Durbin-Watson Test for autocorrelation

```
## lag Autocorrelation D-W Statistic p-value
## 1 -0.04252312 2.07799 0.414
## Alternative hypothesis: rho != 0
```

```
durbinWatsonTest(m2_lm)
```

```
## lag Autocorrelation D-W Statistic p-value
## 1 0.04703748 1.9052 0.016
## Alternative hypothesis: rho != 0
```

```
durbinWatsonTest(m3_lm)
```

```
## lag Autocorrelation D-W Statistic p-value
## 1 0.2625644 1.474372 0
## Alternative hypothesis: rho != 0
```