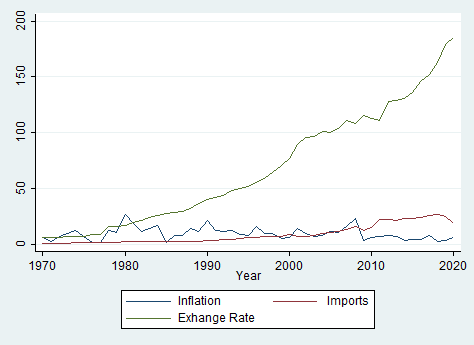
**Trend identify**



**Abbreviation ADF test**

**D-Fuller test for imports @lag(0)**

Dickey-Fuller test for unit root Number of obs = 50  
 ---------- Interpolated Dickey-Fuller ---------  
 Test 1% Critical 5% Critical 10% Critical  
 Statistic Value Value Value

|  |
| --- |
| Z(t) -2.016 -4.150 -3.500 -3.180 |
|  |

MacKinnon approximate p-value for Z(t) = 0.5926

* **This is not statistically significant**

**D-Fuller test for imports @lag(7)**

Augmented Dickey-Fuller test for unit root Number of obs = 43  
 ---------- Interpolated Dickey-Fuller ---------  
 Test 1% Critical 5% Critical 10% Critical  
 Statistic Value Value Value

|  |
| --- |
| Z(t) -3.469 -4.214 -3.528 -3.197 |
|  |

MacKinnon approximate p-value for Z(t) = 0.0428

* **This is statistically significant**

**D-Fuller test for inflation @lag(0)**

Dickey-Fuller test for unit root Number of obs = 50  
 ---------- Interpolated Dickey-Fuller ---------  
 Test 1% Critical 5% Critical 10% Critical  
 Statistic Value Value Value

|  |
| --- |
| Z(t) -4.847 -4.150 -3.500 -3.180 |
|  |

MacKinnon approximate p-value for Z(t) = 0.0004

* **This is statistically significant**

**D-Fuller test for exchange rate @lag(0)**

Dickey-Fuller test for unit root Number of obs = 50  
 ---------- Interpolated Dickey-Fuller ---------  
 Test 1% Critical 5% Critical 10% Critical  
 Statistic Value Value Value

|  |
| --- |
| Z(t) -0.203 -4.150 -3.500 -3.180 |
|  |

MacKinnon approximate p-value for Z(t) = 0.9915

* **This is not statistically significant**

**Performing co-integration test to establish long-run relationship**

**H0= There is no co-integration**

**H1= There is co-integration**

1. Identify appropriate lag length

* *asdoc varbasic inflation imports er, lags(1/5)*

Vector autoregression  
Sample: 1975 - 2020 No. of obs = 46  
Log likelihood = -315.2616 AIC = 15.79398  
FPE = 1589.548 HQIC = 16.50879  
Det(Sigma\_ml) = 180.0787 SBIC = 17.70213  
Equation Parms RMSE R-sq chi2 P>chi2

|  |
| --- |
| inflation 16 5.63363 0.3351 23.18479 0.0803 |
| imports 16 1.59623 0.9749 1784.954 0.0000 |
| er 16 3.03816 0.9976 19068.72 0.0000 |
|  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Coef. | Std.Err. | | z | P>z | [95%Conf. | Interval] |
| inflation | | |
| inflation | | |
| L1. | 0.142 | 0.149 | | 0.950 | 0.342 | -0.150 | 0.433 |
| L2. | -0.000 | 0.158 | | 0.000 | 1.000 | -0.310 | 0.310 |
| L3. | -0.068 | 0.157 | | -0.430 | 0.664 | -0.377 | 0.240 |
| L4. | -0.123 | 0.157 | | -0.780 | 0.435 | -0.431 | 0.185 |
| L5. | -0.198 | 0.147 | | -1.340 | 0.180 | -0.487 | 0.091 |
|  | | |
| imports | | |
| L1. | 0.551 | 0.863 | | 0.640 | 0.523 | -1.140 | 2.242 |
| L2. | -1.082 | 1.128 | | -0.960 | 0.338 | -3.294 | 1.130 |
| L3. | -0.342 | 1.210 | | -0.280 | 0.778 | -2.714 | 2.031 |
| L4. | 0.892 | 1.277 | | 0.700 | 0.485 | -1.612 | 3.396 |
| L5. | -0.939 | 0.983 | | -0.950 | 0.340 | -2.866 | 0.989 |
|  | | |
| er | | |
| L1. | 0.521 | 0.320 | | 1.630 | 0.104 | -0.106 | 1.148 |
| L2. | -0.719 | 0.463 | | -1.550 | 0.120 | -1.625 | 0.188 |
| L3. | -0.086 | 0.457 | | -0.190 | 0.851 | -0.982 | 0.810 |
| L4. | 0.397 | 0.443 | | 0.900 | 0.370 | -0.471 | 1.265 |
| L5. | -0.026 | 0.325 | | -0.080 | 0.936 | -0.663 | 0.612 |
|  | | |
| \_cons | 12.989 | 3.370 | | 3.850 | 0.000 | 6.384 | 19.594 |
| imports | | |
| inflation | | |
| L1. | -0.047 | 0.042 | | -1.120 | 0.261 | -0.130 | 0.035 |
| L2. | 0.037 | 0.045 | | 0.830 | 0.404 | -0.050 | 0.125 |
| L3. | 0.011 | 0.045 | | 0.240 | 0.812 | -0.077 | 0.098 |
| L4. | -0.040 | 0.045 | | -0.900 | 0.367 | -0.128 | 0.047 |
| L5. | 0.020 | 0.042 | | 0.470 | 0.637 | -0.062 | 0.102 |
|  | | |
| imports | | |
| L1. | 0.928 | 0.244 | | 3.800 | 0.000 | 0.449 | 1.407 |
| L2. | -0.780 | 0.320 | | -2.440 | 0.015 | -1.407 | -0.154 |
| L3. | 0.669 | 0.343 | | 1.950 | 0.051 | -0.003 | 1.342 |
| L4. | 0.259 | 0.362 | | 0.720 | 0.474 | -0.450 | 0.969 |
| L5. | -0.336 | 0.279 | | -1.210 | 0.228 | -0.882 | 0.210 |
|  | | |
| er | | |
| L1. | 0.031 | 0.091 | | 0.340 | 0.736 | -0.147 | 0.208 |
| L2. | -0.245 | 0.131 | | -1.870 | 0.062 | -0.502 | 0.012 |
| L3. | -0.011 | 0.130 | | -0.080 | 0.934 | -0.265 | 0.243 |
| L4. | 0.291 | 0.126 | | 2.320 | 0.020 | 0.045 | 0.537 |
| L5. | -0.008 | 0.092 | | -0.080 | 0.932 | -0.188 | 0.173 |
|  | | |
| \_cons | 0.719 | 0.955 | | 0.750 | 0.452 | -1.153 | 2.590 |
| er | | |
| inflation | | |
| L1. | -0.064 | 0.080 | | -0.800 | 0.424 | -0.221 | 0.093 |
| L2. | -0.034 | 0.085 | | -0.400 | 0.688 | -0.201 | 0.133 |
| L3. | -0.027 | 0.085 | | -0.320 | 0.752 | -0.193 | 0.140 |
| L4. | 0.057 | 0.085 | | 0.670 | 0.504 | -0.109 | 0.223 |
| L5. | -0.014 | 0.079 | | -0.180 | 0.857 | -0.170 | 0.141 |
|  | | |
| imports | | |
| L1. | 0.851 | 0.465 | | 1.830 | 0.067 | -0.061 | 1.762 |
| L2. | 0.054 | 0.609 | | 0.090 | 0.929 | -1.139 | 1.247 |
| L3. | -1.827 | 0.653 | | -2.800 | 0.005 | -3.106 | -0.547 |
| L4. | 0.611 | 0.689 | | 0.890 | 0.375 | -0.739 | 1.961 |
| L5. | 0.793 | 0.530 | | 1.500 | 0.135 | -0.246 | 1.832 |
|  | | |
| er | | |
| L1. | 1.000 | 0.173 | | 5.800 | 0.000 | 0.662 | 1.339 |
| L2. | 0.386 | 0.249 | | 1.550 | 0.122 | -0.103 | 0.875 |
| L3. | -0.195 | 0.247 | | -0.790 | 0.430 | -0.678 | 0.289 |
| L4. | -0.426 | 0.239 | | -1.780 | 0.075 | -0.894 | 0.043 |
| L5. | 0.186 | 0.175 | | 1.060 | 0.289 | -0.158 | 0.530 |
|  | | |
| \_cons | 2.622 | 1.817 | | 1.440 | 0.149 | -0.940 | 6.184 |
|  | | | | | | | |

* *asdoc varsoc*

Selection-order criteria  
 Sample: 1975 - 2020 Number of obs = 46

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0 | -501.837 | 684089 | 21.950 | 21.994 | 22.069 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | -346.114 | 311.450 | 9 | 0.000 | 1161.950 | 15.570 | 15.7489\* | 16.0472\* |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2 | -335.465 | 21.297 | 9 | 0.011 | 1087.89\* | 15.4985\* | 15.811 | 16.333 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 3 | -331.239 | 8.451 | 9 | 0.489 | 1357.740 | 15.706 | 16.153 | 16.899 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 4 | -318.725 | 25.028\* | 9 | 0.003 | 1196.420 | 15.553 | 16.134 | 17.104 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 5 | -315.262 | 6.928 | 9 | 0.645 | 1589.550 | 15.794 | 16.509 | 17.702 |

* Endogenous: inflation imports er  
   Exogenous: \_cons

Selected appropriate Lag length is 2 under FPE

**Perform Johansen co-integration test**

Johansen tests for cointegration   
Trend: constant Number of obs = 49  
Sample: 1972 - 2020 Lags = 2

|  |
| --- |
| maximum trace 5% critical 1% critical |
| rank parms LL eigenvalue statistic value value |
| 0 12 -369.27811 30.7721\*1 29.68 35.65 |
| 1 17 -358.72783 0.34990 9.6715\*5 15.41 20.04 |
| 2 20 -355.84417 0.11104 3.9042 3.76 6.65 |
| 3 21 -353.89208 0.07659 |
|  |

maximum max 5% critical 1% critical  
 rank parms LL eigenvalue statistic value value  
 0 12 -369.27811 21.1006 20.97 25.52  
 1 17 -358.72783 0.34990 5.7673 14.07 18.63  
 2 20 -355.84417 0.11104 3.9042 3.76 6.65  
 3 21 -353.89208 0.07659

Decision criteria,

If trace statistic greater than critical value reject the null hypothesis.

* 30.77>29.68

There is at least one co-integration relationship

* 21.10>20.97

There is at least one co-integration relationship

Since both trace statistics and max statistics are indicating that at least one co-integration relationship exists, can perform a regression analysis.

**Vector auto regression model**

Vector autoregression  
Sample: 1972 - 2020 No. of obs = 49  
Log likelihood = -353.8921 AIC = 15.30172  
FPE = 892.4672 HQIC = 15.60933  
Det(Sigma\_ml) = 376.5096 SBIC = 16.1125  
Equation Parms RMSE R-sq chi2 P>chi2

|  |
| --- |
| inflation 7 5.07156 0.2549 16.76293 0.0102 |
| imports 7 1.72703 0.9614 1219.577 0.0000 |
| er 7 3.32718 0.9964 13438.95 0.0000 |
|  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Coef. | Std.Err. | | z | P>z | [95%Conf. | Interval] |
| inflation | | |
| inflation | | |
| L1. | 0.222 | 0.142 | | 1.570 | 0.116 | -0.055 | 0.500 |
| L2. | -0.016 | 0.142 | | -0.110 | 0.912 | -0.294 | 0.263 |
|  | | |
| imports | | |
| L1. | 0.414 | 0.654 | | 0.630 | 0.527 | -0.868 | 1.696 |
| L2. | -0.929 | 0.685 | | -1.360 | 0.175 | -2.271 | 0.413 |
|  | | |
| er | | |
| L1. | 0.346 | 0.250 | | 1.390 | 0.165 | -0.143 | 0.836 |
| L2. | -0.313 | 0.257 | | -1.220 | 0.223 | -0.818 | 0.191 |
|  | | |
| \_cons | 8.149 | 2.102 | | 3.880 | 0.000 | 4.029 | 12.268 |
| imports | | |
| inflation | | |
| L1. | -0.041 | 0.048 | | -0.840 | 0.400 | -0.135 | 0.054 |
| L2. | -0.002 | 0.048 | | -0.050 | 0.963 | -0.097 | 0.093 |
|  | | |
| imports | | |
| L1. | 0.813 | 0.223 | | 3.650 | 0.000 | 0.376 | 1.249 |
| L2. | 0.004 | 0.233 | | 0.020 | 0.987 | -0.453 | 0.461 |
|  | | |
| er | | |
| L1. | -0.130 | 0.085 | | -1.530 | 0.126 | -0.297 | 0.037 |
| L2. | 0.164 | 0.088 | | 1.870 | 0.062 | -0.008 | 0.336 |
|  | | |
| \_cons | 0.648 | 0.716 | | 0.900 | 0.366 | -0.755 | 2.050 |
| er | | |
| inflation | | |
| L1. | -0.101 | 0.093 | | -1.090 | 0.275 | -0.284 | 0.081 |
| L2. | 0.035 | 0.093 | | 0.380 | 0.707 | -0.148 | 0.218 |
|  | | |
| imports | | |
| L1. | 1.773 | 0.429 | | 4.130 | 0.000 | 0.932 | 2.614 |
| L2. | -1.494 | 0.449 | | -3.330 | 0.001 | -2.375 | -0.614 |
|  | | |
| er | | |
| L1. | 1.335 | 0.164 | | 8.150 | 0.000 | 1.013 | 1.656 |
| L2. | -0.365 | 0.169 | | -2.160 | 0.031 | -0.696 | -0.034 |
|  | | |
| \_cons | 1.949 | 1.379 | | 1.410 | 0.158 | -0.754 | 4.652 |
|  | | | | | | | |

**Granger Causality Test**

Granger causality Wald tests

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Equation | Excluded | chi2 | df | Prob>Chi2 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | inflation | imports | 4.053 | 2 | 0.132 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | inflation | er | 2.632 | 2 | 0.268 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | inflation | ALL | 8.097 | 4 | 0.088 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | imports | inflation | 0.841 | 2 | 0.657 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | imports | er | 6.636 | 2 | 0.036 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | imports | ALL | 7.851 | 4 | 0.097 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | er | inflation | 1.192 | 2 | 0.551 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | er | imports | 18.286 | 2 | 0.000 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | er | ALL | 20.263 | 4 | 0.000 |