Performance of the GDPP points

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Abstract: Error Correction Mechanism is very popular to find out the adjustment of short run disequilibrium towards equilibrium to ensure the equilibrium in the long run as often we find the time series variables non-stationary. However if we find out the GDPP points, we can also measure the adjustment where we do not need to care about the stationary behavior of the time series data. Perhaps in some cases it is possible that, suddenly the data starting to run towards completely different directions and starting to show the trend by following completely different paths. Finally the long run equilibrium may change, perhaps for a certain period as often sometimes we ignore the path between the structural break.

Error Correction Mechanism: Sargan is the first, who used Error Correction mechanism (ECM). Later Engle and Granger used it to correct the disequilibrium. According to the **Granger representation theorem** if two variables are Co-integrated, then we can use ECM to find out the relation between the two variables. If two time series variables are non-stationary regressing on variable on another may give us the spurious regression. Therefore after finding out the non-stationary behavior it is better to check whatever they are Co-integrated or not. You can check the text book to understand about the details.

Let, us consider two time series variables $\mathrm{y_t}$ and $\mathrm{x_t}$, those are nonstationary variables

$$\begin{pmatrix}\Delta y_t\\ \Delta x_t\end{pmatrix} = \begin{pmatrix}coef.\\ coef.\end{pmatrix}(y_{t-1} - coef.\ x_{t-1} - cons.) + \begin{pmatrix}coef. & coef.\\ coef. & coef.\end{pmatrix}\begin{pmatrix}\Delta y_{t-1}\\ \Delta x_{t-1}\end{pmatrix} + \begin{pmatrix}coef. & coef.\\ coef. & coef.\end{pmatrix}\begin{pmatrix}\Delta y_{t-2}\\ \Delta x_{t-2}\end{pmatrix} + \begin{pmatrix}e_{1t}\\ e_{2t}\end{pmatrix}$$

Long Run Equilibrium:

$$y_t = cons. + coef.\ x_t + u_t.$$

GDPP :

$$Growth\,rate\ of\ DPP\ (GDPP) = \frac{(x_{n+1} - y_{n+1}) - (x_n - y_n)}{x_n - y_n} \times 100$$

$$where, \qquad x_n > y_n\ \ and\ \ x_{n+1} \geq y_{n+1}\ \ Or, x_{n+1} < y_{n+1}$$

$$Growth\,rate\ of\ DPP(GDPP) = \frac{(x_2 - y_2) - (x_1 - y_1)}{x_1 - y_1} \times 100$$

$$where, \quad x_1 > y_1 \; and \; x_2 \geq y_2 \;\; Or, x_2 < y_2$$

$$If \;\; x_2 > y_2, \qquad when, (x_2 - y_2) = (x_1 - y_1)$$

$$Then \; GDPP = 0, \qquad when, (x_2 - y_2) > (x_1 - y_1)$$

$$Then \; GDPP > 0, \qquad when, (x_2 - y_2) < (x_1 - y_1)$$

$$Then \; GDPP < 0, \qquad If \; x_2 = y_2, \qquad then \quad GDPP = \; -100\%$$

$$If \; x_2 < y_2, \qquad then \;\; GDPP < \; -100\% \;\; and \;\; after \; that \; the \; next \; step \; should \; be,$$

$$Growth \; rate \; of \; DPP(GDPP) = \frac{(x_3 - y_3) - (x_2 - y_2)}{x_2 - y_2} \times 100$$

$$PD = Point \; of \; Distruction \; (That \; Point \; the \; model \; maximum \; can \; allow)$$
$$PD > GDPP \geq \; -100\%$$
$$PD > GDPP > 0$$
$$GDPP = 0$$
$$0 > GDPP > -100$$
$$GDPP = -100$$

(Shahrear, 2009: P2-P4)

Let's consider a range of equilibrium points. As it is a growth rate, the range can vary from one situation to another situation. Therefore if two points for example, UQP and LQP. We can write,

$$UQP \geq GDPP \geq \; LQP$$

Performance:

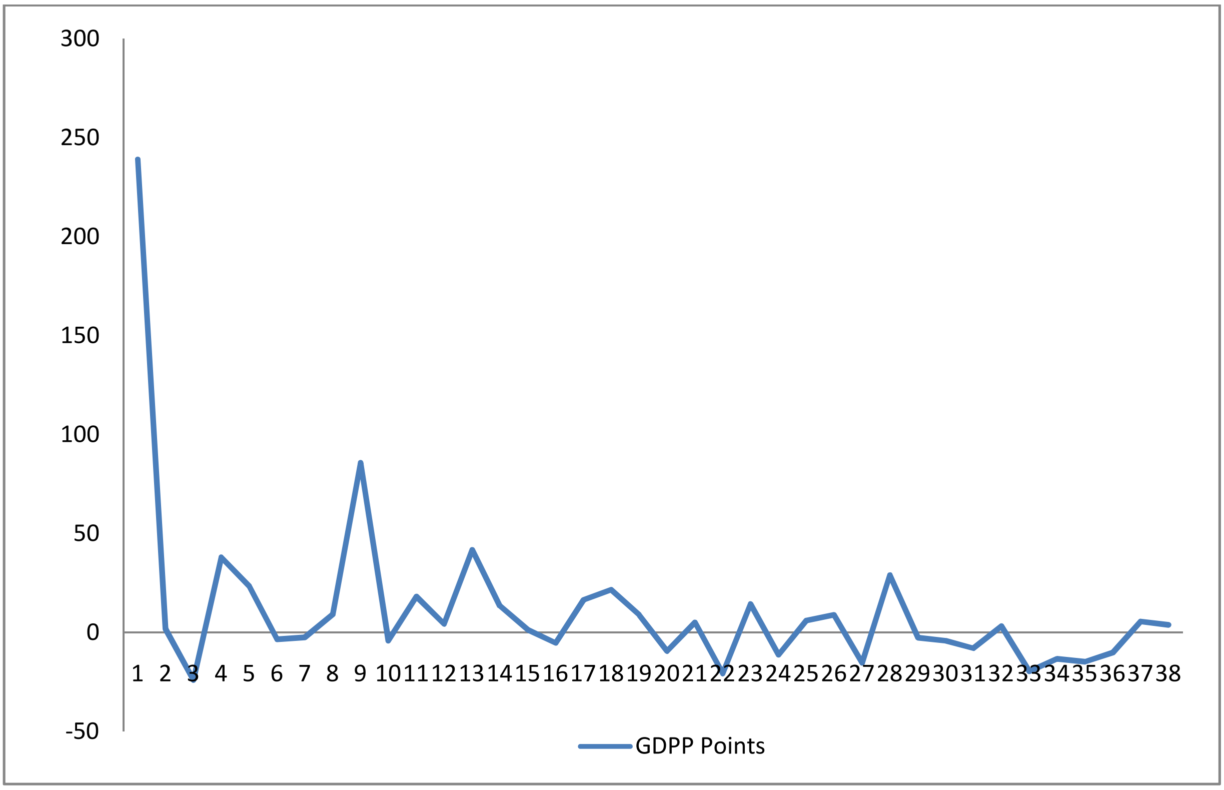
Period	Fertilizers(MetricTons)	Balance of Trade
1974	99250	-428
1975	337160	-715
1976	342258	-1429
1977	260269	-595
1978	358372	-1409
1979	442175	-1606
1980	425997	-2395
1981	414825	-2932
1982	451895	-3766
1983	842197	-3652
1984	806380	-3818
1985	953040	-4353
1986	993180	-4348
1987	1408901	-4962
1988	1598520	-5624
1989	1621470	-6629
1990	1533419	-7476
1991	1786645	-6396
1992	2174218	-5930
1993	2366120	-7134
1994	2142301	-6967
1995	2248042	-10325
1996	1772661	-14447
1997	2030672	-13976
1998	1799357	-13790
1999	1904022	-17629
2000	2073744	-17208
2001	1750542	-17952
2002	2263318	-18115
2003	2198231	-22676
2004	2102306	-23676
2005	1926645	-30060
2006	1982292	-36529
2007	1581364	-39560
2008	1342024	-62087
2009	1138644	-57324,5
2010	1011941	-62093
2011	1036947	-95596,93709
2012	1074791	-100649,736

$$\text{GDPP Point in 1974-1975} = \frac{(337160-(-715))-(99250-(-42\ \ ))}{99250-(-42\ \ )} \times 100 = 238.966472\ \%$$

$$\ldots\ \text{GDPP Point in 2011-2012} = \frac{(1074791-(-100649.736))-(1036947-(-955\quad .93709))}{1036947-(-95\quad .93709)} \times 100 = 3{,}787649866\ \%$$

PERIODS	GDPP point
1974-1975	238,966472
1975-1976	1,720162782
1976-1977	-24,09838021
1977-1978	37,91899227
1978-1979	23,34753642
1979-1980	-3,467701411
1980-1981	-2,482539356
1981-1982	9,073217205
1982-1983	85,6312039
1983-1984	-4,214818484
1984-1985	18,16778121
1985-1986	4,192113375
1986-1987	41,73667306
1987-1988	13,45823464
1988-1989	1,493319802
1989-1990	-5,356185343
1990-1991	16,36360686
1991-1992	21,58941151
1992-1993	8,857472062
1993-1994	-9,437927841
1994-1995	5,076100328
1995-1996	-20,86724611
1996-1997	14,41099251
1997-1998	-11,32229117
1998-1999	5,984291401
1999-2000	8,810184576
2000-2001	-15,42158787
2001-2002	29,00428274
2002-2003	-2,652981701
2003-2004	-4,274154658
2004-2005	-7,962296953
2005-2006	3,174520431
2006-2007	-19,70937493
2007-2008	-13,37588931
2008-2009	-14,82379242
2009-2010	-10,19546083
2010-2011	5,447680156

2011-2012	3,787649863



<u>Conclution:</u>

We can carefully observe the colored marked points and the graph. The data have collected from the official website of the Bangladesh Bank. Bangladesh always has deficit in foreign trade. As the country is highly depends on Agriculture mainly because of her geographical location, culture and traditions. The country has highly sophisticated technologies to produce fertilizer. It is clear that GDPP points not only can explain the present situations but also can help us to warn about the future. After that we can use any standard forecasting method to find out the farther points.

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