Impact of economic growth and financial development on exports: Cointegration and causality analysis in Pakistan

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Abstract: The analysis shows cointegration between exports, economic growth and financial development in case of Pakistan. The results that economic growth and financial development stimulate rate of exports growth in Pakistan. The causality analysis reveals bidirectional causal relationship between financial development and economic growth, financial development and exports and exports and economic growth in case of Pakistan.

I. Introduction

The relationship between export expansion and economic growth has drawn much attention of development economists until recently, and many empirical studies were conducted to examine the role of exports in the economic growth of developing countries from various perspectives (see Ullah et. al. 2009; Vohra 2001; Sengupta and Espana 1994; Ram 1985, 1987; Krueger 1990; Chow 1987; Balassa 1985; Feder 1982; Tyler 1981; and Michaely 1977). Most of these studies concluded that exports have a positive and significant impact on economic growth.

A considerable literature also exists on the relationship of financial development and economic growth (see Shahbaz et al. (2008, 2010); Shahbaz (2009); Shahbaz and Rahman 2010; Ang 2009; Choong and Lim 2009; Ljunwal and Li 2007; Hermes and Lensink 2003; and Omran and Bolbol 2003). All these studies advocate that well developed financial sector facilitates growth through various channels including export expansion.

Though export led growth is theoretically and empirically established, it can also be argued that causality runs from the growth of output to the growth of exports. In a growing economy some industries experience substantial changes in terms of learning and technological innovation; accumulation of human capital occurs; manufacturing experiences and technology transfer via foreign direct investment (FDI) are also observed. Under such a situation, output will still continue to grow even in the absence of outward-oriented policies. The growth of domestic demand will be lower than the growth of output in these prosperous industries; as a result it is likely that producers will sell their products in foreign markets. Hence economic growth will promote export growth in a country.

In contrast to positive growth-led export, a negative growth-led export is also plausible. It is likely to occur if consumers demand more exportable and non-traded goods. In this situation, an increase in domestic demand would induce an increase in domestic output with a decrease in exports. Therefore, output growth will lead to a reduction in exports growth (Lee and Huang, 2002).

A well-developed financial sector may also play a contributory role in export growth in addition to its impact on output growth (see Hur, et al. 2004, for example). Economies with higher level of financial development are more likely to have higher export shares in world trade.

Though literature on exports-led growth and financial development-growth nexus are substantial, literature on growth-led exports and financial development-exports nexus are still limited. This study aims to fill up this gap, and will enrich the existing literature. To the best of our knowledge, this is the first study in Pakistan as well as in South Asia with regard to the effect of economic growth and financial development on exports. The rest of the paper is organized as follows: section II provides literature review; section III presents modeling, data and methodological framework, section IV interprets the results, and finally, section V concludes the paper and presents some policy implications.

II. Literature review

Growth-Export

Growth affects trade (Rodriguez and Rodrik 2000 cited in Won et.al 2008) and vice versa. This is known as the relation between trade regime/outward orientation and growth in the development literature (Edwards 1993). Surveying more than 150 papers Giles and Williums (2000) find that there is no obvious agreement to whether the causality dictates export-led growth or growth-led exports. Bidirectional causality between exports and growth is possible (see Wernerheim 2000).

Using seasonally unadjusted quarterly data from 1987.1 to 2002.4 Alici and Ucal (2003) found only unidirectional causality from exports to output for Turkey, but Dritsaki, Dritsaki and Adamopoulos (2004) observed bidirectional causality between real GDP and real exports for Greece. Ahmad, Alam and Butt (2004) used undeflated annual data from 1972 to 2001 for Pakistan and found unidirectional causality from exports to GDP. Cuadros, Orts and Alguacil (2004) conducted a study for Mexico, Brazil and Argentina; they used seasonally adjusted quarterly data from late 1970s to 2000. Their experience is mixed; that is, they found unidirectional causalities from real exports to real GDP in Mexico and Argentina, and unidirectional causality from real GDP to real exports in Brazil.

Export-led growth is also confirmed by Ullah, et. al (2009) and Shirazi (2004) for Pakistan, Erfani (1999) for some developing countries in Asia and Latin America, Balaguer (2002) for Spain and Jordaan (2007) for Namibia. On the other hand, no evidence of unidirectional causality from exports to economic growth is found in Hong Kong, South Korea, Singapore and Taiwan in the study conducted by Darrat (1986). However, the study reveals the unidirectional causality from economic growth to export growth for Taiwan.

Amavilah (2003), Mah (2005) and Pazim (2009) found no significant relationship between exports and output growth. Amavilah (2003) conducted the study for Namibia using data from 1968 to 1992. Mah (2005) investigated the long-run causality between export and growth for China. Pazim (2009) tested the validity of export-led growth hypothesis for Indonesia, Malaysia, and the Philippines by using panel data analysis.

The literature on the relationship between export and growth presented above indicate that a generalized conclusion can never be drawn. The outcome is country specific, and it depends on certain characteristics of a specific country. Also what variables/considerations are being included, and how the study is being conducted are also matters in determining the outcome. Hence the importance of current study is realized.

Financial Development- Export

Financial sector development is considered as a potential source of comparative advantage for a country. Countries with a well developed financial sector are able to have an easier access to external finance for investment projects than those without (Hur et, al. 2004, Beck 2003, Beck and Levine 2001, Rajan and Zingales 1998, Kletzer and Bardhan 1987).

Becker and Greenberg (2003) found a positive impact of financial development on exports for a given industry and country-pair. They have used accounting standards, stock market capitalization over GDP, ratio of credit to the private sector over GDP, and new issues of equity and bonds over GDP as proxies for financial development and all these variables are positively related to the level of exports. However, if financial development were proxied for comparative advantage, exports should be decreasing in the financial development of the importer.

Exporting firms face large fixed costs. Financial development helps the exporting firms to acquire these fixed costs. Melitz (2002) realized the effects of fixed costs on firm composition in exporting industries. Roberts and Tybout (1997) also noted the importance of sunk costs in a firm's exports. They find that firm's current exporting status is considerably determined by its previous export experience.

Berman and Hericourt (2007) noted that financial health had a causal positive impact on firm's export participation, but not on export share. Empirically, evidence shows that financially developed countries export relatively more in financially vulnerable sectors (see Beck 2003, Manova 2005, Svaleryd and Vlachos 2005, Hur et al. 2006).

Table-1: Descriptive Statistics and Correlation Matrix

Variables	$\ln GDP_t$	$\ln FD_t$	$\ln EXP_t$
Mean	13.7795	13.4441	7.0829
Median	13.7615	13.4366	7.0511
Maximum	14.2065	14.9378	7.5816
Minimum	13.2917	12.0535	6.3986
Std. Dev.	0.2286	0.8250	0.3028
Skewness	0.0848	0.1831	-0.0503
Kurtosis	2.0643	2.0429	1.8925
Jarque-Bera	2.7881	3.2378	3.8127
Probability	0.2480	0.1981	0.1486
$\ln GDP_t$	1.0000		
$\ln FD_t$	0.7803	1.0000	
$\ln EXP_t$	0.4513	0.2227	1.0000

Table-2: Estimation of Unit Root Tests

Variables	ADF Test		DF-GLS Test
	T-calculated	Prob-value	T-calculated
$\ln GDP_t$	-2.1713 (4)	0.4975	-1.9038(4)
$\Delta \ln GDP_t$	-4.2129 (3)*	0.0072	-4.3750 (2)*
$\ln EXP_t$	-1.6093 (4)	0.7793	-1.7571 (4)
$\Delta \ln EXP_t$	-4.7425 (3)*	0.0001	-4.7248 (2)*
$\ln FD_t$	-1.0912 (2)	0.9230	-1.1998 (2)
$\Delta \ln FD_t$	-6.5572 (2)*	0.0000	-6.2183 (2)*
Variables	Ng-Perron Test		
	MZa	MZt	MSB
$\ln GDP_t$	-1.9541 (4)	-0.94701	0.48463
$\Delta \ln GDP_t$	-17.3258 (2)**	-2.93664	0.16949
$\ln EXP_t$	-5.0814(3)	-1.3348	0.2627
$\Delta \ln EXP_t$	-27.8375(2)*	-3.7287	0.1339SS
$\ln FD_t$	-3.6375(1)	-1.2951	0.3560
$\Delta \ln FD_t$	-36.820(1)*	-4.2903	0.1165

Note: The asterisks * (**) denotes the significant at %1 (5%) level. The figure in the parenthesis is the optimal lag structure for ADF and DF-GLS tests, bandwidth for

the PP unit root test is determined by the Schwert (1989) formula

Table-3: Lag Length Criteria

VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	55.66500	NA	4.46e-05	-1.5047	-1.4083	-1.4664
1	309.5149	478.6883	4.08e-08	-8.5004	-8.1149	-8.3473
2	334.2569	44.53571	2.61e-08	-8.9501	-8.2756	-8.6822
3	354.1558	34.11241	1.92e-08	-9.2615	-8.2979	-8.8788
4	391.9692	61.58171*	8.48e-09*	-10.0848*	-8.8321*	-9.5872*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Where **GDP** is real GDP, **EXP** is real exports and FD is real domestic credit to private sector.

Table-3: The Results of Cointegration Test

Panel I: Bounds Testing to Cointegration			
Estimated Model	$F_{EXP}(\ln EXP / \ln GDP, \ln FD)$	$F_{GDP}(\ln GDP / \ln EXP, \ln FD)$	$F_{FD}(\ln FD / \ln EXP, \ln GDP)$
Optimal Lag Length	(4, 4, 4)	(4, 3, 3)	(2, 1, 2, 2)
F-Statistics	8.175*	2.634	4.479**
	Critical values (T = 37)#		
	Lower bounds $I(0)$	Upper bounds $I(1)$	
1 per cent level	4.922	6.328	
5 per cent level	3.920	4.904	
10 per cent level	3.182	4.258	
Panel II: Diagnostic tests	Statistics	Statistics	Statistics
R^2	0.7584	0.9707	0.8139
Adjusted- R^2	0.6626	0.9616	0.7506
CUSUM	Stable	Stable	Stable
CUSUMsq	Stable	Unstable	Stable

Note: The asterisks * and **denotes the significant at 1% and 10% level. The optimal lag structure is determined by AIC. # Critical values bounds computed by surface response procedure developed by Turner (2006).

Table-5: Long Run Elasticities

Dependent Variable = $\ln EXP_t$

Variable	Coefficient	Std. Error	T-Statistic
Constant	-3.5142	2.0217	-1.7382***
$\ln GDP_t$	0.5967	0.1960	3.0434*
$\ln FD_t$	0.1765	0.0543	3.2490*

R-Squared = 0.8457
Adjusted R-Squared = 0.8414
S.E. of Regression = 0.1206
Akaike info Criterion = -1.3528
Schwarz Criterion = -1.2594
F-Statistic = 194.6664*

Diagnostic Tests	**Statistics**
J-B Normality test	1.2406 [0.5377]
ARCH LM test	4.2203 [0.0436]
White Heteroscedisticity	0.8448 [0.4339]
Ramsey RESET	2.4433 [0.1236]
CUSUM	Stable**
CUSUMsq	Stable**

Note: * and ** (***) denote significance at the 1% and 5% (10%) levels respectively.

Table-6: Short Run Elasticities

Dependent Variable = $\Delta \ln EXP_t$

Variable	Coefficient	Std. Error	T-Statistic
Constant	0.0077	0.0190	0.4063
$\Delta \ln GDP_t$	0.4717	0.1189	3.9644*
$\Delta \ln FD_t$	0.0253	0.3370	0.0753
ECM_{t-1}	-0.5920	0.1156	-5.1196*

R-Squared = 0.4216
Adjusted R-Squared = 0.3661
S.E. of Regression = 0.1089
Akaike info Criterion = -1.5420
Schwarz Criterion = -1.4155
F-Statistic = 16.5270*
Durbin-Watson = 1.9514

Diagnostic Tests	**Statistics**
J-B Normality test	0.4956 [0.7805]
Breusch-Godfrey LM test	1.3102 [0.2767]
ARCH LM test	1.7365 [0.1919]
White Heteroscedisticity	31488 [0.0303]
Ramsey RESET	1.6015 [0.2093]
CUSUM	Stable**
CUSUMsq	Stable**

Note: * and ** denote significance at the 1% and 5% levels SS respectively.

Table-6: The Results of Granger Causality

Dependent variable	Type of Granger Causality						
	Short-run			Long-run	Joint (short- and long-run)		
	$\Delta \ln EXP_t$	$\Delta \ln GDP_t$	$\Delta \ln FD_t$	ECT_{t-1}	$\Delta \ln EXP_t, ECT_{t-1}$	$\Delta \ln GDP_t, ECT_{t-1}$	$\Delta \ln FD_t, ECT_{t-1}$
	F-statistics [p-values]			[T-statistics]	F-statistics [p-values]		
$\Delta \ln EXP_t$	–	4.9447** [0.0010]	1.3922* [0.2558]	-0.6527* [-4.3669]	–	8.3037* [0.0001]	8.0412* [0.0001]
$\Delta \ln GDP_t$	18.9780* [0.0000]	–	32.1154 [0.0000]	-0.4825* [-3.4183]	16.6909* [0.0000]	–	36.3915** [0.0000]
$\Delta \ln FD_t$	2.2923)*** [0.1091]	50.2327* [0.0000]	–	-0.0478** [-2.1913]	3.5889** [0.0182]	34.1945** [0.0000]	–

Note: The asterisks *, ** and *** denote the significant at the 1, 5 and 10 per cent levels, respectively.

Year	$\ln EXP_t$	$\ln FD_t$	$\ln GDP_t$
1990Q1	NA	NA	NA
1990Q2	NA	NA	NA
1990Q3	6.398661	12.05357	13.29178
1990Q4	6.634902	12.10989	13.54571

1991Q1	6.637690	12.12744	13.42659
1991Q2	6.897430	12.17478	13.45184
1991Q3	6.613852	12.15499	13.37479
1991Q4	6.726173	12.23303	13.61537
1992Q1	6.791987	12.28499	13.49358
1992Q2	6.976413	12.31158	13.51863
1992Q3	6.610913	12.38518	13.38826
1992Q4	6.799417	12.46629	13.60930
1993Q1	6.719411	12.49875	13.53492
1993Q2	6.763316	12.53015	13.55375
1993Q3	6.698606	12.52068	13.45030
1993Q4	6.736984	12.61563	13.64769
1994Q1	6.758163	12.63328	13.57222
1994Q2	6.865475	12.66483	13.56972
1994Q3	6.715631	12.67099	13.47138
1994Q4	6.836453	12.76601	13.67703
1995Q1	6.768757	12.80225	13.62736
1995Q2	7.027576	12.83730	13.64997
1995Q3	6.569317	12.82631	13.53115
1995Q4	6.768374	12.95230	13.76094
1996Q1	7.014719	12.96756	13.67365
1996Q2	7.146075	12.98548	13.67732
1996Q3	6.774397	12.98764	13.56221
1996Q4	6.944571	13.09521	13.79222
1997Q1	6.897807	13.10872	13.68105
1997Q2	6.933034	13.13300	13.66101
1997Q3	6.846801	13.11618	13.55238
1997Q4	7.043957	13.22929	13.79567
1998Q1	6.943632	13.27769	13.71249
1998Q2	6.967632	13.29003	13.68998
1998Q3	6.881106	13.25695	13.58444
1998Q4	6.962192	13.37508	13.83414
1999Q1	6.895173	13.39448	13.72106
1999Q2	7.023803	13.42254	13.76216
1999Q3	6.950274	13.39951	13.62943
1999Q4	7.058288	13.46184	13.88126
2000Q1	6.999581	13.47171	13.75120
2000Q2	7.122602	13.45069	13.80570
2000Q3	7.089200	13.45122	13.66557
2000Q4	7.145909	13.56401	13.87053
2001Q1	7.180248	13.56417	13.79234
2001Q2	7.316886	13.52778	13.82302
2001Q3	7.246497	13.51310	13.70314
2001Q4	7.161082	13.60596	13.89777
2002Q1	7.085099	13.59331	13.81744
2002Q2	7.295828	13.59633	13.86085

2002Q3	7.266594	13.56243	13.73673
2002Q4	7.258730	13.69047	13.93278
2003Q1	7.263644	13.72011	13.88936
2003Q2	7.473229	13.78486	13.90870
2003Q3	7.356282	13.80840	13.80783
2003Q4	7.303871	13.95685	14.00387
2004Q1	7.332713	13.99248	13.96045
2004Q2	7.433763	14.05786	13.97980
2004Q3	7.444884	14.10812	13.88171
2004Q4	7.305095	14.25952	14.07775
2005Q1	7.466821	14.31285	14.03433
2005Q2	7.581688	14.35323	14.05367
2005Q3	7.553949	14.39756	13.94862
2005Q4	7.473968	14.51352	14.14466
2006Q1	7.479284	14.53641	14.10124
2006Q2	7.576401	14.56404	14.12059
2006Q3	7.508526	14.58133	14.01048
2006Q4	7.475008	14.67615	14.20652
2007Q1	7.423881	14.68501	14.16310
2007Q2	7.552038	14.72361	14.18245
2007Q3	7.482501	14.76672	14.07854
2007Q4	7.462384	14.80337	14.08610
2008Q1	7.438828	14.83873	14.09360
2008Q2	7.374880	14.87287	14.10105
2008Q3	7.315177	14.90589	14.10844
2008Q4	7.295681	14.93785	14.11578

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