SCIENTIFIC LETTERS

Econometrics Letters Volume (7), 1, 2020, June.

Internal migration, economic size and trade Openness nexus: A City Level Multivariate VAR Analysis

Uzma Tabassum[1]
Munazah Nazeer[2]

Abstract

This research aimed at exploring the interconnection between trade openness, economic city size and internal migration. The association among these variables grabbed the attention of various researchers in the existing literature but the causal connection between them was unduly ignored especially in the context of Pakistan even at national level. This research explored the causal interdependence between the said variables. Thus establishing the link between trade openness and migration and this link, as a priori, is expected to be positive. For achieving the said objective a panel dataset comprising of 14 major cities of Pakistan including Karachi, Hyderabad, Sukkur, Lahore, Faisalabad, Rawalpindi, Islamabad, Bahawalpur, Sargodha, Sialkot, Gujranwala, Multan, Peshawar and Quetta are selected over a time period from 1999-00 till 2014-15. This study also explores the impacts of own and cross impulse responses of these variables along with observing their variance decomposition effect.The estimation results supported existence of unilateral causality flowing from economic city size and trade openness to migration while the reverse links are not statistically significant as per the data under analysis. As far as openness and economic size, they both bilaterally cause one another. The variance decomposition effects reveals that the variations in trade openness are explained more by migration then economic city size while the variations in migration are attributed more from economic city size in relative terms than trade openness.

Keywords: Migration, Trade openness, Economic Size, Panel VAR, Cities.
JEL Codes: R1, F1, O4

[1] Applied Economics Research Centre (AERC) University of Karachi, Tel: 9221-99261543, Email: uzma.tbsm@hotmail.com
[2] (Corresponding Author) Applied Economics Research Centre (AERC) University of Karachi, Email: munza_83@hotmail.com

1. Introduction

Migration spurs economic growth of receiving region in two ways. First, it expands workforce and encourages more business start-ups. Second, it increases economic efficiency by supplying more labor to low- and high-skill labor markets which reflects reduction in production cost and lowers the cost associated with trade and increases economic growth. Trade openness as a percentage of GDP increases economic growth, reduces poverty and also attracts more FDI inflows. Furthermore, trade contributes positively to other sectors in the economy such as agriculture, industry and services; this will not only grow the economy but also build-ups foreign reserves and heighten the economic growth of the country. Openness and economic growth have positive effects on one another. Also economic growth and population growth (urbanization) are linked pro-cyclically. Interestingly in the context of Pakistan especially, the growth in urban population is not attributable to natural population growth rather it is from increasing migration towards the urban areas. Thus establishing the link between trade openness and migration and this link, as a priori, is expected to be positive.Trade facilitates growth in some regions of a country while shrinking others, and therefore to benefit from trade, labour may need to migrate towards such regions. However, only a limited number of papers study how internal migration responds to international trade (Aroca & Maloney, 2005; Aguayo Tellez, 2005; Flores, et al., 2013) and much of the internal migration literature has failed to find a significant impact of international trade on internal migration.

Most of the migration literature did not ask the question of the trade liberalization effect on migration, especially internal migration. It is just a few authors in the last decade that urge the migration literature to study the effects of trade on migration (Lucas, 1997; Borjas, 1999). Also, despite the latent significance of this interaction, only a small number of studies have explicitly analyzed the effect of trade liberalization on internal migration in Mexico (Aroca& Maloney, 2005; Aguayo Tellez, 2005). In Pakistan disparities among the economic growth of regions are quiet apparent. The regions that are more open to trade or hosting bulk of migration flows are also the major contributor of economic growth relative to those regions that are not. Considering the interdependence of these variables this research will provide empirical evidence whether these linkages can be used to curtail these disparities among region and promote balanced and sustainable growth. The objective of this research is to explore the causal interdependence between migration towards cities, economic size of cities and openness to trade. Further, it seeks if migration within a country has increased in response to trade openness. Next the effect of trade openness on the economic activity in different locations is examined and then the effect of this activity on migration. Further this study explores the impacts of own and cross impulse responses of these variables along with observing their variance decomposition effect.

The next section presents the review of the existing literature relevant to the issue. Section 3 discusses the theoretical foundations and links on which this study is based on. The same section also specify the research model. Data sources and variable description are presented in section 4.The econometric framework for the analysis is discussed in section 5 followed by empirical results and conclusion in section 6 and 7 respectively.

2. Review of Literature

Interactions with other regions can be a powerful engine of economic development and technological change, especially for small regions (Alesina et al; 2000, Frankel and Romer; 1999). For several decades economists have focused on a country's openness to trade, measured by policies (Sachs and Warner; 1995, Lucas; 2009) or by trade flows as a share of GDP (Frankel and Romer; 1999, Rodrik; 2000) to quantify the importance of inter regional interactions on economic growth. They apprehend that openness to trade could be a consequence, as much as a cause, of high income per person across countries. Trade openness is correlated with openness to migration. Frankel and Romer (1999) reported the positive significant correlation between trade as a share of GDP and the migration across. In Short, trade openness occupies a prominent place in the growth process of a specific region.

Henderson (1982) has a decisive contribution in elucidation the equilibrium frame work of trade liberalization and internal geography. According to Henderson the effect of trade liberalization depend on the geography of particular region. The cities closer to the port benefited more with trade liberalization hence trade openness is allied with enhance urban concentration (Rauch; 1991). In contrast Krugman (1996), Krugman & Elizondo (1996), Behrens, et al (2007) support off-putting relationship between trade openness urban concentration or growth and wrap up with the argument that external trade liberalization supports internal dispersion.Using developing countries data from 1990-87 and 1978-88 Harrison (1996) found that more trade openness, for most of the alternative measure he used for openness, linked positively with higher growth levels. A significant positive impact was found between openness and growth based on a penal analysis performed by Wacziarg (2001) using a penal of 19 years (1970-89) and 57 countries. Huang & Zhao (2009) took a region's population growth and found that trade liberalization and region's growth was directly proportional to one another as for the data from 1987 to 2005 in China.

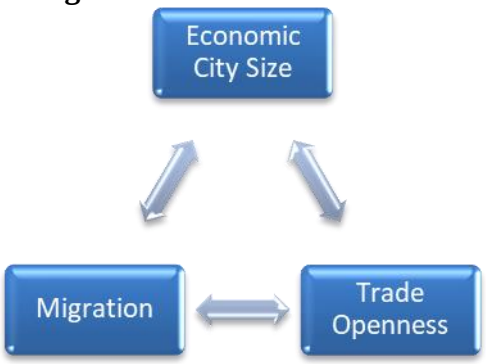
Though relationships among economic growth, trade openness and migration grabbed the attention of various researchers in the existing literature, causal connection between them was unduly ignored. As per Perera-Tallo (2003) degree of trade openness is determined by the level of income hence there is a possibility of long run causal connection between the two. In China, Liu, et al (2002) found a bi-causality in export and growth. Gries & Redlin (2012) explored the causal relationship between openness and trade over a data set of 158 countries spread over a time span from 1970 to 2009. They found significant positive causality running from openness to growth suggesting that international integration would lead to growth in long run. For short run openness might be painful as indicated by a negative causal coefficient. The same was revealed by Awokuse (2007) for Bulgaria. In contrast, Bouoiyour (2003) investigated data for Morocco over the period 1960-00 and concluded that in long the two key variables, trade and economic growth, were not causally related while in short run the causality exits.

The literature suggest that geographic characteristics may raise income through the interactions between regions (exchange of ideas, technological diffusion, innovation, investment) and these interactions would be reflected in the mobility of goods (trade) and of people (migration). Thus, trade is not the sole vehicle of globalization through which interactions between countries promote economic growth. Acknowledging that openness to trade and openness to migration may both be considered as accelerator of economic growth. On the other side economic growth accelerate competitiveness of region and thus enhance trade potential as well as attracts more migrants from different region (Ortega and Peri, 2014). Majority of the literature reviewed discusses the linkages between growth, openness and migration at national level. None of the literature is found to relate these linkages at city level considering internal migration.

3. Theoretical Framework& Model Specification

Most studies relate openness to economic growth and reports positive effects of these on one another. Also economic growth and population growth (urbanization) are linked pro-cyclically. Interestingly in the context of Pakistan especially, the growth in urban population is not attributable to natural population growth rather it is from increasing migration towards the urban areas. Thus establishing the link between trade openness and migration and this link, as a priori, is expected to be positive. To understand this nexus of inter-connections between these three, each link is discussed individually.

Figure 1: The Research Nexus



Source: Author's visualization

3.1 Migration & Economic City Size

City size (measured as city's contribution to national gross domestic product) and migration are positively linked to one another either city size is defined in physical or in economic terms. Physical definition of city size incorporate population as greater land area is needed to accommodate it while economic size incorporate economic contribution by city. Domestic and foreign investment in a particular area increases the city size by increasing job opportunities resulting in increased labour demand and higher wages which foster migration flows towards that city from rural areas as well as other cities, Lowry (1966). More migrants mean more consumers too. Thus more aggregate demand for goods and services by the cities further stimulates investment and employment demand for further production to meet city demand, Anjomani (2002). All this, together, again accelerate economic activities in the city, Mills and Lubuele (1995). Because of migration city size increases both physically and economically. It supplies labour as well as consumers to the city and investment increases for both of these. Migration and city size are inter-dependent.

3.2 Growth & Trade Openness

The theoretical literature about the relationship between openness and growth can be divided into two lines. The first line of literature supports the proposition that openness effect economic size of the region or region's growth of income positively (Mill & Song, 1979 and Romer, 1993). They argue that in the regions that are more open to trade has a greater ability to catch up to leading technologies of the rest of the world also in these regions significance of transportation modes increases. Chang et al (2009) indicate that trade openness prop up the efficient allocation of resources through comparative advantage. It also encourages competition in local and international markets by allowing spreading of knowledge and

technological advancements. In contrast Krugman (1994) and Gabaix& Ioannides (2003) point out that openness reduces cities economic size. With trade openness clustering of firms in an urban area, to minimize its average cost through sharing of raw material, labour pool and knowledge spill-over no longer required. When the economy becomes open to international trade, firm can minimizes its average cost of production via importing raw materials from more competitive international market rather than the domestic one. These contradictory theoretical findings also appear in empirical literature.

3.3 Migration & Trade Openness

Trade causes growth in some industries and regions and contraction in others (Baylis, et al., 2012). For people to be able to benefit from trade, they need to be able to migrate to those areas where new jobs, accessibility and other opportunities are being created (Todaro& Smith, 2011). Thus openness to trade frames the migration patterns within a country as well. On the other hand, regions with high migration may facilitate trade openness. Because of migration, regions and industries would become more cost efficient and productive both in terms of quantity and quality. This will enable them to compete in the international markets and thus opens the international market for business.

To account for the interdependence between internal migration, economic city size and trade openness, a panel vector autoregressive (PVAR) analysis is performed using the following econometric model.

$$Y_{it} = \Gamma(L)Y_{it-1} + \varepsilon_{it} \quad (1)$$

Where

i, t and p represent cities, time and number of lags respectively.

Yit = vector of stationary variables,

Y_{it-1} = (3×*p*) matrix of lagged variables.

Γ(L) = matrix polynomial inthe lag operator with Γ(L) = Γ1L1+ Γ2L2+. . .+ ΓpLp,

ε_{it} = vector of idiosyncratic errors.

4. Data Sources and Variable Description

4.1 Data And Data Sources

This research covers a micro-panel dataset for the multivariate analysis. The data set used commence from 1999-00 till 2014-15 for fourteen major cities of Pakistan. These fourteen cities are Karachi, Hyderabad, Sukkur, Lahore, Faisalabad, Rawalpindi, Islamabad, Bahawalpur, Sargodha, Sialkot, Gujranwala, Multan, Peshawar and Quetta. The main data sources areLabour Force Survey (LFS), Pakistan Statistical Yearbook, UN ComTrade data and Census of Manufacturing Industries (CMI)

4.2 Variable Description

This research required data for migration, trade openness and economic size at city level which is not directly available. The data for migration has been extracted from Labour Force Surveywhile for the other two variables certain disaggregation techniques are applied. The detailed description of data is as follows.

4.2.1 Migration

For migration, number of migrants reported by Labour Force Survey (LFS) is used as an outcome variable. This variable is adjusted for children of migrants who were born after migration had been taken place. For example for migrants who had migrated 10 years ago their children less than 10 years of age are excluded as these children are not migrants at destination places. i.e

$$Mig_{ij} = TI_{ij} - NBM_{ij} \quad (2)$$

Where i and j reflects cities of origin and destination respectively.
Mig = migrants from city i to city j.
Tl = Total individuals in migrant families
NBM = Non born members of the family at the time of migration.

4.2.2 Trade openness

There are various indicators that can be used to measure trade liberalization. The first one is about trade policies, such as tariff and non-tariff barriers but these measures are not free from measurement errors. Especially, if ratio of tariff revenues to import is used as a measure this might be misleading because they tend to underestimate the actual rate of tariff. Pritchett and Sethi (1994) reported the extensivedivergence among collected rates and official tariff rates. Several studies have analyzed the relationship between GDP and average tariff rate. They found mixed results; some studies reported a significant negative relationship (Lee, 1993; Harrison, 1996 and Edwards, 1998), however others established very weak relationship between them (Sala-i-Martin, 1997; Clemens and Williamson, 2001 and Edwards, 1998). Some studies used the ratio of manufacturing output to GDP as a measure of trade openness. The supportive arguments they give in this regards is that the open economies can access advanced superior technology easily to flourish productivity of using sector which is usually a manufacturing sector (Das, 2002 and Dollar, 1992). Moreover population densities also used as a measure of trade openness due to the belief that the regions which have greater population density are more probable to be open and they have greater contacts internationally (Sachs and Warner, 1995 & 1997). The trade to GDP ratio is the most widely used measure of trade openness and trade policies.City-wise trade openness is calculated using the following formulation

$$TO_{jt} = \frac{IM_{jt} + EX_{jt}}{RGDP_{jt}} \quad (3)$$

$$EX_j = \sum_{i=1}^{n} \frac{S_{ij}}{S_i} (EX_i) \quad (4)$$

$$IM_j = \sum_{i=1}^{n} \frac{S_{ij}}{S_i} (IM_i) \quad (5)$$

This research also use trade ratio (1) as a measure of trade openness because of their relative importance and ease of availability. The second variable of interest, to perform panel causality analysis, is economic size of cities. Real GDP of cities are the best representative of cities economic contribution or economic size. Cities physical size; their area or population may misguide actual facts regarding their productive capacity.

4.2.3 Economic Size of Cities.

City level real GDP (RGDP) is calculated using top-down approach, a statistical technique, for disaggregating the annual aggregate value of sector-wise real GDP using a suitable base for this disaggregation. These sectors include agriculture, manufacturing and services. For obtaining City-wise real GDP production of these three sectors is added up at City level as per production method for GDP measurement. Symbolically

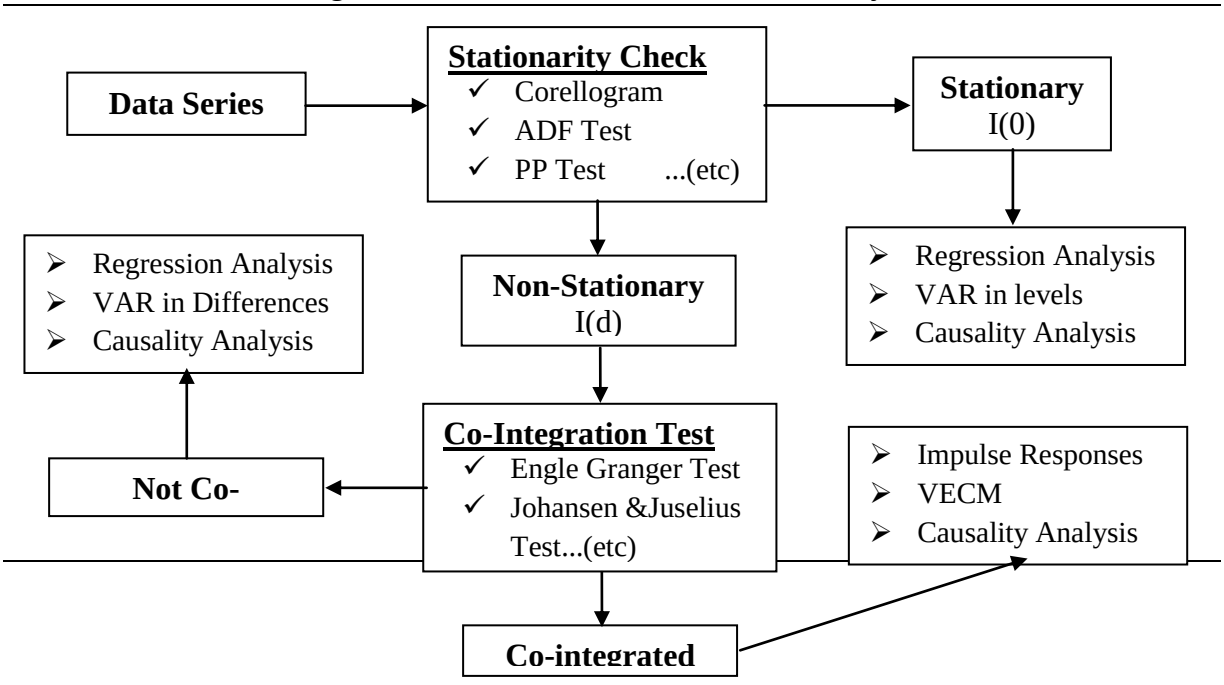
$$RGDP_{ct} = \sum_{s=1}^{3} \frac{RGDP_{st}}{L_{st}} * L_{stc} \quad (6)$$

Where c, t and s represents city, time and sector respectively.
$RGDP_{ct}$= real GDP of city c at time t.
L_{stc} =Labour engaged in sector s in city c at time t
L_{st} = Overall labour engaged in sector s at time t nationally.

5. Research Technique &Econometric Framework

Figure 1 summarizes the procedure and techniques that can be applied for the analysis depending on the properties of time series under consideration for various cross-sections. The flow explains that analyzing time series data begins with testing whether the data series are stationary or not. If all the series are stationary, one can directly move on estimating the regression, applying VAR in levels or perform causality analysis. On the contrary if the data series are non-stationary at level but are stationary after differencing *d* times i.e they are integrated of order *d* then a test of co-integration is to be applied. Again there are two outcomes. If the series are not co-integrated, estimation would follow regression analysis using stationary series obtained after differencing *d* times, a VAR model in differences or finding the causal links between the differenced variables. On the other hand, if series are co-integrated then the estimation may follow VECM analysis, generating impulse responses or employing granger causality test.

Figure: 2: Econometric Framework for Analysis



Source: Author's depiction of the econometric framework

Hence, first we employed Augmented Dickey-Fuller (ADF), Phillips Perron unit root test & correlogram test to check he stationarity properties of the series To find out the long run relationship among the variables, we employed both Engle Granger as well as the Johansen and Juselius multiple co-integration tests & to check short run equilibrium convergence Error Correction Mechanism employed. Causality between the series is also been tested by Granger Causality Test.

Analysis using time series data could involve variable series with time varying moment's i.e they might be non stationary. This may result in producing spurious regression results and relationships that might be meaningless theoretically. Thus, it is crucial to determine the stationary properties of time series prior to the application of multivariate co-integration analysis. Then accordingly the estimation technique and procedure would be followed.

6. Empirical Results

Following the econometric framework presented earlier, stationary checks are performed to conclude if the data under consideration possess a unit root or not. Non-stationarity of data series may arise either because of existence of trend or variance or both. For this first data series are examined graphically both at levels and at their log transformation (A-2 in appendix). Secondly, unit root test are applied to both level and log seriesindividuallyunder the null hypothesis that the series possess a unit root i.e it is non-stationary.

Table 1: Unit Root Test Results

Levin, Lin & Chu Unit Root Test Results				
Series	**At Level**		**At Log**	
	Statistic	**Prob.**	**Statistic**	**Prob.**
ECS	-1.130	0.129	-3.015	0.001
MIG	-0.817	0.207	-3.230	0.001
TO	-0.614	0.270	-4.325	0.00
Ho: Series is non-stationary				
Lag length = 2 (SIC)				

The results revealed that the data series in hand are non-stationary at levels but are stationary at their log transformation. Even in the graphical presentation of these series trend seems to be the base for non-stationarity rather than the variance.

Proceeding with the log transformation of the series, multivariate vector autoregression (VAR) is performed directly as for stability of the VAR model, stationary data series are required. The estimates of the VAR (2)[3] model are presented below.

Table 2: Multivariate Panel VAR Estimation Results

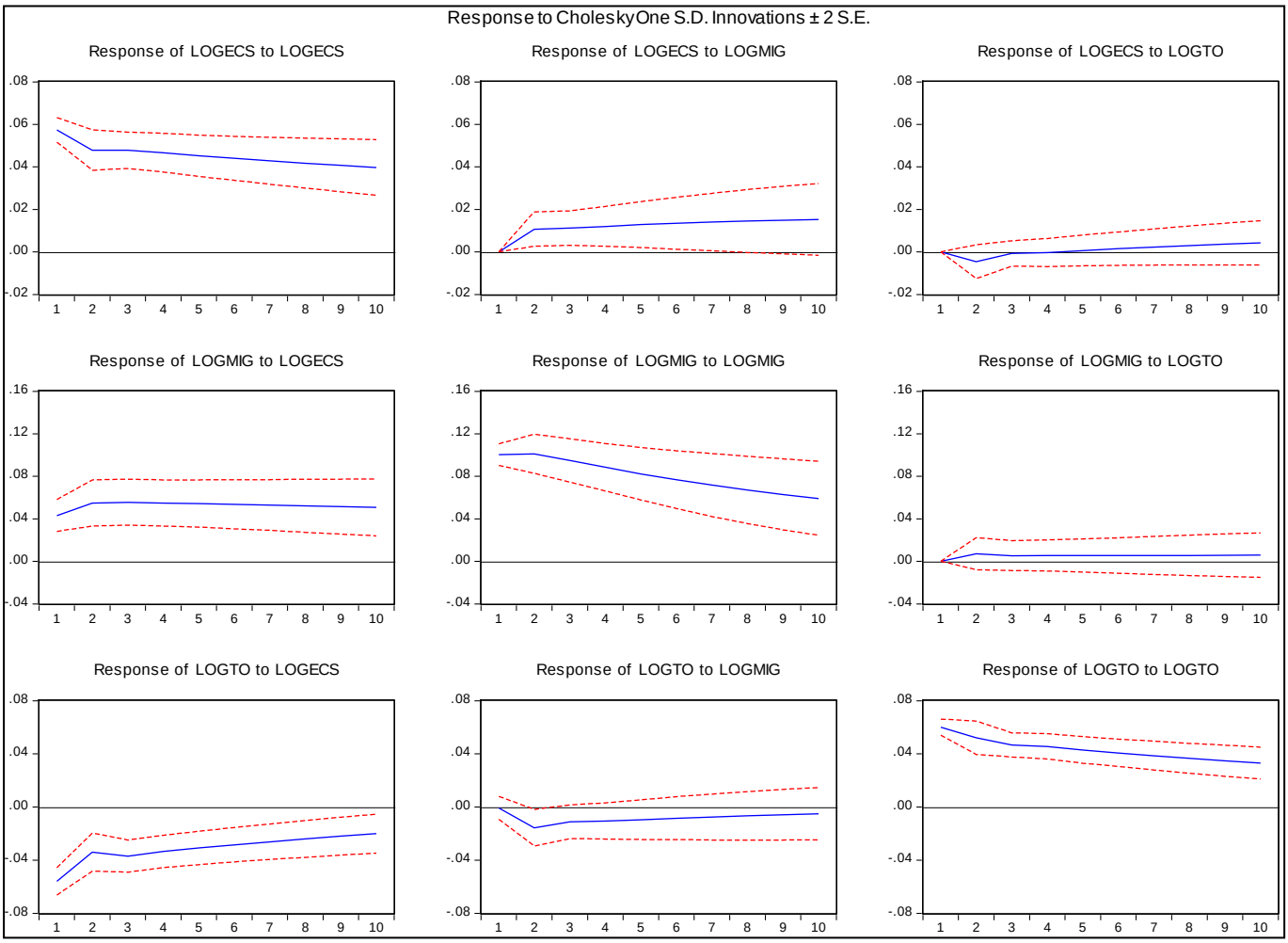
Vector Autoregression Estimates			
Variables	**LOGTO**	**LOGMIG**	**LOGECS**
LOGTO(-1)	0.867	0.118	-0.077
	[9.149]	[0.938]	[-1.162]
LOGTO(-2)	0.071	-0.109	0.095
	[0.763]	[-0.881]	[1.464]
LOGMIG(-1)	-0.150	1.007	0.106

[3]VAR(2) i.e VAR model with two lags of each variable. Lag length is selected as per SIC criteria.

	[-2.631]	[13.252]	[2.650]
LOGMIG(-2)	0.137	-0.084	-0.079
	[2.446]	[-1.126]	[-2.006]
LOGECS(-1)	0.366	0.316	0.680
	(0.142)	(0.189)	(0.099)
	[2.573]	[1.668]	[6.845]
LOGECS(-2)	-0.327	-0.230	0.271
	[-2.318]	[-1.223]	[2.750]
C	0.052	-0.031	0.081
	[0.813]	[-0.369]	[1.796]
t-statistics in parenthesis			

In the equation of trade openness, previouslag of trade openness and both lags of migration and economic city size significantly predict the contemporaneous trade openness.While one period back lagged migration predicts current migration significantly. Finally in the regression with economic city size as the dependent variable, except for trade openness all the lags have statistically sound predicting power. Next impulse response for the shocks given to the three variables is estimated. Impulse responses express how long it takes a shock to disappear. Graphical presentations of these impulses are presented below along with their confidence belts.

Figure 3: Impulse responses of variables



The shocks of own and cross variables given to ECS reveals that openness shock will die out soon followed by migration shock though own shock does not seems to die till lag 10 despite being continuously declining. Shocks of openness to migration vanishes post one lag of time while its own shock tends to become smaller but required a much longer time to disappear. Finally in impulse responses of trade opennessexcept for own shock, the rest shocks would disappear at lag 10 (ECS shock) and 1 (MIG shock).

Table 3: Variance decomposition estimates

Variance Decomposition of LOGTO:				
Period	**S.E.**	**LOGTO**	**LOGECS**	**LOGMIG**
1	0.082	100	0	0
2	0.104	96.84	1.06	2.10
3	0.121	96.70	0.95	2.34
4	0.133	96.50	1.02	2.47
5	0.144	96.37	1.10	2.53
6	0.153	96.29	1.19	2.53
7	0.160	96.21	1.29	2.50
8	0.166	96.14	1.40	2.47
9	0.171	96.06	1.51	2.42
10	0.175	95.99	1.64	2.37
Variance Decomposition of LOGECS:				
Period	**S.E.**	**LOGTO**	**LOGECS**	**LOGMIG**
1	0.057371	46.47539	53.52461	0
2	0.07562	49.55374	48.47654	1.969722
3	0.090166	48.41662	48.66083	2.922551
4	0.102232	47.57954	48.77924	3.64122
5	0.112503	46.6111	49.08161	4.307294
6	0.121553	45.62427	49.46047	4.915262
7	0.129653	44.64946	49.85861	5.49194
8	0.137004	43.69456	50.26261	6.042833
9	0.143742	42.76725	50.66146	6.571288
10	0.149971	41.87079	51.05008	7.079133
Variance Decomposition of LOGMIG:				
Period	**S.E.**	**LOGTO**	**LOGECS**	**LOGMIG**
1	0.109277	7.651205	7.883878	84.46492
2	0.158763	7.961042	11.46324	80.57572
3	0.193196	8.62673	12.81733	78.55594
4	0.219517	9.099565	13.77926	77.12117
5	0.240707	9.5387	14.61378	75.84752
6	0.25833	9.942568	15.36509	74.69234
7	0.273322	10.3157	16.06924	73.61506
8	0.286291	10.66142	16.73898	72.5996
9	0.297661	10.98113	17.38165	71.63723
10	0.307738	11.27615	18.00152	70.72233
Cholesky Ordering: LOGTO LOGECS LOGMIG				

Variance decomposition results for trade openness explains that variations in trade openness are solely because of its own lag in the first period after that the share in explain trade openness by other variable increases. Also these variations are explained more by migration then economic city size. Likewise variation in economic city size is 46% explained by trade openness and 54% by its own lag. Finally the variations in migration are explained by trade openness (8%), economic city size (8%) and its own lag which has the strongest impact (84%). The variations in migration are attributed more from economic city size in relative terms than trade openness.

Finally as all of the series are stationary at level, a penal causality analysis to explore the causal linkages between the three variables is performed directly without performing co-integration analysis.Otherwise one had to go for differencing the series to make them stationary followed by assuring that the series should be co-integrated at same level of integration. This research uses the panel causality test proposed by Dumitrescu and Hurlin (2012) in heterogeneous panels by estimating individual cross-sectional coefficients. The test results for causality analysis are tabulated in table 5.

Table 5: Panel causality results

Pairwise DumitrescuHurlin Panel Causality Tests			
Null Hypothesis:	**W-Stat.**	**Zbar-Stat.**	**Prob.**
LOGECS does not homogeneously cause LOGMIG	6.114	3.842	0.00
LOGMIG does not homogeneously cause LOGECS	2.281	-0.315	0.753
LOGTO does not homogeneously cause LOGMIG	10.294	8.376	0.00
LOGMIG does not homogeneously cause LOGTO	2.591	0.021	0.984
LOGTO does not homogeneously cause LOGECS	11.541	9.728	0.00
LOGECS does not homogeneously cause LOGTO	9.379	7.384	0.00
Lag length:: 2			

Dumitrescu and hurlin (2012) panel causality test accounts for heterogeneity of the co-efficient across all cross-sectional units. It regress the standard Granger causality test for each and every cross-sectional unit and then combines the statistics by averaging them. This average statistic is named as W-Stat which follows a normal distribution and its significant is then being checked using probability of the Z-bar statistic. Under the null hypothesis it is assumed that there is not even a single cross section where the two variables under consideration homogenously causes one another that is homogenous non-causality hypothesis is checked. While under the alternate hypothesis it is assumed that there is at least one and at most (N-1) non causal relationships exist in the model. This implies that there are some cross sections where no causality between the variables exits while for the rest there is some causal association exists. The results of the test provide evidence of unilateral causality flowing from economic city size and trade openness to migration while the reverse links are not statistically significant as per the data under analysis. As far as openness and economic size, they both bilaterally cause one another.

7. Conclusion

This research focuses on exploring the interconnection between trade openness, economic city size and internal migration. Though relationships among economic growth, trade openness and migration grabbed the attention of various researchers in the existing literature, causal connection between them was unduly ignored especially in the context of Pakistan even at national level. Further the literature reported openness and economic growth as well as

economic growth and urbanization (population growth) to be linked positively. In Pakistan, the growth in urban population is not attributable to natural population growth rather it is from increasing migration towards the urban areas. Thus establishing the link between trade openness and migration and this link, as a priori, is expected to be positive.For achieving the said objective a panel dataset comprising of 14 major cities of Pakistan including Karachi, Hyderabad, Sukkur, Lahore, Faisalabad, Rawalpindi, Islamabad, Bahawalpur, Sargodha, Sialkot, Gujranwala, Multan, Peshawar and Quetta are selected over a time period from 1999-00 till 2014-15. Generating city level data for the variables itself become a significant contribution by this research.This study also explores the impacts of own and cross impulse responses of these variables along with observing their variance decomposition effect. The research employed panel vector autoregressive (PVAR) estimation technique for analysing the interdependence between the three core variables. The estimation results supported existence of unilateral causality flowing from economic city size and trade openness to migration while the reverse links are not statistically significant as per the data under analysis. As far as openness and economic size, they both bilaterally cause one another. The variance decomposition effects reveals that the variations in trade openness are explained more by migration then economic city size while the variations in migration are attributed more from economic city size in relative terms than trade openness.

References

Aguayo Tellez, E., 2005. Rural–Urban Migration in the 1990s Mexico: Switching the 'Ejido'for the 'Maquiladora', Houston: Unpublished.

Alesina, A., Spolaore, E., Wacziarg, R., 2000.Economic integration and political disintegration. Am. Econ. Rev. 90 (5), 1276–1296.

Anjomani (2002), Regional Growth and Interstate Migration, Socio-Economic Planning Science, 36(4), pp 239-265.

Aroca, P. & Maloney, W. F., 2005. Migration, Trade and Foreign Direct Investment in Mexico. The World Bank Economic Review, 14 December, 19(3), pp. 449-472

Awokuse, T.O. (2007). Causality between exports, imports, and economic growth: Evidence from transition economies. Economics Letters, 94 (3), pp. 389-395.

Baylis, K., Garduño-Rivera, R. &Piras, G., 2012. The distributional effects of NAFTA in Mexico: Evidence from a panel of municipalities. Regional Science and Urban Economics, January, 42(1-2), pp. 286-302.

Behrens, K., Gaigne, C., Ottaviano, G. I. P., &Thisse, J. F. (2007) "Countries, Regions and Trade; on the welfare impacts of economic integration". European Economic Review 51(5), pp.1277–1301.

Borjas, G. J., 1999. The economic analysis of immigration. In: Handbook of Labor Economics. New York: Elsevier.

Bouoiyour, J. (2003), Trade and GDP Growth in Morocco: Short-run or Long-run Causality? Brazilian Journal of Business and Economics 3(2) pp. 14-21.

Chang, R., Kaltani, L. &Loayza, N. (2009) "Openness is Good for Growth: The Role of Policy Complementarities". Journal of Development Economics 90, pp. 33-49.

Clemens, M. A. & Williamson, J. G. (2001) "A tariff-growth paradox? Protection's impact the world around". NBER Working Paper Series, No. 8549.

Das, K. D. (2002) "Trade Liberalization and Industrial Productivity: An Assessment of Developing CountryExperiences". Indian Council for Research on International Economic Relations, Working Paper No. 77.

Dollar, D. (1992) “Outward-oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs”. Economic Development and Cultural Change, 40(3), pp. 523-44.

Dumitrescu, E &Hurlin, C (2012). Testing for Granger non-causality in heterogeneous panels. Economic Modelling 29(4), pp. 1450-1460.

Edwards, S., (1998) “Openness, productivity and growth: what do we really know?” Economic Journal 108, pp. 383– 398.

Flores, R., Aguilera, R.V., Mahdian, A. and Vaaler, P.M. (2013), “How well do supranational regional grouping schemes fit international business research?”,Journal of International Business Studies, Vol. 44 No. 5, pp. 451-474.

Frankel, J.A., Romer, D., 1999.Does trade cause growth? Am. Econ. Rev. 89 (3), 379–399.

Gabaix, X. & Ioannides, Y.M (2003) “The Evolution of City Size Distributions”, working paper, Department of Economics, Tufts University.

Gries and Redlin (2012) " Trade Openness and Economic Growth: A Panel Causality Analysis". Centre of International Economics Working Paper Series, No. 2011-06.

Gries, T., &Redlin, M. (2012). Trade Openness and Economic Growth: A Panel Causality Analysis.Center for International Economics, Working Paper Series, (2011-06).

Harrison, A (1996) “Openness and Growth: a time series, cross-country analysis for developing countries”. Journalof Development Economics, 48, pp. 419– 447.

Henderson, J. V. (1982) "Systems of Cities in Closed and Open economies". Regional Science and Urban Economics, 12(3) pp. 325-350.

Krugman, P. (1994) “Urban Concentration: The Role of Increasing Returns and Transport Costs”, Conference Paper, World Bank Annual Conference on Development Economic.

Krugman, P. (1996) "The self-organizing Economy". Oxford Blackwell Publishers.

Krugman, P.R. and R. Livas Elizondo (1996) "Trade Policy and Third World Metropolis". Journal of Development Economics, 49, pp. 137-150.

Lee, J.W. (1993) “International trade, distortions, and long-run economic growth” IMF Staff Papers 40 (2), pp. 299 – 328.

Liu, X., Burridge, P. & Sinclair, P. J. N. (2002). "Relationships between economic growth, foreign direct investment and trade: Evidence from China". Applied Economics, 34(11), pp. 1433–1440.

Lowry (1966), Migration and Metropolitan Growth: Two Analytical Models, Chandler Publishing Company, San Francisco

Lucas, R. E., 1997. Internal Migration in Developing Countries. In: Handbook of Populalion and Family Economics. Amsterdam: Elsevier.

Lucas, R.E., 2009.Trade and the diffusion of the industrial revolution. Am. Econ.J. Macroecon. 1 (1), 1–25.

Mill, E. S & Song, B. N (1979) “Urbanization and Urban Problem”, Harvard University Press, Cambridge.

Mills and Lubuele (1995), Projecting Growth of Metropolitan Areas, Journal of Urban Economics, 37, pp 344-360.

Perera-Tallo, F. (2003) "Growth Due to Globalization". International Economic Review 44, pp. 651-676.

Rauch,J.E (1991) “Reconciling the pattern of trade with the pattern of migration”. American Economic Review 106, pp. 775-796.

Rodrik, D., 2000.How far will international economic integration go? J. Econ. Perspect. 14(1), 177–186.

Romer, D. (1993) "Openness and Inflation: Theory and Evidence". Quarterly Journal of Economics 108(4), pp. 870-903.

Sachs, J.D. & Warner, A.M. (1995). “Natural resource abundance and economic growth”. Center for InternationalDevelopment and Harvard Institute for International Development.

Sachs, J.D. & Warner, A.M. (1997). "Fundamental sources of long-run growth". American Economic Review 87, pp. 184–188.

Sala-i-Martin, X.X. (1997). "I just ran two million regressions". American Economic Review 87(2), pp. 178– 183.

Sethi, G (1994), Tariff Rates, Tariff Revenue, and Tariff Reform: Some New Facts, The World Bank Economic Review, 8 (1), pp 1–16.

Todaro, M. P.and Smith, S.C (2011), ECONOMIC DEVELOPMENT. Addison-Wesley.Pearson Education Limited. 8

Wacziarg, R (2001) 'Measuring the Dynamic Gains from Trade', World Bank Economic Review, 15(3), pp.393-429.