Human Capital Outflow and Economic Misery:Fresh Evidence for Pakistan

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Abstract: This paper visits the impact of economic misery on human capital outflow using time series data over the period of 1975-2012. We have applied the combined cointegration tests and innovative accounting approach to examine long run and causal relationship between the variables. Our results affirm the presence of cointegration between the variables. We find that economic misery increases human capital outflow. Foreign remittances add in human capital outflow from Pakistan. The migration from Pakistan to rest of world is boosted by depreciation in local currency. Income inequality is also a major contributor to human capital outflow. The present study is comprehensive effort and may provide new insights to policy makers for handling the issue of human capital outflow by controlling economic misery in Pakistan.
Keywords: Economic misery, human capital outflow, Pakistan

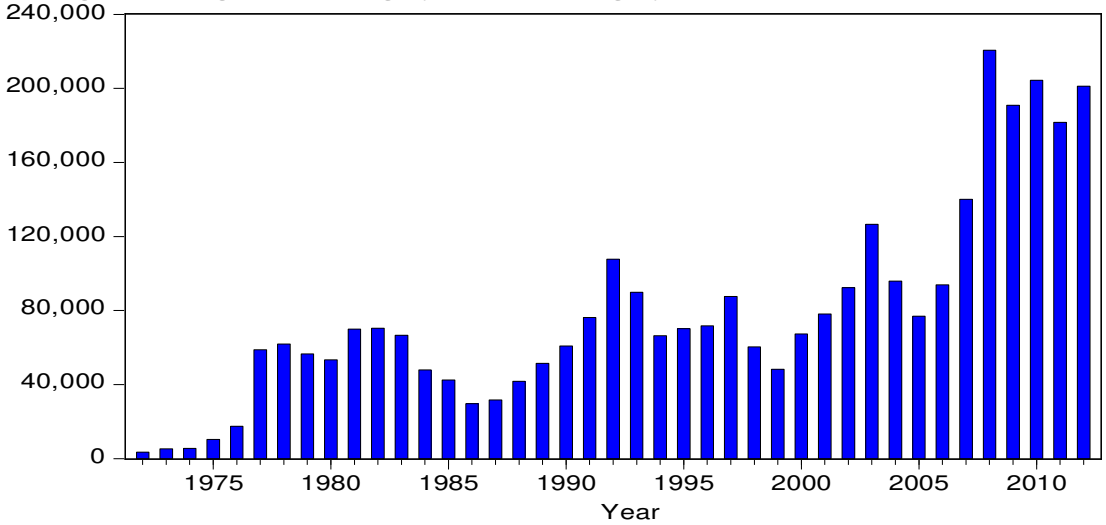
I. Introduction

More than 50 years ago, the phenomenon of international immigration i.e. human capital outflow had received the importance for social scientists of both developed as well as developing nations. Historically, the immigrant receiving countries like the United States, Canada and Australia has shifted their demand from Europe towards Asia, Latin America and Africa. The Europe has transformed into immigrant importing society which was immigrant exporter for few decades ago. If we see the external outlook of the developed nations, they are multi-ethnic and multi-cultural societies. It is unable to explain why the recent migration has been occurring from developing economies to developed nations (Massey et al. 1993). There are number of the theoretical models which explain the reason for international migration. All the models have explained same picture by applying different assumptions framework and concepts. The neo-classical opines that it is the wage differentials and employment conditions which is the major source of international migration i.e. human

capital outflow across the globe. Dual labor market theory highlights that structural changes are responsible for international migration. Lewis, (1954); Ranis and Fei, (1961); Todaro, (1969) and, Harris and Todaro (1970) argued that economic prosperity of West is responsible for the migration from developing countries.

There are push and pull factors which play their role to stimulate human capital outflow from developing countries to developed economies. For example; Datta, (2002) highlighted that pull factors are positive attributes in migration receiving countries and on the other side, push factors are the negative attributes to home country. There are number of reasons which affect the magnitude of human capital outflow such as high per capita income, macroeconomic stability, high living standard, less environmental problems and various kinds of freedom. Unfortunately, Pakistan is facing high inflation and unemployment, lower real wages and less domestic investment for new job creation etc. Pakistan is the sixth most populous country of the world with more than 40 percent population living below poverty line, inflation remains between 10 to 22 percent and unemployment rate is more than 5 percent throughout the history of Pakistan (Economic Survey of Pakistan, 2013). The Pakistani government is busy in remedial measures to promote overseas employment which is helping country to increase foreign remittances. This strategy of government is a little bit helpful in reducing unemployment. The government of Pakistan has signed agreements with Malaysia, Qatar, Oman, Saudi Arabia and Kuwait for exporting her labor, now a days Pakistan is exporting skilled, semi-skilled and unskilled labor to these countries. The flow of migrant workers from Pakistan was 12300 in 1973 and 23077 in 1975, 129847 in 1980, 115520 in 1990 and 110136 in 2000, 0.43 million in 2008 and 0.46 in 2011 (Economic Survey of Pakistan, 2012). This increasing number of emigrants is due to the difference in economic conditions of Pakistan and in host countries. The Figure-1 shows the migration of highly qualified, highly skilled and skilled professionals who migrated to other countries for better employment opportunities.

Figure-1: Migration of Highly Qualified, Highly Skilled and Skilled Professionals



Source: Bureau of emigration and overseas employment

This paper contributes in existing literature by investigating the impact of economic misery on human capital outflow in case of Pakistan by five folds. (i), This is a pioneering effort in the case of Pakistan; (ii), the stationarity properties of the variables are tested by using ZA

unit root test; (iii) the long relationship among the variables is tested by applying the Bayer-Hanck combined cointegration approach; (iv) long-and-short runs dynamic effects are also investigated and finally, innovative accounting approach is applied to test the direction of causal relationship between the variables. We find that economic misery boosts human capital outflow. Foreign remittances add in human capital outflow. Income inequality and exchange rate depreciation lead human capital outflow i.e. international migration from Pakistan. The causality analysis shows that foreign remittances cause human capital outflow and human capital outflow causes economic misery in Pakistan.

II-Literature Review

There has been considerable recent debate on the pros and cons of international migration from developing countries. Walsh, (1974) studied the macroeconomic determinants of human capital outflow i.e. international migration in case of Ireland. He found that unemployment differential and wage differential had significant impact on net migration. The labor from low income societies was seen to move in those countries where inflation, poverty and unemployment rates are low. Mountford, (1997) estimated that because of increase in international migration the value of human capital at home has increased. Borjas, (1993) investigated that wage differential did matter for human capital outflow from developing countries towards the US. He unveiled that in case of the US and Canada, the immigration policies matter a lot because these countries are using skill selective policies for immigration. Basu, (1995) noted that migration between the countries occur because of wage differential and the level of unemployment. But in case of open economies, it creates unfavorable terms of trade and raises unemployment in the host country as well as the welfare of the people in the host country is reduced.

Solimano, (2002) found that the expectations of high income encourage the people of developing countries to migrate. He also highlighted that there are other factors such as war, political instability and ethnic discrimination affect the decision of migration. He reported that family relatives and friends have positive relationship with international migration. Munshi, (2003) examined the conditions of the US and Canada for labor imports. He concluded that the networks impact on destination and employment opportunities for immigrants from Mexico to developed nations of the US and Canada is significant and positive. León-Ledesma and Piracha, (2004) investigated the impact of human capital outflow and foreign remittances in transition economies. They found that human capital outflow affects unemployment and enhances foreign remittances and self-employment activities. Moreover, foreign remittances increase the foreign reserves, which further increase the level of domestic investment which affects economic growth. Chiquiar and Hanson, (2005) noted that the proportion of income between rich and poor decides the international migration. Orrenius and Zovodny, (2005) unveiled that it is the level of education which intends the people to migrate and 10-15 years of education leads human capital outflow from developing countries to rest of the world. They found that less educated labor faces high cost for migration as compared to educated people.

Rosenzeweig, (2006) found that the number of student immigration is more than labor immigration in the case of US. Moreover, he found that more than 30 percent students like to stay in US after completion their studies rather to join labor market of their mother land. McKenzie and Rapoport, (2007) found that developed countries demand low educated immigrants because their labor is cheap and less costly. Mayda, (2007) studied the determinants of inflow of migration to OECD countries. They noted that the impact of

cultural, geographical and demographic factors play important role to take decision for moving to developed countries. Ahmad et al. (2008) examined the impact of macroeconomic variables on human capital outflow from Pakistan. They found that unemployment, foreign remittances and inflation increase human capital outflow and rise in wage rate declines it. This indicates that the impact of push factors is strong in the case of Pakistan. Djafar and Hassan, (2012) investigated the push and pull factors of migration between Malaysia and Indonesia. They found the long run relationship between income and unemployment for workers of Indonesia, and there is the unidirectional causality running from income and unemployment to workers of Indonesia in Malaysia.

III. Model Construction, Variables and Data Collection

The pioneering work of Chiswick, (1978) and Carliner,(1980) analyzed how immigrant skills adapted to the host country's labor market by estimating the cross-section regression model. Following Chiswick, (1978) and Carliner, (1980), we apply human capital outflow function to examine the factors that contribute to migrate from Pakistan to rest of world by incorporating economic misery. As Walsh, (1974) mentioned that inflation and unemployment are necessary and sufficient conditions for human capital to move from developing countries to rest of the world for better earning and employment opportunities. We have used the log-linear specification for empirical purpose and model is given below:

$$\ln M_t = \beta_1 + \beta_2 \ln EM_t + \beta_3 \ln R_t + \beta_4 \ln E_t + \beta_5 \ln I_t + \varepsilon_i \qquad (1)$$

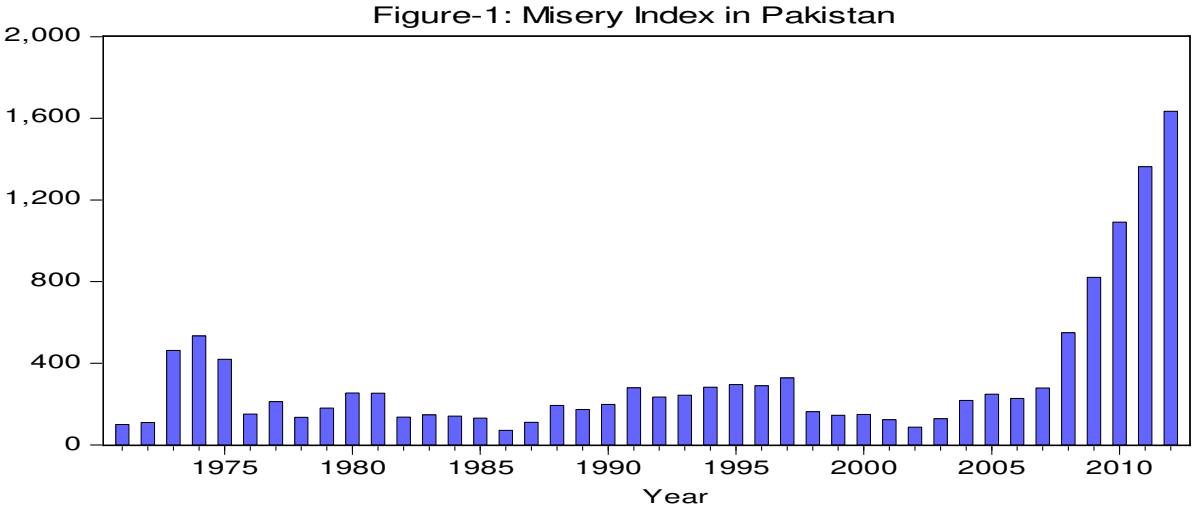
Where $\ln M_t$ is natural log of human capital outflow from Pakistan to rest of world proxies by summation of highly qualified, highly skilled and skilled professionals, $\ln R_t$ is natural log of foreign remittances per capita in Pakistan and $\ln E_t$ is natural log of exchange rate in Pakistan. $\ln I_t$ is natural log of Gini-coefficient proxy for income inequality. $\ln EM_t$ is natural log of misery index (interaction between inflation and unemployment) for Pakistan generated by authors and ε_i is error term which supposed to be normally distributed.

III.I Misery Index in Pakistan

Inflation is defined as "a general increase in the prices of goods and services" which affects the purchasing power of individual during their life period. This decrease in purchasing power of money is linked with a decline in welfare of the household and in resulting, life expectancy is affected. Barro (1991), Fischer (1983, 1993), and Bruno and Easterly (1998) exposed that inflation affects economic growth inversely. The decline in economic activities is positively linked with unemployment. Although empirical findings between unemployment and mortality rate is controversial but Forbes and McGregor (1984) reported the positive association between unemployment and mortality. The existing literature provides various studies, where misery index is used as a measure of economic misery (for example see, Treisman (2000), King and Ma (2001), Neyapti (2004), Martinez-Vazquez and McNab (2006), Shah (2006), Thornton (2007) and, Iqbal and Nawaz (2010)). In 1960s, Arthur Okun generated misery index combining inflation and unemployment rates. For understanding the real picture of economic misery, we have constructed misery index (MI) following Arthur Okun. The misery index (MI) is computed by taking the sum of inflation and unemployment rates in the case of Pakistan for the period of 1972-2012. The data on inflation and unemployment rates is collected from economic survey of Pakistan (various issues).

$$MI = Inflation + unemployment \quad (2)$$

Where MI is misery index, inflation is the annual percentage change in consumer price index (CPI) and unemployment is comprised of all persons sixteen years age and above during the reference period, this definition is according to International Labor Organization (ILO). The MI is presented in Figure-1.



The data on highly qualified, high skilled and skilled professionals has been collected from bureau of emigration and overseas employment (BEEOE, 2013). Economic survey of Pakistan (2012-13) has combed to attain data on exchange rate and foreign remittances. The data on inflation and unemployment rate is also collected from economic survey of Pakistan (2012-13). The study covers the period of 1972-2012. We have transformed all the series into natural-log form (Shahbaz, 2010).

IV. Econometric Methodology

In econometric analysis, the time series is said to be integrated if two or more series are individually integrated, but some linear combination of them has a lower order of integration. Engle and Granger, (1987) formalized the first approach of cointegration test which is a necessary criteria for stationarity among non-stationary variables. This approach provides more powerful tools when the data sets are of limited length compared to the most economic time-series. Later, another cointegration test called *Johansen maximum eigenvalue test* was developed by Johansen (1991). Since it permits more than one cointegrating relationship, this test is more generally applicable than the Engle–Granger test. Another main approach of cointegration is based on residuals is the *Phillips–Ouliaris cointegration test* developed by Phillips and Ouliaris (1990). Other important approach such as the Error Correction Model (ECM) based F-test of Peter Boswijk (1994), and the ECM based *t*-test of Banerjee et al. (1998).

However, different tests might suggest different conclusions. To enhance the power of cointegration test, with the unique aspect of generating a joint test-statistic for the null of no-cointegration based on Engle and Granger, Johansen, Peter Boswijk, and Banerjee tests, the so called *Bayer-Hanck* test was newly proposed by Bayer and Hanck (2013). Since this new approach allows us to combine various individual cointegration test results to provide a more

conclusive finding, it is also applied in this paper to check the presence of cointegrating relationship between economic misery and human capital outflow in the case of Pakistan. Following Bayer and Hank (2013), the combination of computed significance level (*p*-value) of individual cointegration test in Fisher's formulas as follows:

$$EG-JOH=-2\left[\ln(p_{EG})+(p_{JOH})\right] \quad (3)$$

$$EG-JOH-BO-BDM=-2\left[\ln(p_{EG})+(p_{JOH})+(p_{BO})+(p_{BDM})\right] \quad (4)$$

Where p_{EG}, p_{JOH}, p_{BO} and p_{BDM} are the *p*-values of various individual cointegration tests respectively. It is assumed that if the estimated Fisher statistics exceed the critical values provided by Bayer and Hank (2013), the null hypothesis of no cointegration is rejected.

After examining the long run relationship between the variables, we use Granger causality test to determine the direction of causality between the variables. If there is cointegration between the series then the vector error correction method (VECM) can be developed as following:

$$\begin{bmatrix}\Delta\ln \mathrm{M}_t\\ \Delta\ln \mathrm{EM}_t\\ \Delta\ln R_t\\ \Delta\ln \mathrm{E}_t\\ \Delta\ln \mathrm{I}_t\end{bmatrix}=\begin{bmatrix}b_1\\ b_2\\ b_3\\ b_4\end{bmatrix}+\begin{bmatrix}B_{11,1}\,B_{12,1}\,B_{13,1}\,B_{14,1}\,B_{15,1}\\ B_{21,1}\,B_{22,1}\,B_{23,1}\,B_{24,1}\,B_{25,1}\\ B_{31,1}\,B_{32,1}\,B_{33,1}\,B_{34,1}\,B_{35,1}\\ B_{41,1}\,B_{42,1}\,B_{43,1}\,B_{44,1}\,B_{45,1}\\ B_{51,1}\,B_{52,1}\,B_{53,1}\,B_{54,1}\,B_{55,1}\end{bmatrix}\times\begin{bmatrix}\Delta\ln \mathrm{M}_{t-1}\\ \Delta\ln \mathrm{EM}_{t-1}\\ \Delta\ln R_{t-1}\\ \Delta\ln \mathrm{E}_{t-1}\\ \Delta\ln \mathrm{I}_{t-1}\end{bmatrix}+\ldots+\begin{bmatrix}B_{11,m}\,B_{12,m}\,B_{13,m}\,B_{14,m}\,B_{15,m}\\ B_{21,m}\,B_{22,m}\,B_{23,m}\,B_{24,m}\,B_{25,m}\\ B_{31,m}\,B_{32,m}\,B_{33,m}\,B_{34,m}\,B_{35,m}\\ B_{41,m}\,B_{42,m}\,B_{43,m}\,B_{44,m}\,B_{45,m}\\ B_{51,m}\,B_{52,m}\,B_{53,m}\,B_{54,m}\,B_{55,m}\end{bmatrix}$$

$$\times\begin{bmatrix}\Delta\ln \mathrm{M}_{t-1}\\ \Delta\ln \mathrm{EM}_{t-1}\\ \Delta\ln R_{t-1}\\ \Delta\ln \mathrm{E}_{t-1}\\ \Delta\ln \mathrm{I}_{t-1}\end{bmatrix}+\begin{bmatrix}\zeta_1\\ \zeta_3\\ \zeta_3\\ \zeta_4\\ \zeta_5\end{bmatrix}\times(ECM_{t-1})+\begin{bmatrix}\mu_{1t}\\ \mu_{2t}\\ \mu_{3t}\\ \mu_{4t}\\ \mu_{5t}\end{bmatrix} \quad (4)$$

where difference operator is $(1-L)$ and ECM_{t-1} is the lagged error correction term, generated from the long run association. The long run causality is found by significance of coefficient of lagged error correction term using t-test statistic. The existence of a significant relationship in first differences of the variables provides evidence on the direction of short run causality. The joint χ^2 statistic for the first differenced lagged independent variables is used to test the direction of short-run causality between the variables. For example, $B_{12,i}\neq 0\forall_i$ shows that economic misery Granger causes human capital outflow and human capital outflow is Granger of cause of economic misery if $B_{11,i}\neq 0\forall_i$.

V. Results and their Discussions

The results of descriptive statistics and pairwise correlations among the variables are presented in Table-1. The results show that human capital outflow from Pakistan, economic misery, foreign remittances, exchange rate and income equality are normally distributed. The results of pairwise correlation show that human capital outflow from Pakistan has positive

correlation with economic misery, foreign remittances, exchange rate and income inequality. Economic misery is positively correlated with foreign remittances, exchange rate and income inequality. Foreign remittances are positively correlated with exchange rate and income inequality. There is positive correlation between exchange rate and income inequality[1].

Table-1: Descriptive Statistics and Pair-wise Correlation

Variable	$\ln M_t$	$\ln EM_t$	$\ln R_t$	$\ln E_t$	$\ln I_t$
Mean	11.1668	5.4524	6.9147	3.3361	-1.0419
Median	11.1569	5.3708	7.0997	3.3296	-1.0042
Maximum	12.3044	7.3989	8.0000	4.5500	-0.8915
Minimum	9.2497	4.2719	3.3315	2.3025	-1.2902
Std. Dev.	0.6356	0.7039	0.7673	0.7606	0.1198
Skewness	-0.5465	1.1649	-2.7384	-0.0072	-0.6350
Kurtosis	4.2217	4.1780	13.5925	1.5669	2.2836
$\ln M_t$	1.0000				
$\ln EM_t$	0.5623	1.0000			
$\ln R_t$	0.6094	0.1280	1.0000		
$\ln E_t$	0.7324	0.4738	0.2177	1.0000	
$\ln I_t$	0.4272	0.3499	0.3489	0.4478	1.0000

Testing the unit root properties of the variables is precondition for examining the cointegration among the variables. There are different types of unit root tests available for testing the stationarity of the variables. The conventional unit root tests provide ambiguous empirical results due their low explanatory power. Furthermore, these tests do not accommodate the structural breaks stemming in the series. We have overcome this issue by applying Zivot and Andrews, (1992) unit root test which accommodates single unknown structural break in the series. The results are reported in Table-2 and we find that all the variables have unit root problem at level with intercept and trend in the presence of structural breaks in the series. These structural breaks are 1998, 1998, 2002, 2004 and 2002 in the series of human capital outflow (economic misery), foreign remittances, exchange rate and income inequality respectively. Pakitsan's economic performance was murky in 1990s which intended human capital to migerate abroad for better employment opportunities. Similarly, there was monetary instability and unemployment rate was hight which affected economic misery in Pakistan. The structural break in foreign remmitances is linked with 9/11 when overseas Pakistani felt Pakistan a safe place for their earnings. This incaresed the inflows of remittances that affected economic growth in 2002. Due to incentives provided offered byt government foreign investors in 2003 which affected exchange rate (Pak ruppe against US dollar) via impacting economic activity and hence economic growh. The global financial crisis in 2001-02 and sever draughts in Pakistan hit the poverty and hence income inequality. We note that the series are found to be stationary after first difference. It shows that variables are integrated at I(1).

Table-2: Zivot-Andrews Structural Break Trended Unit Root Test

Variable	**At Level**		**At 1st Difference**	
	T-statistic	Time Break	T-statistic	Time Break

[1]See Shahbaz et al. (2013)

$\ln M_t$	-4.887 (2)	1998	-6.034 (1)*	1980
$\ln EM_t$	-4.395 (1)	1998	-7.684 (3)*	1998
$\ln R_t$	-4.153 (1)	2002	-7.306 (1)*	2003
$\ln E_t$	-4.153 (3)	2004	-7.314(1)*	2002
$\ln I_t$	-3.929 (2)	2002	-7.314(1)*	2002
Note: * represents significant at 1% level of significance. Lag order is shown in parenthesis.				

We find that all the variables are stationary at $I(1)$ which leads us to apply Bayer-Hanck (2013) combined cointegration approach. Table-4 illustrates the combined cointegration results including EG-JOH, and EG-JOH-BO-BDM tests. The result reveals that Fisher-statistics for EG-JOH and EG-JOH-BO-BDM tests, in case of M_t, are greater than 5% critical values. This indicates that both EG-JOH and EG-JOH-BO-BDM tests statistically reject the null hypothesis of no cointegration between variables. However, the result of combined cointegration tests when using dependent variables such as EM_t, R_t, E_t *and* I_t fail to reject the null hypothesis of no cointegration. Our findings show that there is one cointegrating vector which confirms the presence of cointegration among human capital outflow from Pakistan, economic misery, foreign remittances, exchange rate and income inequality. This implies that long run relationship exists among the variables over the period of 1975-2012 in case of Pakistan.

Table-3: The Results of Bayer and HanckCointegration Analysis

Estimated Models	EG-JOH	EG-JOH-BO-BDM	Lag Order	Cointegration
$M_t = f(EM_t, R_t, E_t, I_t)$	13.8469**	38.9161**	2	Yes
$EM_t = f(M_t, R_t, E_t, I_t)$	9.1625	13.3026	2	No
$R_t = f(M_t, EM_t, E_t, I_t)$	9.0437	12.7412	2	No
$R_t = f(M_t, EM_t, E_t, I_t)$	9.2036	9.4173	2	No
$I_t = f(M_t, EM_t, R_t, E_t)$	9.2704	2.9532	2	No
Note: ** represents significant at 5 per cent level. Critical values at 5% level are 10.576 (EG-JOH) and 20.143 (EG-JOH-BO-BDM) respectively. Lag length is based on minimum value of AIC.				

Now we examine the marginal impact of economic misery, foreign remittances, exchange rate and income equality on human capital outflow from Pakistan after having cointegration among the variables. Long run results are reported in Table-4. Table-4 reveals that economic misery adds in human capital outflow from Pakistan and it is statistically significant at 1 per cent level of significance. All else is same, a 1 per cent increase in economic misery leads human capital outflow from Pakistan by 0.3173 per cent. This finding is consistent with Ahmad et al. (2008) who reported that inflation as well as unemployment increases human capital outflow. We find that foreign remittances has positive and significant effect on human capital outflow from Pakistan at 1 percent significance level. Keeping other things constant, a 1 per cent increase in foreign remittances increases human capital outflow by 0.4203 percent. This fnding is contradictory with León-Ledesma and Piracha, (2004) who reported that firegn remmitances are affected by human capital outflow. There is positive and significant relationship with exchange rate and human capital outflow from Pakistan. We note that a 1

percent increase in exchange rate leads human capital outflow from Pakistan to increase by 0.4365 per cent. Income inequality has positive and statistically significant impact on human capital outflow from Pakistan. A 1 percent increase in income inequality leads human capital outflow from Pakistan by 0.4572 percent, all else is same.

Table-4: Long Run Analysis

Dependent Variable = $\ln M_t$				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
Constant	5.5625*	0.3977	13.9853	0.0000
$\ln EM_t$	0.3173*	0.0978	3.2411	0.0028
$\ln R_t$	0.4203*	0.0467	8.9901	0.0000
$\ln E_t$	0.4365*	0.0682	6.4010	0.0000
$\ln I_t$	0.4572*	0.1602	2.8525	0.0075
R^2	0.8036			
F-Statistic	32.7343*			
Prob. Value	0.0000			
Note: * shows significance at 1% level.				

The results of short run are presented in Table-5. We find that economic misery increases human capital outflow from Pakistan and it is statistically significant at 5 percent. Foreign remittances also add in human capital outflow. Exchange rate has negative but insignificant impact on international migration from Pakistan. Income inequality is positively linked with human capital outflow from Pakistan but it is insignificant. The negative sign of coefficient of ECM_{t-1} is -0.4242 and it is statistically significant at 1 percent level of significant. This confirms our established long run relationship among the variables. The coefficient of lagged error term indicates the speed of adjustment from short run towards long run equilibrium path. We find that short run deviations in previous period are corrected by 42.42 per cent in future in case of Pakistan. It may consume almost 2 years and 3 months to reach at long run equilibrium path. The short run model shows that error term is normally distributed with zero mean and constant variance. There is no problem of autoregressive conditional heteroskedisticity and short run model is well constructed[2].

Table-5: Short Run Analysis

Dependent Variable = $\Delta \ln M_t$				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
Constant	0.0550	0.0618	0.8897	0.3805
$\Delta \ln EM_t$	0.2956**	0.1309	2.2583	0.0311
$\Delta \ln R_t$	0.3130*	0.0923	3.3906	0.0019
$\Delta \ln E_t$	-0.4085	0.6587	-0.6202	0.5396
$\Delta \ln I_t$	0.1613	0.8287	0.1947	0.8469
ECM_{t-1}	-0.4242*	0.1524	-2.7839	0.0091
R^2	0.4323			

[2]Results are available upon request from authors.

F-Statistic	4.7217*			
Prob. Value	0.0025			
Note: * and ** shows significance at 1% and 5% levels respectively.				

There are numerous causality approaches available in existing applied economics literature and most widely used is the vector error correction method (VECM) Granger causality to examine long run and short run causality relationship between the variables (Tiwari and Shahbaz, 2013). The main demerit with the VECM Granger causality is that it only captures the relative strength of causality within a sample period and cannot explain anything out of the selected time period. Further, the VECM Granger approach is unable to identify the exact magnitude of feedback from one variable to another variable (Shan, 2005). The variance decomposition approach indicates the magnitude of the predicted error variance for a series accounted for by innovations from each of the independent variable over different time-horizons beyond the selected time period. Further, the generalized forecast error variance decomposition approach estimates the simultaneous shock affects. Engle and Granger, (1987) and Ibrahim, (2005) argued that with VAR framework, variance decomposition approach produces better results as compared to other traditional approaches.

The results of variance decomposition approach are reported in Table-6 reveal that a 65.3970 per cent portion of international migration from Pakistan is explained by its own shocks while shocks of economic misery contribute to human capital outflow from Pakistan by 4.6689 per cent. The shocks in foreign remittances contribute in human capital outflow from Pakistan by 20.4953 percent in Pakistan. The role of exchange rate and income inequality is very less in explaining human capital outflow from Pakistan which is 7.4908 per cent and 1.978 per cent respectively. The shocks in human capital outflow from Pakistan contribute to economic misery by 29.8170 per cent. The results show that 22.4620 per cent portion of economic misery is explained by its own shocks and foreign remittances contribute by 42.8443 per cent in economic misery. On the other hand, exchange rate and income inequality plays a minimal role in explaining economic misery i.e. 3.3393 per cent and 1.5372 per cent respectively. human capital outflow from Pakistan has explained 11.3011 per cent of foreign remittances and economic misery contributesto foreign remittances by 9.0984 per cent. Exchange rate and income inequality show their weak contribution in foreign remittances. A 14.5029 per cent portion of exchange rate is explained by human capital outflow from Pakistan and 40.2023 per cent is by economic misery. The contribution offoreign remittances and income inequality in exchange rate is minimal. Human capital outflow from Pakistan and exchange rate contribute minimally to income inequality. Income inequality is explained by 36.7721 per cent by economic misery and 45.7591 per cent by foreign remittances.

Overall, we find the unidirectional causality running from human capital outflow from Pakistan to economic misery. Foreign remittances cause of human capital outflow from Pakistan and economic misery. Exchange rate is caused by economic misery. The unidirectional causality is found running from economic misery and foreign remittances to income inequality.

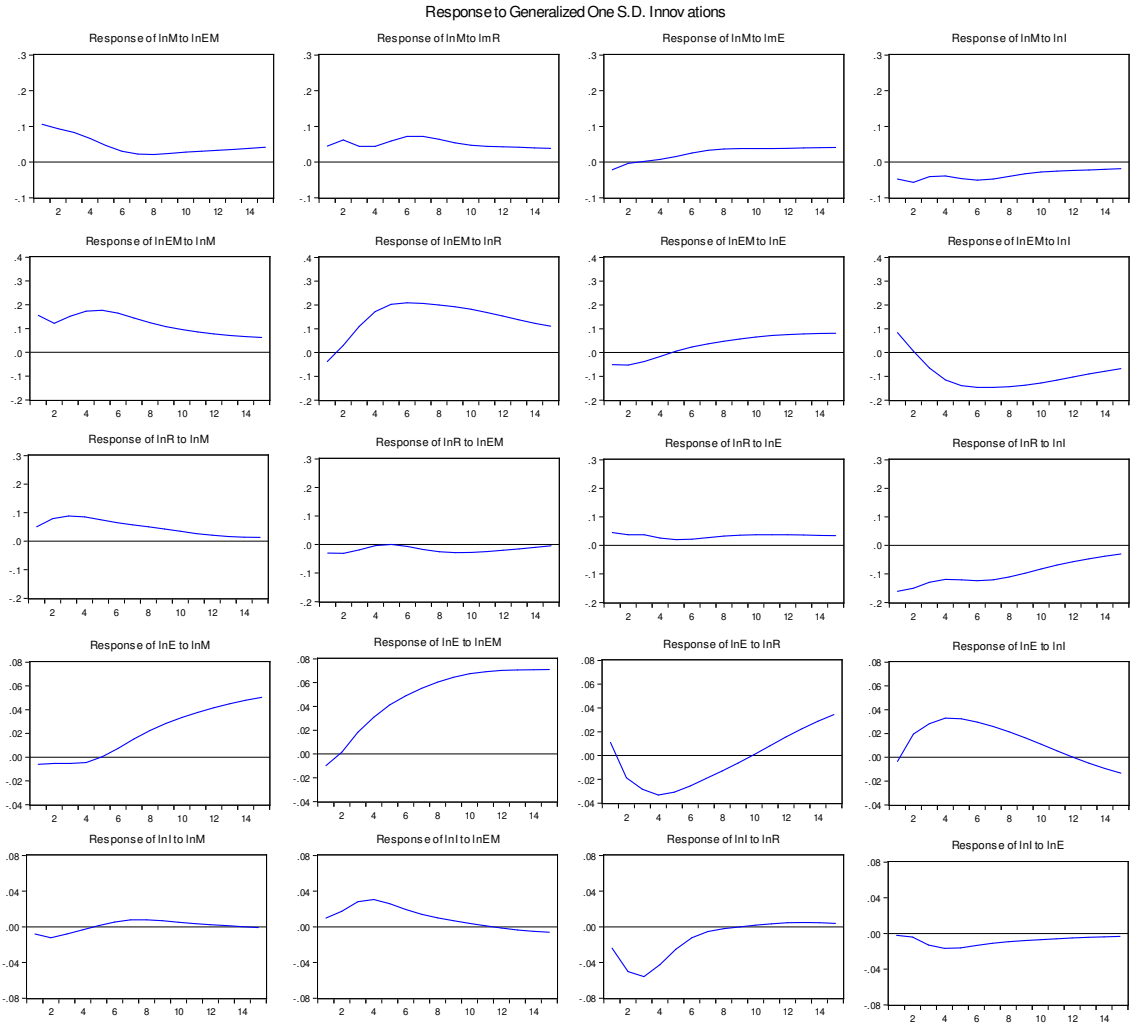
Table-6:Variance Decomposition Method

Variance Decomposition of $\ln M_t$						
Period	S.E.	$\ln M_t$	$\ln EM_t$	$\ln R_t$	$\ln E_t$	$\ln I_t$
1	0.2238	100.0000	0.0000	0.0000	0.0000	0.0000

2	0.2895	98.5957	0.1046	1.0465	0.1095	0.1434
3	0.3126	95.2622	1.6594	2.1483	0.2111	0.7187
4	0.3256	90.4793	3.5591	4.0268	0.2982	1.6363
5	0.3366	85.9061	4.2559	7.1768	0.4229	2.2380
6	0.3474	81.9465	4.1452	10.8479	0.6951	2.3651
7	0.3575	78.7884	3.9182	13.8097	1.1895	2.2941
8	0.3661	76.4430	3.7394	15.7376	1.8722	2.2076
9	0.3731	74.6029	3.6345	16.9699	2.6456	2.1468
10	0.3793	72.9512	3.6369	17.8640	3.4363	2.1114
11	0.3854	71.3492	3.7330	18.6064	4.2240	2.0871
12	0.3915	69.7844	3.8879	19.2488	5.0189	2.0597
13	0.3978	68.2742	4.0883	19.7806	5.8314	2.0252
14	0.4042	66.8180	4.3439	20.1916	6.6595	1.9867
15	0.4110	65.3970	4.6689	20.4953	7.4908	1.9478
Variance Decomposition of $\ln EM_t$						
Period	S.E.	$\ln M_t$	$\ln EM_t$	$\ln R_t$	$\ln E_t$	$\ln I_t$
1	0.3272	22.4099	77.5900	0.0000	0.0000	0.0000
2	0.4236	21.6443	75.0570	2.2436	0.3326	0.7222
3	0.4986	24.9191	65.2719	7.9601	0.4888	1.3599
4	0.5649	28.8051	53.9198	15.2215	0.4757	1.5776
5	0.6243	31.5696	44.8032	21.6439	0.3935	1.5895
6	0.6746	32.9566	38.4833	26.6253	0.3533	1.5813
7	0.7162	33.3138	34.1541	30.5460	0.3838	1.6021
8	0.7510	33.0583	31.0647	33.7566	0.4862	1.6340
9	0.7806	32.5211	28.7709	36.3921	0.6649	1.6508
10	0.8059	31.9165	27.0298	38.4814	0.9272	1.6449
11	0.8273	31.3537	25.6860	40.0601	1.2755	1.6245
12	0.8452	30.8692	24.6250	41.2022	1.7035	1.5998
13	0.8604	30.4612	23.7655	41.9978	2.1988	1.5765
14	0.8736	30.1152	23.0549	42.5259	2.7480	1.5558
15	0.8855	29.8170	22.4620	42.8443	3.3393	1.5372
Variance Decomposition of $\ln R_t$						
Period	S.E.	$\ln M_t$	$\ln EM_t$	$\ln R_t$	$\ln E_t$	$\ln I_t$
1	0.2558	3.9243	5.6875	90.3881	0.0000	0.0000
2	0.3697	6.4039	7.0786	85.7909	0.0365	0.6898
3	0.4327	8.8663	7.6794	82.6291	0.0327	0.7922
4	0.4710	10.7707	7.6165	80.9162	0.0276	0.6688
5	0.5014	11.7542	7.3603	80.1530	0.0292	0.7031
6	0.5291	12.0584	7.2582	79.8482	0.0310	0.8040
7	0.5542	12.0559	7.4520	79.6183	0.0284	0.8452
8	0.5752	11.9611	7.8708	79.2911	0.0416	0.8351
9	0.5913	11.8439	8.3293	78.9257	0.0882	0.8127
10	0.6029	11.7186	8.6949	78.6220	0.1693	0.7949
11	0.6112	11.5957	8.9339	78.4083	0.2780	0.7838
12	0.6171	11.4876	9.0668	78.2600	0.4087	0.7768
13	0.6214	11.4020	9.1234	78.1443	0.5587	0.7713

14	0.6245	11.3408	9.1276	78.0385	0.7262	0.7666
15	0.6268	11.3011	9.0984	77.9293	0.9084	0.7626
Variance Decomposition of $\ln E_t$						
Period	S.E.	$\ln M_t$	$\ln EM_t$	$\ln R_t$	$\ln E_t$	$\ln I_t$
1	0.0621	0.9204	1.5894	3.0313	94.4587	0.0000
2	0.0813	0.9629	1.2509	6.3472	90.8791	0.5597
3	0.1023	0.8829	6.0852	8.9441	83.6294	0.4582
4	0.1220	0.7629	13.7750	10.344	74.7855	0.3315
5	0.1402	0.5773	21.4831	9.9978	67.6902	0.2513
6	0.1570	0.6844	27.9168	8.9491	62.2460	0.2035
7	0.1729	1.3424	32.9462	7.7045	57.8325	0.1742
8	0.1884	2.5347	36.7541	6.5359	54.0117	0.1633
9	0.2038	4.0945	39.5163	5.5956	50.6170	0.1764
10	0.2192	5.8556	41.3343	4.9943	47.6003	0.2152
11	0.2345	7.7015	42.2880	4.7984	44.9386	0.2733
12	0.2499	9.5494	42.4919	5.0133	42.6045	0.3406
13	0.2654	11.3320	42.1027	5.5885	40.5670	0.4096
14	0.2812	12.9952	41.2893	6.4432	38.7959	0.4761
15	0.2972	14.5029	40.2023	7.4927	37.2634	0.5385
Variance Decomposition of $\ln I_t$						
Period	S.E.	$\ln M_t$	$\ln EM_t$	$\ln R_t$	$\ln E_t$	$\ln I_t$
1	0.0380	4.5064	16.3559	26.5291	0.4285	52.1799
2	0.0680	4.6231	20.1085	49.2680	0.8605	25.1397
3	0.0913	3.3410	26.9976	54.7838	0.4886	14.3889
4	0.1046	2.6485	32.7241	52.8266	0.7810	11.019
5	0.1107	2.3802	35.9510	50.2880	1.4184	9.9621
6	0.1132	2.5006	37.1933	48.7146	2.0351	9.5562
7	0.1145	2.8972	37.4225	47.8043	2.5216	9.3542
8	0.1152	3.3290	37.3093	47.2142	2.9126	9.2347
9	0.1157	3.6345	37.1228	46.8145	3.2627	9.1653
10	0.1161	3.8007	36.9276	46.5498	3.5918	9.1298
11	0.1163	3.8745	36.7510	46.3786	3.8913	9.1044
12	0.1166	3.8957	36.6344	46.2504	4.1474	9.0718
13	0.1169	3.8878	36.6069	46.1172	4.3578	9.0300
14	0.1172	3.8681	36.6625	45.9543	4.5309	8.9840
15	0.1175	3.8526	36.7721	45.7591	4.6787	8.9373

Figure-1: Impulse Response Function



The results of the impulse response function are illustrated in Figure-1 which is also considered an alternative to variance decomposition method. We find that response of human capital outflow is positive due to forcast error in economic misery and foreign remmitances. Human capital outflow responds positively after 5th time horizon but human capital outflow shows negative response due to forcast error in exchange rate and income inequality respectively. Economic misery responds positively due to forcast error in human capital outflow, foreign remmitance (after 2nd time horizon) and exchange rate (after 5th time horizon) respectively. The response in foiregn remmitances is ambegious due to forcast error occur in human capital outflow, economic misery, exchange rate and income inequality respectivel. Income inequality affects economic misery negatively. Exchange rate also responds positively due to forcast error setm in human capital outflow and economic misery. The response of exchange rate is U-shaped and inverted U-shaped due to foiregn remmitances and income inequality. Income inequality responds ambegiously due to forcast error in human capital outflow, economic misery, foreign remittances and exchange rate.

VI. Conclusions and Policy Implications

The aim of the study is to investigate the impact of economic misery on human capital outflow from Pakistan using time series data over the period of 1972-2012. We have applied Zivot-Andrews unit root test and the combined cointegration approach to test the unit root properties and cointegration among the variables. Innovative accounting approach is used to examine direction of causal relationship between the variables. Our results affirm the presence of cointegration between the variables.We find that economic misery intends skilled people to move abroad for better employment opportunities. Foreign remittances and exchange rate also lead human capital outflow from Pakistan. Income inequality is another factor that contributes in skilled human capital outflow. The results of innovative accounting approach show the unidirectional causality is running from human capital outflow from Pakistan to economic misery in Pakistan. Economic misery is cause of foreign remittances. Foreign remittances and economic misery cause income inequality.

In the context of policy implications, although outflow of human capital reduces unemployment via promoting real sectors economic and employment activities in the country. Similarly, human capital outflow leads foreign remmitances which can be helpfull in redcuing current account deficit. But this will create human capital gap for Pakistan in future. Government must focus on pull afctors (economic misery) of human capital outflow. Government should promote activities for creating news jobs which will enhance domestic production as well as exports. Government should adopt necessary measures to control inflation via promoting real sectors. Foreign remittances can also be used as tool to promot economic activities which would be helpfull in reducing inflation and unemployment in the country.

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