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THE MEASUREMENT OF PAKISTAN'S BLACK ECONOMY: A MODIFIED CURRENCY DEMAND APPROACH

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Abstract. The study re-examines the size of Pakistan's informal sector using the dynamic monetary method. It investigates the relationship between the tax burden and currency ratio by controlling the impact of education, financial development, interest rate and strength of government regimes. Previous work on Pakistan indicates that most of the studies used traditional currency demand approach, which involves a number of problems and henceforth gives spurious results. Study applied Auto Regressive Distributed Lag (ARDL) bound test approach to estimate dynamic monetary model and unearthed the existence of volume of shadow economy in Pakistan. The empirical results of the study reveal a positive and significant long-run equilibrium relationship between tax burden and currency ratio. Besides, it is also observed that financial development, regime strength, education and interest rate have inverse linkage with money demand. Results of the study predict that size of Pakistan's informal sector was at its highest 49.38% of GDP in 1998 and reduced to 27.16% of GDP in 2015. Besides, it is also observed that volume of shadow economy remained less during the era of dictatorship as compared to democracy. Empirical findings of the study envisage that economic managers of Pakistan's economy should work on

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readjusting tax brackets and focus on increasing tax base rather than tax rates.

Keywords: Shadow Economy, Monetary approach, ARDL, Financial Development

JEL Classification: O17, E26, G3, K4

I. INTRODUCTION

THEORETICAL AND PRACTICAL RELEVANCE

The inefficiencies of market system resulting from lack of legal and political institutions in low income and developing countries increased the significance and consequences of existence of underground economy in these nations. Theoretical and empirical literature argues that informal economy comprises of all the market operations is not recorded in the official statistics of national output. Recorded estimates of informal economy have exceeded 40% in developing countries, which signify the inability of public institutions to tax a major share of output. These figures show that shadow economy prevails parallel to the legal market operations whose income is untaxed and undocumented[1].

Literature failed to present a unified definition of shadow economy; difference in researchers' opinions might be a result of variation in research objectives and contrary estimation technique. This is pertinent to the notion that the measurement of its degree and extent to which it prevails in a region require complex measurement methods. Conducive environment for shadow economy to flourish is primarily dependent upon the entrepreneurs' intention of finding a safe haven from unwarranted taxation and tight regulations. Main question to be investigated is, whether informal sector substitutes or complements the official economy? Allingham and Sandmo (1972) argue that black economy tends to spur that official economic activities in which government employees work for gaining private earning. When the entrepreneurs face the option of working in the underground economy, they hinder the ability of a fraudulent official to distort the formal sector for his/her

[1] For detail see Kemal (2010)

private gains. Under this stance, the role of shadow economy complements the official sector instead of substituting it. Friedman et al. (2000) point out that the businessmen consider the black economy as a lucrative option to reduce the burden of bureaucracy and corruption.

The greatest concern of researchers and scholars to estimate the volume of underground economy is to expose misguided current policies, which are framed on inaccurately calculated statistical accounts. This implies that an existence of active underground economy always promotes the meanness of taxation policies and regulatory laws[2]. Basic objective of macroeconomic policies is to reduce market uncertainty through effective fiscal and monetary policies. The effectiveness of these macroeconomic policies depends on precisely calculated estimates of key statistics including unemployment and output. Therefore, presence of non-trivial production and unrecorded market transactions can distort the estimation of key economic statistics. This makes it impossible for government officials to devise informed strategies at national level. Due to untaxed economic activity, the countries face negative consequences for competitiveness while undermining social cohesion and law and order, resulting into huge fiscal losses. Failure to detect shadow economy can change the country into dysfunctional state that is ineffective, unfair and inefficient. Hence, for governments, the major concern is to detect and measure the size of informal economy so that informed decision and policies can be made accurately.

During late 1970s and 1980s, United States faced an intense recession and high rates of unemployment. However, it is believed by some scholars that since the employment statistics of underground economy in United States were not recorded in the official employment statistics, so the whole recession era was a mirage[3]. Since this is considered as a polarizing point of view about the negative impact of inaccurate calculations due to existence of shadow economy, it still highlights the significant importance of measuring the informal sector. It is highly pertinent to take the analogy into account that the effect of unofficial economy is not primarily limited to developed countries. The

2 For detail see Tanzi (1983)

3 For detail see Edgar (1989)

discrepancies in national accounts also have serious repercussions for underdeveloped and developing countries like Pakistan and India.

The rising Asian underground economy[4] has made it a focal point of discussion for analyzing the brunt of the dip in developing/transitional economies of the region. Shehryar (2014) argues that globalization and liberalization has become a smooth path for informal economies to enter into the formal sector and sustained their impacts in most of the developing nations, especially Pakistan. Since Pakistan is a third world country with extractive institutions and narrow tax base, a high opportunity of fraudulent behavior in tax auditing fuels the impetus to become a part of shadow economy (Gulzar et al., 2010). Hence, amongst poverty and unemployment situation in the country, shadow economy has also become one of the inhibiting development issues to be resolved. The mounting concern in Pakistan of the expanding informal sector makes it imperative to reevaluate it. According to Kemal (2010), the size of shadow economy in Pakistan was 92% of GDP in 2009. Therefore, objective of the study is to re-examine the volume of informal sector of Pakistan for economic managers to address the issues of narrow tax base, strength of political regimes, stagnating higher education enrollment and under developed financial sector. The aforementioned factors might play a key role in exhibiting higher trends in Pakistan's shadow economy. Rest part of the study is organized as follow: section II presents brief review of existing literature, section III outlays the methodology for the study, section IV provides the results and discussion and section V presents the conclusion.

II. REVIEW OF LITERATURE

The informal sector constitutes a major share in national output, and it is not limited to developing countries but developed economies also portray similar pattern. Across the emerging market economies, the shadow economy has continued to expand due to increased tax burden, political instability and underdeveloped financial sector. According to Blades et al (2011), a large proportion of the income of the masses is dependent upon the shadow economy in the developing world. This is the main reason

[4] Almost 41% as a percentage of GDP

why there is an expanding informal sector in the developing regions of the world (Schneider and Enste, 2000). According to Schneider et al (2010) the shadow economy in the developing countries has remained between 40 to 60 % of GDP.

Major portion of existing literature supports the common notion that overall tax burden is the prime reason of shadow economy's existence[5]. Tax burden and tax distortions have become a key issue for the researchers as it highly contributes toward increasing the discrepancy between the aggregated costs associated with labor, and after tax earnings. According to Schneider et al. (2010), higher inconsistency between labor expenditure and after-tax earning motivates the individuals to indulge in illegal economic activities. The burden of tax is a fundamental force behind the growth of informal sector all over the world. Moreover, it is argued by many researchers that a rise in levels of taxation leads to an increase in tax burden awareness. This induces people to switch from formal to informal activities, hence, indicating a positive linkage between tax burden and shadow economy (Ahmed and Hussain, 2008; Chaudhry and Munir, 2010).

Apart from tax burden, financial development in a country is also considered as a well-known contributing factor to shadow economy. Empirical findings of Blackburn et al. (2012) reveal that financial development suppresses the existence and growth of black economy. It is also argued that the countries having low level of financial development face higher rates of shadow economy and tax evasion (Capasso and Jappelli, 2013). Other informal sector promoting factors are social polarization, autocratic authority pattern, political reforms and political instability (Elbahnasawy et al., 2016; Elgin 2010) and (Jamalmanesh, 2013). It is observed in literature that when the political stability is higher in a country, there is low level of corruptive activities, inflated burden of tax and reduced size of hidden economy (Elgin, 2010). When tax burden is higher and there is political stability in the country, the excessive tax revenue will be rapidly used for the production of public goods, building an incentive to operate in the formal sector while decreasing the aggregated magnitude of the underground economy (Aslam, 1998).

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[5] See Schneider et al., (2010)

According to Horvath (2017), for the measurement and estimation of shadow economy, the importance of interest rates fluctuation cannot be undermined. The contraction in the interest rate in an emerging economy can cause stagnation in output and an expansion of informal sector. The transactions taking place in illegal market operations are primarily based on cash because of unavailability of other financial tools. Hence, due to rise in interest rates, the opportunity cost of holding money increases while causing a decrease in hidden economic activities (Tanzi, 1983; Shneider et al., 2010).

As concerned to Pakistan, literature reports that financial underdevelopment is a major cause of growing informal economy (Gulzar et al., 2010). According to Arby et al. (2010), during the weak and fragile political regimes, the informal economy has been found out to be at its peak in Pakistan. Apart from the above mentioned factors, the extent of higher education in developing countries also plays a vital role in curbing the informal sector. Higher level of education creates civic sense and improves morality in the public while reducing the size of shadow economy. Many studies have found a significantly negative relationship between education and informal sector[6]. According to Chaudhry and Munir (2010), low tax revenue is found to be associated with low level of education in Pakistan.

Brief review of literature reveals that mostly, the size of informal sector is assessed by using ad hoc approaches like traditional currency demand approach and MIMIC, and simple OLS and structural equation modeling was used for estimation. These estimation techniques do not address the issues of stationarity and endogeneity that lead to spurious results. In addition, none of the study considered the instability of regimes, financial development measured by domestic credit to private sector by the bank as a percentage of GDP and enrolment at higher education level[7] while estimating the volume of shadow economy in Pakistan. Hence, this study has considered above mentioned factors to estimate the size of informal sector of Pakistan's economy to fill the existing research gap.

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[6] Chaudry and Munir (2010), Arby et al. (2010) and Gulzar et al (2010)

[7] Except Arby et al. (2010).

III. THEORETICAL BACKGROUND AND METHODOLOGY

Gutmann (1977) and Tanzi (1983) used the idea of Cagan (1958) to measure the size of shadow economy of USA, which states that increasing rates of taxation cause people to make use of currency for transactional purposes in order to avoid taxation. These studies do not address the issues of time series data while estimation through simple OLS and used dependent variable (currency ratio) in the log form that creates a serious disaggregation problem.

THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

Following Arby et al. (2010), modified monetary approach is used to estimate the volume of informal sector of Pakistan. This approach measures size of shadow economy by currency ratio (M0/M2) and assumes that all informal sector transactions are carried out only via currency outside the banks. Besides, it is also assumed that velocity of money of informal and formal sectors is similar. Main focus of the study is on tax to GDP ratio to assess the volume of informal sector of Pakistan after controlling the impact of financial development, regime durability, enrolment at higher education level and interest rate. Functional form of relationship between currency ratio with other variables is shown as follows:

$$CR = f(TB, FD, RS, i, ED) \qquad (1)$$

Where:

CR = Currency Ratio

TB = Tax Burden

FD = Financial Development

RS = Regime Strength

i = Interest Rate

ED = Level of Higher Education

Equation (1) shows that tax burden positively impacts the informal sector measured by currency ratio, and all other variables such as financial development, regime strength, interest rate and level of higher

education negatively effect of size of shadow economy. Following econometric form of equation (1) is used for estimation.

$$CR = \beta_0 + \beta_1 TB + \beta_2 FD + \beta_3 RS + \beta_4 i + \beta_5 ED + \mu \qquad (2)$$

Literature prevailing on the issue predicts that $\beta_1 > 0$ and $\beta_2, \beta_3, \beta_4, \beta_5 < 0$. Study used Auto-regressive Distributive Lag (ARDL) technique to estimate the equation (2). The ARDL model assists in addressing some of the issues related to the traditional currency demand approach. The auto regressive distributed lags model allows the use of variables integrated of order I (0) and I (1) in the model and can be helpful in producing long run relationship between the dependent and the independent variables. According to Pesaran and Shin (1999), the estimators based on the ARDL model are super consistent and valid inferences linked with long run parameters can be chalked down with the use of customary normal asymptotic theory. Furthermore, they also suggest that the model is sufficient to correct serial correlation of the residuals and address the problem of endogeneity and non-stationarity. Equation (3) is the ARDL version of equation (2) which shows the short run as well as long run dynamics of the model.

$$\begin{aligned}\Delta CR_t = {} & \lambda_0 + \lambda_1 CR_{t-1} + \lambda_2 TB_{t-1} + \lambda_3 i_{t-1} + \lambda_4 FD_{t-1} + \lambda_5 RS_{t-1} + \\ & \lambda_6 ED_{t-1} + \sum_i^k \alpha_{1i} \Delta TB + \sum_0^k \alpha_{2i} \Delta i_{t-1} + \sum_0^k \alpha_{3i} \Delta FD_{t-1} + \\ & \sum_0^k \alpha_{4i} \Delta RS_{t-1} + \sum_0^k \alpha_{5i} \Delta ED_{t-1} + U_t\end{aligned} \qquad (3)$$

Where subscript t indicates time period, currency ratio (CR) is the ratio of M_0 with respect to M_2 (M_0 is the currency in circulation and M_2 is broad money), Tax Burden (TB) is the ratio of aggregated tax revenue to nominal GDP, interest rate (i) is measured by nominal interest rate, Regime Strength (RS) is measured by regime durability, Level of Higher Education (ED) is measured by the total enrollment in the universities and colleges and finally Financial Development (FD) is measured by the domestic credit provided to private sector by the banking sector as a percentage of GDP and U_t is the error term.

Following Arby et al., (2010), following equation is used to calculate the volume of informal sector of Pakistan.

$$\varepsilon_t = \frac{Y_i}{Y} = \frac{\lambda_2 TB + \lambda_6 ED}{m_t} \qquad (4)$$

Where $\frac{Y_i}{Y}$ is the size of shadow economy with respect to official sector of Pakistan, λ_2 is the estimated coefficient of Tax Burden (TB) variable, λ_6 is the estimated coefficient of level of Higher Education (ED), and m_t is money demand ratio i.e. M_2 to M_1.

VARIABLE SPECIFICATION AND DATA SOURCES

Currency Ratio variable is designed by dividing M0 (currency in circulation) to M2 (broad money) that measures the amount of currency outside the banks with respect to the total money supply. The tax revenue to GDP measures the tax burden in an economy. Regime Strength/durability shows the strength of the government regime in terms of time in office before the latest regime change i.e. from democracy to dictatorship and vice versa. It takes into account the first year of regime change as 0 and then adds 1 for each subsequent year until there is another change in the regime. Money market interest rate has been taken as a proxy for the opportunity cost for holding money. It is defined as the interest that is paid on interest bearing accounts and is higher than the saving accounts. Financial Development is measured by domestic credit to private sector as a percentage of GDP. For the level of higher education, total enrolment in universities and colleges are considered. Money supply M1 and nominal GDP have also been taken into account to calculate the size of informal sector of Pakistan.

The data for money Supply M0, M1, M2 and enrollment in universities and colleges are taken from Pakistan's Handbook of Statistics. Money market interest rate and nominal GDP have been extracted from International Financial Statistics. The data for tax revenue to GDP ratio and domestic credit to private sector is taken from the World Development Indicators. Lastly, regime durability is taken from Polity IV data set.

IV. EMPIRICAL RESULTS AND DISCUSSION

Study used time series data from 1972 to 2015 to estimate the volume of shadow economy of Pakistan, using ARDL estimation method. Results of

unit root test predict that money market interest rate and regime durability series have I(0) order of integration (stationary at level) and all other variables are integrated of order I(1)[8]. In ARDL estimation technique, selection of optimal lag length is important, as the variation in F-statistic is highly dependent on the included lags associated with the equation (3). Vector Auto Regressive (VAR) lag selection criteria is used and values of Akaike, Shwartz, and Hannan Quin criterion suggest that optimum lag to be the first lag, as shown in Table 1.

TABLE 1

VAR Lag Selection

Lags	LogL	LR	FPE	AIC	SC	HQ
0	-132.68	NA	3.49e-05	6.76	7.02	6.86
1	68.531	333.72*	1.13e-08*	-1.29*	0.46*	-0.65*

The optimal length of Lag is shown by (*)

After selection of optimal lag length, the short run dynamics of the variables are tested, and results presented in Table 2 indicate that all short run coefficients of variables are highly significant and signs are as per predictions of previous studies.

TABLE 2

Results of Short Run Dynamics of Variables

(Dependent variable: Currency Ratio)

		Coefficients		**T-statistics**	
Currency Ratio (-1)		0.4919		4.81***	
Tax Burden		0.9311		3.02***	
Interest rate (-1)		-0.0042		-2.26**	
Financial Development		-0.0033		-3.37***	
Regime Strength		-0.0029		-2.79***	
Higher Education		-0.0153		-4.62***	
C		0.3311		5.16***	
R^2	0.9256	DW	1.89	F- Stat.	62.19***
Adj. R^2	0.9107	X_{LM} (Pr ob)	0.29	SIC	-5.07
		X_{hetro} (Pr ob)	0.61	AIC	-5.18

Note: ***, ** and * indicate 1%, 5% and 10% significance level, respectively

[8] For unit root results see appendix Table A-1.

ARDL Bound Test is applied to test the existence of long run equilibrium relationship among variables, and results shown in Table 3 reveal that the null hypothesis about the prevalence of no long run relation among the variables is rejected at 5% significance level. Besides, critical value of F-statistic is also above the upper bound value of the test. This propagates that there prevails a long run linkage between the dependent and independent variables.

TABLE 3

Result of ARDL Bound Test

Test statistic	Value	K
F-statistic	3.40**	5
Significance	I(0) Bound	I(1) Bound
10%	2.08	3.0
5%	2.39	3.38
2.5%	2.70	3.73
1%	3.06	4.15

Note: ** indicates 5% level of significance

Following Table 4 presents the long run coefficients and error correction term estimated through ARDL method. Results indicate that long run coefficients are providing statistical significance and have signs as per prediction of theory and previous studies. Coefficient of tax burden shows the elasticity which predicts that 1% increase in tax to GDP ratio will result in 1.83% increase in currency ratio, hence, increases the volume of shadow economy in Pakistan. Empirical findings of previous studies suggest that harsher tax regulations cause people to move out of the official market operations and indulge in illegal economic activities. The higher the tax burden, the greater are the incentives to seek employment in the informal sector. The monetary approach to measurement of shadow economy assumes that all the transactions taking place in the economy are based on cash transactions. So, higher currency ratio signifies an inflated size of illegal market operations. This finding is also supported by the results of previous studies such as Tanzi (1983) and Arby et al., (2010).

Monetary approach also predicts that increase in rate of interest increases the opportunity cost of holding money, thereby reducing the demand for currency. The empirical results of the study reveal that there is a negative relationship between the market interest rate and the

currency demand. Apart from interest rate, financial development also leads to a decline in the unofficial sector. A regulated financial sector increases the role of the banks and other financial institution in business transactions and reduces cash dealings in an economy. This helps in shrinking the magnitude of the informal sector as predicted by the results of the study in hand.

TABLE 4

Long Run Results of ARDL

(Dependent Variable: Currency ratio)

Variable	**Coefficients**	**T-statistics**
Tax burden	1.8326	4.08***
Interest rate	-0.0096	-3.63***
Financial development	-0.0066	-3.34***
Regime Strength	-0.0057	-2.51**
Higher Education	-0.0301	-6.78***
C	0.6519	6.36***
$EC_{(t-1)}$	-0.4319	-4.17***

Note: 1%, 5% and 10% significance level are shown by ***, **, *, respectively

Another finding of the study is relationship between currency ratio and regime strength (regime durability). Results of the study indicate a negative relationship between currency ratio and regime strength, which implies that social polarization, autocratic authority pattern and instability of government regimes cause insecurity among the nation. This causes people to indulge in the informal sector in order to earn more for the bad financial times to come. When the political stability is higher in a country, there is low level of corruptive activities and reduced size of hidden economy. These findings are supported by the empirical findings of previous studies like Elgin (2010) and Elbahnasawy et al. (2016). Another important finding of the study is, 100% increase in level of higher education will bring 3% decrease in currency ratio, resulting in reduction of the size of Pakistan's informal sector. This implies that level of higher education in the country inculcates the sense of morality in the general population therefore reducing the size of the underground economy.

In addition, coefficient of error correction term is negative and significant, which implies that 43.19% short run disequilibrium will be

adjusted towards long run equilibrium in the first year. Study also used CUSUM and CUSUMSQ tests to test the stability of the model, and results are shown by Figure-1 and Figure-2. Both figures indicate that estimated residuals are within the 5% bound; signifying that performance of the model remained stable during the sample period of the study.

FIGURE 1

Cumulative Sum of Recursive Residuals

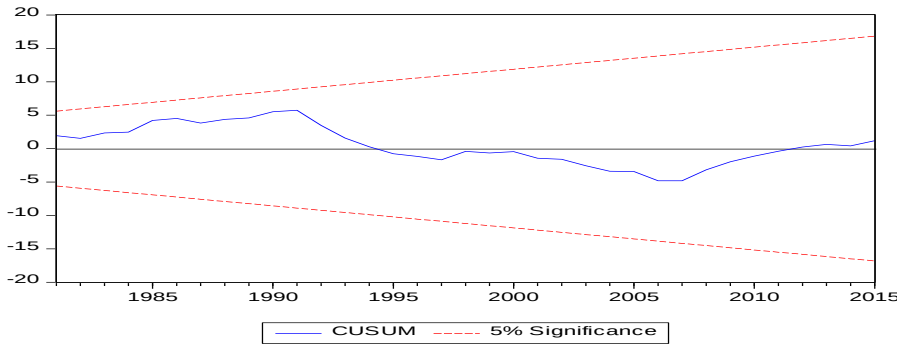
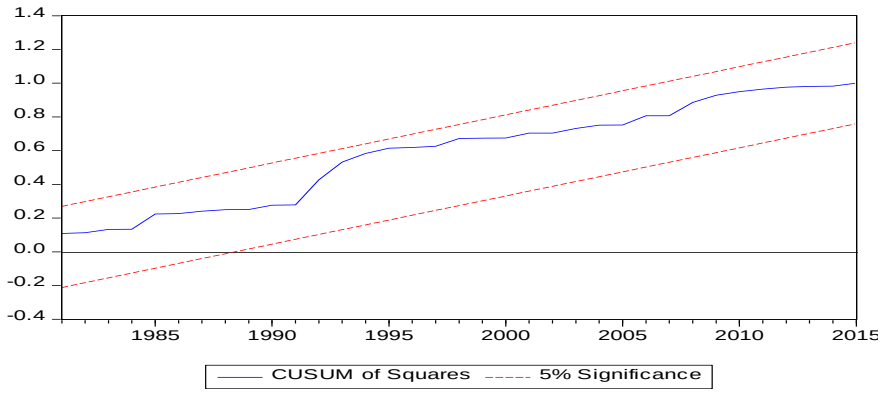


FIGURE 2

Cumulative Sum of Square of Recursive Residuals



SIZE OF THE SHADOW ECONOMY OF PAKISTAN

After establishing the long run relationship, study calculated the size of shadow economy (SE) of Pakistan by using equation (4), and calculated results are compared with previous studies; Arby et al., (2010)

and Gulzar et al., (2010) in Table 5. The previous studies[9] did not control the variables of regime durability and financial development. The current study takes into account both the aforementioned variables while calculating the size of the informal sector. Calculated values of the study of the shadow economy of Pakistan are little bit higher than the values of previous studies which might be the result of higher estimated value of tax burden as compare to mentioned studies. According to Tanzi (1983), the magnitude of the coefficients might change depending upon the types and the number of variables used in the equation, causing the size of the shadow economy to vary across studies. Tanzi (1983) postulates that the direction of the shadow economy over the period is more important rather than the size of the shadow economy. Findings of the study also reveal that volume of shadow economy of Pakistan remained higher during the decade of 1990s, and it was highest in 1998 (49.38% of GDP). It is also observed that size of shadow economy remained higher during the era of democracy as compared to dictatorship.

TABLE 5

Estimates of the Pakistan's Shadow Economy

Years	SE % of GDP (Study Result)	SE % of GDP (Arby, et.al., 2010)	SE % of GDP (Gulzar, et.al., 2010)
1966	-	24.4	-
1967	-	29.2	-
1968	-	28.8	-
1969	-	33.1	-
1970	-	36.0	-
1971	-	32.3	-
1972	36.37	29.8	-
1973	35.53	29.3	27.66
1974	35.99	27.1	26.56
1975	29.16	25.9	26.96
1976	32.99	28.4	27.54
1977	31.36	27.9	27.14
1978	33.73	29.2	27.13
1979	32.37	31.1	26.77
1980	35.92	33.3	26.32
1981	33.25	33.1	26.17

[9] Arby et al (2010) and Gulzar et al (2010).

Years	SE % of GDP (Study Result)	SE % of GDP (Arby, et.al., 2010)	SE % of GDP (Gulzar, et.al., 2010)
1982	35.70	31.6	26.41
1983	35.71	32.8	25.65
1984	35.58	32.1	21.83
1985	33.39	29.6	25.97
1986	35.08	35.2	31.02
1987	32.50	35.4	26.57
1988	30.71	32.7	21.57
1989	31.49	32.5	20.45
1990	30.30	30.0	24.74
1991	29.16	26.1	16.48
1992	36.44	27.7	16.44
1993	38.31	30.1	26.69
1994	39.11	33.3	14.61
1995	42.50	34.8	14.37
1996	45.96	36.8	22.00
1997	46.64	36.4	18.88
1998	49.38	36.4	25.36
1999	36.44	35.2	20.99
2000	33.32	26.0	29.89
2001	22.59	26.3	28.15
2002	21.57	27.0	32.85
2003	21.34	29.0	26.85
2004	20.82	24.9	22.75
2005	20.47	18.7	21.51
2006	28.82	18.3	21.48
2007	29.87	18.9	22.42
2008	29.86	19.6	20.35
2009	30.82	-	19.23
2010	29.39	-	18.23
2011	27.54	-	-
2012	30.42	-	-
2013	26.63	-	-
2014	27.04	-	-
2015	27.16	-	-

V. CONCLUSIONS AND POLICY IMPLICATIONS

The study used ARDL Bound Test approach to estimate the size of shadow economy of Pakistan using currency ratio as dependent variable, and tax burden, financial development, interest rate, regime strength and higher education enrolment as independent variables. Empirical findings

of the study predict that increase in tax burden (measured by tax to GDP ratio) promotes demand for currency and hence increases the volume of shadow economy. Higher degree of financial development and regime strength, an increase in interest rate and improvement in higher education enrolment will be helpful in reducing the size of informal sector of Pakistan. Results of the study predict that 1% increase in tax burden will increase the size of informal sector by 1.83%, and 100% increase in enrolment at university and college level will lower the volume of shadow economy by only 3.1%. Results of all diagnostic tests show that estimated model is stable and free from time series issues such as autocorrelation and serial correlation. Important observation of the study is that volume of informal sector of Pakistan remained higher during the decade of 1990s and was highest in 1998 (49.38% of GDP). It is also observed that size of shadow economy was less in the era of dictatorship as compared to democracy. Results of the study suggest that economic managers of Pakistan economy should focus on tax base instead of adjusting the tax brackets. Besides, it is also suggested that policies should be framed to enhance the enrolment at university and college level to reduce the size of shadow economy of Pakistan.

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APPENDIX

TABLE A-1

Unit Root Test Results (Augmented Dickey Fuller Test)

Unit root	Currency Ratio		Tax burden		Interest Rate	
	Trend and intercept	Intercept	Trend and intercept	Intercept	Trend and intercept	Intercept
Level	-3.59	-1.23	-1.82	-1.49	-2.55	-2.68**
First difference	-6.01***	-6.00***	-6.05***	-5.66***	-5.59***	-5.61***

Unit root	Financial Development		Regime Strength		Higher Education	
	Trend and intercept	Intercept	Trend and intercept	Intercept	Trend and intercept	Intercept
Level	-1.77	-1.61	-3.26**	-3.14***	-0.90	1.07
First difference	-5.37***	-5.38***	-6.82***	- 6.91***	-6.23***	-3.51**

TABLE A-2

Descriptive Statistics

	Currency Ratio	Interest Rate	Tax burden	Regime Strength	Financial Development	Log Enrollment
Mean	0.246	8.72	0.112	3.364	23.82	11.713
Median	0.251	8.86	0.109	3.00	24.21	11.228
Maximum	0.350	12.47	0.142	10	29.79	14.419
Minimum	0.155	2.13	0.091	0	15.39	9.770
St. Deviation	0.057	2.35	0.014	2.754	3.57	1.382
Skewness	-0.053	-0.66	0.396	0.513	-0.62	0.608
Kurtosis	1.884	3.49	2.094	2.301	3.02	2.117
Jarque-Bera	2.305	3.66	2.654	2.828	2.82	4.162
Probability	0.316	0.16	0.265	0.243	0.24	0.125
Sum	10.83	383.68	4.938	148.0	1047.95	515.41
Sum Sq. Deviation	0.14	237.92	0.008	326.19	548.19	82.146
Observations	44	44	44	44	44	44

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TECHNOLOGICAL ADVANCEMENT AND TOTAL FACTOR PRODUCTIVITY GROWTH: A PANEL DATA ANALYSIS OF ASIAN GROWING ECONOMIES

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Abstract. The paper empirically examines the potential determinants of total factor productivity (TFP) growth in order to assess the role of technological advancement in promoting productivity. The particular emphasis is placed on intangible sources such as research and development and information and communication technology in defining the TFP growth. Fixed effect with robust standard errors panel data approach is applied for estimation in the case of nine Asian growing and emerging economies over the period 1996 to 2015. The results indicate that information & communication technology, Governance and gross domestic investment as a percentage of GDP yield positive and statistically significant impact on TFP growth of selected countries. The research and development expenditure although yield positive impact but not statistically significant. Policy attention must be committed to provide universal information & communication technology coupled with broadband connectivity to facilitate the ICT use, make substantial investments to improve R&D capability and quality of capital stock and necessary steps should also be taken to improve Governance and education system to enhance TFP growth.

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JEL Classification: O30, O32, O40, O50

I. INTRODUCTION

The developing countries are suffering from a number of economic problems like low output growth, poverty, inflation, unemployment, high trade and budget deficit and low saving and investment rate. Therefore, the living standard of people in developing countries is poor as compared to developed countries. The only way to improve the living standard is the sustainable output growth. The sustained economic growth can be achieved either by increasing the growth of factors of production or by improving the total factor productivity (TFP). Total factor productivity growth is the part of overall growth which is not because of increase in inputs but is due to better technology, innovation, specialization and better organization (World Bank, 1993). It is a change in overall growth at given quantity of inputs. The enhancement of TFP means the enhancement of a country's capability of producing more output with the same level of inputs. Through the enhancement of TFP, the long run output growth is possible even with scarcity of real factors of production. The TFP growth leads to the better and efficient use of available resources. The developing countries having limited factors of production can achieve sustainable growth through advancement of total factor productivity and its advancement is dependent on technological advancement. It is the most important indicator of long-run economic prospects. Increasing the total factor productivity can raise living standard because it increases real income of people which enhances their ability to purchase goods and services, improve housing and education, enjoy leisure and contribute to social and environmental programs. This study is aimed to investigate the ways of enhancing TFP growth.

It is a bitter reality that almost all developing countries face the scarcity of technology crucial to boost the productivity of factors of production. On the other hand, high-tech developed countries seriously invest on R & D that is why most of technology is clustered in developed counties. The role of improved technology has been a central part of the growth strategies of technologically advanced countries. The import of

high-tech products, Technology embodied machinery and intermediate goods and foreign direct investment (FDI) are channels of external technology exposures. The MNCs import modern machinery along with the ideas and knowledge generated through cumulated domestic R & D capital stock of parent country. Knowledge and technology were treated as significant endogenous determinants of economic development and as drivers of TFP growth by the endogenous growth theory originated and advocated by Romer (1990), Lucas (1988), Grossman and Helpman (1991) and Aghion and Howitt, 1998.

In this era of digitization, more than 3.2 billion people of the World are users of the internet and digital communication between citizens, companies and countries that is considered as a critical driver of productivity growth. It is referred to as post-industrial revolution and also referred to comprehensive changes brought by digital computing and ICT[1] revolution which includes computer, mobile phones, smart phones, tablets, digital cellular phones and internet connectivity. Digital revolution and ICT have affected the productivity by changing the working conditions and workplaces altogether[2]. The advances in transportation, communication, financial services, Governance, energy system and variety of other technological advances have affected the productivity. Therefore, revisiting the potential determinants of TFP growth is very important and crucial in this present era.

Over the last few decades, Asia has been the major contributor to the World economy which is driven by its cheap labor. The high GDP growth of Asian economies during the last few decades has transformed Asia from low to middle income region but the real challenge for Asian growing economies is to sustain growth which mainly depends on improvement in total factor productivity. According to the ADB report 2016 "The Asia 2050" if the Asia continues with the same growth trajectory, it could achieve 52% share of World GDP by 2050. The report concludes that this achievement is only possible if Asian economies transform their economies into knowledge based economies as the knowledge is significant promoter of TFP. The poverty level in the

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[1] The index of information and communication technology

[2] ICT usage enhances the innovation which induces higher total factor productivity growth.

region remains high and resources are insufficient to tackle the challenges. Therefore, it is essential for Asia to seek a different strategy not only for sustainability of economic growth but also to accelerate it. The enhancement of TFP growth through innovation and technological advancement is the only option to meet region's challenges. Human capital, R&D, ICT and Governance are the four main pillars of TFP growth.

Rapidly advancing technology has brought big changes in the whole structures of the economies and has affected the total factor productivity. Information and communication technology has a number of measurements and interpretations but the past studies on ICT and productivity concentrated only on a single dimension like hardware side which just includes computers and computing related equipments. Therefore, productivity paradox remained unresolved and the impact of ICT on productivity growth needs to be examined by taking usage side of ICT and this study aims to do that. In this era of knowledge based economies having rapidly changing technology, innovation and digitization it is very important to re-visit the sources of total factor productivity growth. This study aims to contribute to the growth literature by empirically investigating the determinants of TFP growth.

In order to assess the role of technological advancement and innovation in promoting TFP growth, the objective of this study is to investigate the potential determinants of TFP growth by empirically examining the impact of increased use of ICT[3], Human capital, R&D, Governance, exposure to external technology, Financial deepening and other control variables on TFP growth of nine Asian growing economies and recommend the suitable policies for its enhancement. For this purpose, the study constructed the indices of TFP, information & communication technology (ICT), exposure to external technology (EET) and financial deepening (FD) by using the appropriate statistical and mathematical procedure. The specific emphasis of present study is to examine the knowledge based determinants of TFP growth which is unique contribution to the growth literature. Therefore, this study has

[3]The use of information communication technology is measured by the Mobile cellular subscriptions, number of internet users, number of PCs, fixed broad band subscription and fixed telephone subscription.

very important implication for the achievement of long-term sustainable output growth and better living standard of developing countries.

II. LITERATURE REVIEW

A lot of literature has shown that the countries which have low growth performance are those which are unable to develop appropriate technological capacities. There are also debates in literature regarding measurements of total factor productivity, its potential determinants and specification issues or methodology to be used. In this section a comprehensive review of the theoretical and empirical literature is provided.

The technology and knowledge has been considered as a significant determinant of growth since the endogenous growth theory by Lucas (1988), Romer (1986, 1990) and Grossman and Helpman (1991). Advancement in technology is crucial for developing economies to catch up with high-tech economies. Since the 1960s, technological differences have gained support to be the main determinant of growth and development differentials (Abramovitz, 1986). The technology as a driver of TFP growth was also advocated by Aghion and Howitt (1998.)

Previous studies examined the impact of ICT investment on productivity and they found productivity paradox of ICT. In other words, it was expected that ICT investment has the key role in boosting productivity but they found unexpected results and no major contribution from ICT investment in productivity growth was found. The studies on productivity paradox include Zachary (1991), Brynjolfsson (1993, 1994) and Greenwood and Yorukoglu. (1996). According to Sichel (1997) there is no clear finding and consensus among the researchers regarding the contribution of ICT investment to the productivity.

Ulku (2004) suggests that innovations measured by the proxy of patent application are important determinant of GDP per capita and TFP. Only large OECD countries are found to be able to stimulate their innovation by investing in R&D and small OECD countries are found to be in the learning stage to promote their own innovation. It is also found that innovation affects the growth rate only for short period of time which is opposite to the findings of many studies, such as, Romer (1990). Potterie and Guellec (2001) investigated the impact of R&D on TFP

growth of 16 OECD economies over the period 1980 to 1998. The results show that R&D has important role for TFP growth.

Drucker (2007) analyzed the difference between the traditional economies and today's evolving knowledge based economy in 21st century; mega projects of investment will be in knowledge management, scientific and technological advances and innovations in which human capital will be the sole factor and knowledge will be a transferable source on different prices at different places. Thus effective application and efficacious use of knowledge, skills and attitudes will be a pre-requisite condition to meet with national and international competition in order to achieve economic development.

Krammer (2008) examined the role of knowledge spillover via FDI and international trade on growth in the case of European and transition countries from 1990 to 2006 by using panel co-integration test. The result of study showed that FDI and trade both were main source of foreign technology transformation. The impact of technology through trade is significant as compare to FDI. The absorption capacity of host countries measured with domestic R&D and human capital found to be crucial for productivity. The study concluded that technology transfer via liberalization was very beneficial for developing countries but effective utilization of this technology depends on absorption capacity of these countries. However, the role of some important sources of external technology, like imports of high tech machinery and capital good and licensing have not been examined by this study.

Saba (2016) estimated the total factor productivity of Indian economy by using growth accounting approach for the period 1961 to 2008. The study found that the average growth of TFP was 1.5% over the period 1961-2008. The TFP growth from 1961 to 1970 was although positive but very low and zero. The study also observed that TFP growth of manufacturing sector remained negative during 1971 to 1980 suggesting technological regress during this period. The reactions of low productivity were due to external shocks like oil price, war, drought along with stick and rigid regulations.

Alves, R.P (2017) analyzed the main reasons of showdown in productivity of Portugal since 1990s by examining its major determinations. Because of economic integration of the Portugal into

growing markets its productivity was expected to converge to the developed economics but it did not happen paradoxically. The study identified that the main reasons for this slowdown in productivity were the misallocation of resource and market inefficiencies. The policy focus remained in job creation without sustainable improvement in resource allocation. The study proposed stable and effective economic policies with continuous evaluation both the public and private sectors. It was also found that there were too small, dependent and too indebted firms in Portugal and heavily dependent on domestic demand. Therefore, these firms need to be integrated into global value chains to catch up with the global prettier of productivity.

Bergeaud, A et al. (2017) analyzed the long terms trends in GDP growth and TFP growth over the period 1890-2015 in the case of four most developed areas of the world: The US, the Europe, the British and Japan, The GDP growth was decomposed into its components which were working time employment, capital intensity. TFP growth and population found to be the main determinant of changes in GDP growth. The study also attempted to investigate the factors affecting the TFP growth therefore the impact of quality of factors and technology diffusion on TFP growth was examined. The quality of factors was measured by average age of capital machinery and average level of education. The shocks of technology were measured by ICT and electricity. The result showed that both ICT and electricity waves had positive and significant association with TFP growth but the impact of ICT wave was smaller than the impact of electricity. However, this study accepted that the large part of productivity still remained unexplained and further future research is required to explain the drivers of TFP growth. It concluded that the accurate fore-casting of growth was difficult because of lack of understanding and knowledge about the drivers of GDP and TFP growth. The study recommended that innovations should be promoted and opportunities of new technology shocks like ICT revolution should not be missed in order to enhance TFP growth.

Exposure to the foreign technology through various channels of technology transformation is a widely explored topic in economic literature. Bulk of studies agrees on the key findings that the major channels of technology diffusion are foreign direct investment, trade in products, transmission of techniques, knowledge and people movement

of human resource from one country to other. Foreign R&D capital stock is an effective channel of technology transmission via capital and technology imports. The impact of foreign technology depends on absorption capacity of the host country which is measured by level of human capital and R&D. The work on foreign technology transformation includes the studies by Coe and Helpman (1995), Eaton and Kortum (1996), XU and Wang (2000), Melitz (2003), Hoekman, et al. (2005), and Boermans (2010). However, the impact of exposure to external technology on TFP growth has not been examined empirically.

The studies review above suffered some serious shortcomings. The mostly previous studies used total labor force or employed labour force as an input in TFP measurement which is inappropriate. The employed labour force after adjusting with number of hours worked is appropriate measure. The adjustment of labour force matters for accurate measurement of TFP. Secondly, most of previous studies used gross capital stock as an input in TFP calculation. This measure of input is also not appropriate. The real capital stock which represents actual number of machinery in physical form instead of nominal term is accurate measure of capital input for TFP estimation. Thirdly most of studies used nominal GDP for measuring TFP which is also not appropriate because real GDP reflects the actual performance of economy by excluding the inflationary factor. Therefore, real GDP should be used in TFP measurement. All mentioned shortcomings have been addressed in present study.

All past studies vary in their definition of ICT and in their method of measuring ICT. Due to rapidly developing technology, higher productivity is expected but previous studies have mixed finding and have no clear cut evidence regarding the impact of this enormous improvement in ICT on productivity. Information and communication technology has a number of measurements and interpretations but the past studies on ICT and productivity concentrated only on a single dimension like hardware side which just includes computers and computing related equipment. Therefore, productivity paradox remained unresolved and the impact of ICT on productivity growth needs to be examined by taking usage side of ICT and this study aims to do that.

III. THEORETICAL FOUNDATION

The theoretical foundation is a structure which supports exiting theories and concepts related to particular research topic. It describes the existing and previous theories which enlightens why research problem of specific topic of interest exists. The existing theories are framed to predict, explain and understand phenomenon in order to extend the knowledge within particular assumptions.

PRODUCTIVITY INDEX

Generally, the index of productivity can be represented as a ratio of output index to input index which measures the ability of inputs to produce output that is:

$$A_t = \frac{Q_t}{X_t} \qquad \text{For t} \quad = 0, \ldots. \text{T}$$

Where A_t is productivity index, Q_t and X_t are output and inputs quantity indices, respectively. If the input index X_t contains single input then the productivity index A_t will be partial productivity index, for example, labor productivity or capital productivity index. However, there are limitations of partial productivity index like omitted inputs bias. For example, increase in productivity of labor may be because of increase in the quantity of capital per worker which is an omitted input in the labor productivity measurement rather than the actual increase in labor productivity. If input index X_t contains two or more inputs, then productivity index A_t becomes the total factor productivity (TFP) index. Mostly it is constructed using two inputs labor and capital. Total factor productivity index is constructed by using disaggregated quantities of inputs. The inputs quantities are needed to be weighted by their respective shares in output while developing the inputs indices. Most commonly used concept of TFP growth in literature is as under[4].

TFP growth = Output growth – input(s) growth

[4]Kathuria et al., (2013).

This measure of TFP growth includes all the residuals after accounting for the growth of inputs that is why it is also known as "the index of ignorance"[5].

GROWTH ACCOUNTING APPROACH

The growth accounting approach is based on Cobb-Douglas aggregate production function which assumes constant returns to scale and Hicks neutral technical progress[6]. The production function for aggregate output can be written as under.

$$Q_t = A(t)F(K, L) \qquad 1$$

The above equation reveals that aggregate output (Q_t) is the function of capital (K), labor (L) and TFP (A_t). Total Factor Productivity A(t) accounts for the shift of production function over time and capture the effect of long term technological advancement or technical change in total output. Taking the logarithmic differential of equation (1) both side.

$$\frac{dQ}{dt} = \hat{A}F(K, L) + A\frac{\partial F}{\partial K}\frac{\partial K}{\partial t} + A\frac{\partial F}{\partial L}\frac{\partial L}{\partial t} \qquad 2$$

Replacing $\frac{dQ}{dt} = \hat{Q}, \frac{\partial K}{\partial t} = \hat{K}$ *and* $\frac{\partial L}{\partial t} = \hat{L}$

$$\hat{Q} = \hat{A}F(K, L) + A\frac{\partial F}{\partial K}\hat{K} + A\frac{\partial F}{\partial L}\hat{L} \qquad 3$$

Dividing the both side of equation 3 by Q

$$\frac{\hat{Q}}{Q} = \frac{\hat{A}}{A} + A\frac{\partial F}{\partial K}\frac{K}{K}\frac{\hat{K}}{Q} + A\frac{\partial F}{\partial L}\frac{L}{L}\frac{\hat{L}}{Q} \qquad 4$$

By putting $\frac{\partial Q}{\partial K} = A\frac{\partial F}{\partial K}$ *and* $\frac{\partial Q}{\partial L} = A\frac{\partial F}{\partial L}$ then equation 4 become

[5]Abramovitz (1956).

[6] See Solow (1957).

$$\frac{\hat{Q}}{Q} = \frac{\hat{A}}{A} + \frac{\partial Q}{\partial K}\frac{K}{Q}\frac{\hat{K}}{K} + \frac{\partial Q}{\partial L}\frac{L}{Q}\frac{\hat{L}}{L} \qquad 5$$

Denoting $\frac{\partial Q}{\partial K}\frac{K}{Q}$ by F_K and $\frac{\partial Q}{\partial L}\frac{L}{Q}$ by F_L

$$\frac{\hat{Q}}{Q} = \frac{\hat{A}}{A} + F_K\frac{\hat{K}}{K} + F_L\frac{\hat{L}}{L}$$

Where F_K and F_L are the relative output factor shares of capital and labor respectively

Now denoting $\frac{\hat{Q}}{Q} = q_t, \frac{\hat{K}}{K} = l$ *and* $\frac{\hat{A}}{A} = TFPG$

$$q = TFPG + F_K k + F_L l$$

or

$$TFPG = q - F_K k - F_L l \qquad 6$$

In equation 6 *TFPG* is the growth of total factor productivity, *q* represents the growth of real GDP, *k* is growth rate of capital stock and growth rate of labor input. If the data on real GDP growth, growth rate of capital stock and labor and their factor shares is available then TFP growth can be measured by equation 6.

The TFP index can be written as a ratio of output index and inputs index as under:

$$TFP_t = \frac{Q_t}{X_t} \qquad 7$$

Where Q_t is output index which is based on growth of real GDP relative to base year and X_t is combined index of labor and capital based growth rates of both factors of production relative to base year and weighted with their respective shares in gross output.

Equation 7 can be written as:

$$TFP_t = \frac{Q_t}{F_K K_t + F_L L_t} \qquad 8$$

Taking the natural logarithm on both side of equation 8

$$\ln TFP_t = \ln Q_t - F_K \ln K_t - F_L \ln L_t \qquad 9$$

Taking lag on both sides of equation 9

$$\ln TFP_{t-1} = \ln Q_{t-1} - F_K \ln K_{t-1} - F_L \ln L_{t-1} \qquad 10$$

Subtracting equation 10 from equation 9

$$\ln TFP_t - \ln TFP_{t-1} = \ln Q_t - \ln Q_{t-1} - \{F_K(\ln K_t - \ln K_{t-1}) + F_L(\ln L_t - \ln L_{t-1})\} \qquad 11$$

where

$\ln TFP_t - \ln TFP_{t-1} = TFPG$, $\ln Q_t - \ln Q_{t-1} = q$, $\ln K_t - \ln K_{t-1} = k$ and $\ln L_t - \ln L_{t-1} = 1$

TFPG is the growth of total factor productivity, *q* represents the growth of real GDP, *k* is growth rate of capital stock and *l* growth rate of labor input replacing in equation 11.

$$TFPG = q - F_K k - F_L l \qquad 12$$

The equation 12 shows that the index number approach derives the same results as drawn through the growth accounting approach in equation 6. Therefore, the index number approach of TFP measurement is an extension and complement of the growth accounting approach.

Growth accounting approach to measure the TFP has the following merits. First, growth accounting or Solow residual approach has been extensively used in the productivity growth literature as it is easy and simple to apply. Second, it can also be applied even in the case of missing data for some time periods. Thirdly, when data is available only for small number of years then the growth accounting and index number approach are the only methods which can be applied for TFP estimation. Last, it gives TFP estimates in detail for each period in order to monitor the growth performance of the economy regularly.

IV. DATA AND METHODOLOGY

The study includes panel of nine Asian growing and emerging economies (China, Hong Kong, India, Korea, Malaysia, Singapore, Pakistan,

Thailand and Turkey) over the period: 1996 to 2015. The growing and emerging countries having data available on all the variables used in the analysis have been selected from Asian region. Turkey is one of the top emerging economies of Western Asia in terms of annual growth rate of GDP (7.4%) ahead of Korea, Rep. (3.1%) Malaysia (5.9%), Singapore (3.6%), China (6.9%), India (6.6%), Pakistan (5.7%), Thailand (3.9%) and Hong Kong (3.8%) according to World bank data 2017, despite slowdown of Gross Domestic Product by 4.7% in 2009 due to financial scarcity, Turkey achieved 8.5% growth rate in 2010 very next year to the crisis and 11.11% in 2011. The GDP of Turkey increased by 105%, from 2004 to 2014 i.e. it doubled according to the International Monetary Fund's report (2015). That is the reason for including Turkey in the productivity analysis of emerging markets of Asia. The purpose of study is to analyze the productivity growth and therefore difference in economies does not matter in this regard. A balanced panel data on yearly basis is used. The data on different variable is collected from Penn World Tables, OECD's Main Science and Technology Indicators and World Development Indicators (WDI). The other sources of data are given in Table 1. All data is expressed as percentage of GDP, percentage of population or as percentage of imports/exports in order to maximize the cross-country comparability of panel data. In this way the influence of data outliers can also be minimized. All the variables are used in logarithm form except Governance. Data on All the indicators used in the construction of indices are normalized and converted into a uniform scale ranging from 0 to 100 through mini-max method of normalization. The weights used for calculating the indices are determined by the method of Principal Components Analysis (PCA). The detail of indices is given in the Table 1.

The index number approach as an extension of growth accounting approach has been used to estimate TFP index. An alternative measure of two factors of production (labour and capital has been used) instead of traditional measures of these input factors. In traditional method which was mostly used in previous studies the labour is measured as total number of employed workers and capital is measured as gross capital stock in monetary terms such as dollars or rupees. In this study the employed workers after adjusting for hours of worked is used as an alternative input measure to estimate TFP index. Similarly, real capital

stock which is adjusted for inflation is used as an alternative measure of this input. The TFP index is measured at based year of 1990. The Shares of respective compensation in GDP of labour and capital has been used as weights to measure the TFP index[7]. However, in the case of Pakistan the weights of labour and capital measured by Ahmad, H.K. (2011) have been used.

The data of real GDP, capital stock, employed labour force, average annual hours worked and share of labour compensation in gross domestic product taken from 9.0 version of Penn World Table (PWT) is based on latest World Bank International Comparison Program (ICP), 2011 also known as benchmark year[8]. The data of capital stock is built up on the basis of investment assets having major four categories: structures, machinery, transport and other assets. Structures include residential and non-residential, machinery includes computer, printer, communication equipment and other assets contain software, intellectual property and other intangible assets. The data of real GDP has been revised and improved because of incorporation of latest ICP 2011 as a benchmark. This revision of real GDP data is very important for cross country comparison and analysis. The data of Gross R&D expenditure is taken from the database of OECD: Science, technology and innovation. It expresses the total expenditure on R&D including R&D within a country and funding from abroad but it excludes payments made by country for R&D to abroad. It consists of R&D expenditure in government sector, business sector, non-profit firms and higher education. The missing values in data are interpolated by the method of averaging the observations of preceding and succeeding years. However, in construction of an index if more observations are missing then zero weight is assigned to missing entries.[9]The variables are used in logarithm form in estimation.

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[7] For detail see *Robert C. Feenstra, Robert Inklaar and Marcel Timmer (2013)*

[8] For detail see Feenstra et al. (2015) also visit: "http://www.rug.nl/research/ggdc/data/pwt/v81/the_next_generation_of_the_penn_world_table.pdf" and "(http://www.rug.nl/research/ggdc/data/pwt/pwt-8.0)".

[9]Dreher, (2006)

TABLE 1

The Detail of Indicators Used in Indexes

Indicator	Sources of data	Variable weights (%)
Information & Communication Technology		
Internet users (per 100 people)	World Development Indicators	23
Mobile cellular subscriptions (per 100 people)	World Development Indicators	20
Personal Computer (per 100 people)	ECONSTATS™ and www.nakono.com	23
Fixed telephone subscriptions (per 100 people)	World Development Indicators and ITU	13
Fixed broadband subscriptions (per 100 people)	World Development Indicators	21
Exposure to external technology		
Imports of high-tech Manufactures (% of total Imports)	UNCTAD	30
Technology imports intensity (% of total imports)	UNCTAD	30
Foreign direct investment, net inflows (% of GDP)	World Development Indicators	25
Royalties and license fee payments (% of total services Imports)	UNCTAD and WDI	15
Financial deepening		
Domestic Credit by the Financial sector (% of GDP)	World Development Indicators	35
Financial system deposits (% of GDP)	World Development Indicators	35
Liquid liabilities (% of GDP)	World Development Indicators	30
Governance		
Government effectiveness	World Governance Indicators	16.7
Voice and accountability	World Governance Indicators	16.7
Regulatory quality	World Governance Indicators	16.6
Control of corruption	World Governance Indicators	16.6
Rule of law Kaufmann	World Governance Indicators	16.7
Political stability	World Governance Indicators	16.7

Source: Author's own calculation

In panel data analysis across autocorrelation of disturbances is likely to be present which leads to biased estimation of standard errors. To overcome this problem, the robust standard errors is used. Therefore, fixed effects with robust standard errors estimation technique is used in this study for estimation of model. The estimates obtained through this method are robust and arbitrary accommodate to contemporaneously (cross sectional) correlation, within cross-section serial correlation and

heteroskedasticity[10]. It indicates that estimated model has panel corrected standard errors robust to contemporaneous correlation, heteroskedasticity and serial correlation[11]. Redundant fixed effects test, Lagrange Multiplier Tests for Random Effects and Correlated Random Effects - Hausman Test are used for selection of the best and appropriate model and estimation technique.

V. MODEL SPECIFICATION

A lot of literature has shown that the countries which have low growth performance are those which are unable in developing appropriate technological capacities. The technology as a driver of TFP growth is advocated by Lucas (1988); Romer (1990); Aghion and Howitt (1998). Education and human capital are very important for productivity growth (Nelson and Phelps, 1966; Benhabib and Spiegel, 1994, 2005). Training, higher education and R&D help to enhance the productivity.

The financial deepening index indicates maturity of financial and banking sector which helps to improve the productivity by promoting the investment in all sectors of the economy. Olson et al. (1998), Kaufmann & Kraay (2002), Maurice and Wang (2004), Williams & Siddique (2008) and Everhart et al. (2009) conclude that there is positive and significant role of Governance in raising the level of productivity growth. Similarly, gross domestic investment-to-GDP ratio represents not only addition to the capital stock of the economy but also captures the improvement in the quality of capital stock. It is measured by the gross domestic investment as percentage of GDP. Ahmad, H.K. (2011) finds positive and significant relationship between investment to GDP ratio and TFP growth. The most of literature examining the impact of electricity on TFP finds that the overall effect varies across countries[12].

Foreign technology imported through trade openness is assumed to have positive impact on TFP because it has potential to acquire knowledge of production in the form of machinery and capital goods (Madsen and Philip, 2006). Similarly, FDI which is also one of the

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[10]Wooldridge 2002, p.148-153, Arellano, 1987 and E-views user Guide Ix.

[11]NihatTas, EmarahOnder and Ali Hepsen (2013)

[12]Fedderke and Bogetic, 2006 and Noumba Um, Vellutini and Straub (2009).

indicators of technological diffusion is also positively related to TFP because FDI brings new technology, know-how, knowledge and its positive externalities (Savvides and Zachariadis, 2005; Keller, 2001). For assessing the impact of all sources of external technology on TFP growth jointly, the index of "exposure to external technology" is developed[13].

Information and communication technology revolution which includes computer, mobile phones, smart phones, tablets, digital cellular phones and internet connectivity positively affects the productivity by changing the working conditions and workplaces. The positive contribution of ICT has also been advocated in pervious literature[14]. For assessing its impact on TFP growth the index of ICT has been developed in present study. Research and development can affect TFP growth in two ways, firstly it directly stimulates innovation and secondly it improves the ability to learn and imitate external technology. The second role of R&D is captured through its interaction with exposure to external technology. The role of interaction between imported technology and domestic capacity building, such as, R&D in boosting productivity has been advocated by Mayer, (2001). On the basis of above discussion, the following model is specified for analysis:

$$TFP_{it} = \alpha_0 + \alpha_1(RD)_{it} + \alpha_2(ICT)_{it} + \alpha_3(I)_{it} + \alpha_4(G)_{it} + \alpha_5(FD)_{it} + \alpha_6(EET)_{it} + \alpha_7(HC)_{it} + \alpha_8(EC)_{it} + \alpha_9(RD)(EET)_{it} + \varphi_i + \varphi_t + \varepsilon_{it} \quad (13)$$

The country dummies φ_i are included in order to capture the country-specific fixed conditions which may affect the long-run growth. Countries specific fixed effects are, such as, institutional, geographical and ethnic heterogeneity that do not change during the selected period of time. Social characteristics such as language, religion, colonial legacy and ethnic division are time invariant and hardly change (Acemoglue et al., 2012; Alesina et al., 2003). The time dummies φ_t are for taking account of the exogenous shocks that are common to all countries like

[13]Global Economic prospects 2008.

[14]Stiroh (2002) found that in ICT using industries the productivity is higher as compare to non-ICT industries. Piatkowski (2004) also analyzed the contribution of ICT to productivity growth in the case of eight transition economies of Easter and central Europe. He found large contribution of ICT to productivity growth.

exchange rate changes or oil price changes and ε_{it} is stochastic error term. The description of variables is given in the Table 2.

TABLE 2

Variables Description

Variables	Description
TFP	Index of Total Factor Productivity
RD	R&D expenditure (in millions $)
ICT	Index of Information and Communication Technology
I	Gross domestic investment as percentage of GDP
G	index of Governance
FD	Index of Financial Deepening
EET	Index of exposure to external technology
HC	Human Capital measured by Secondary enrollment with 3 year lag
EC	Electric power consumption (kWh per capita)
φ_i	Country dummy
φ_t	Time dummy
ε_{it}	Stochastic Error term.

VI. EMPIRICAL RESULTS

Empirical analysis has great importance in the field of economics. The empirical work examines the economic issues and problems deeply and watchfully and on the basis of its findings existing theories can be falsified or validated. This section contains the empirical analysis of this study.

First, the Redundant Fixed Effects Tests is used to examine whether the fixed cross-section effects are redundant or necessary in the panel model regression. The null hypothesis of redundant fixed effects test is that the fixed effects are un-necessary and thus are redundant. The result of this test is given in Table 3.

TABLE 3

Redundant Fixed Effects Tests (Test Cross-Section Fixed Effects)

Effects Test	Statistic	Df.	Prob.
Cross-section F	7.54*	(8,162)	0.00
Cross-section Chi-square	57.00*	8	0.00

*Note: * indicates significance at 1% level*
Source: Author's estimates

According to the results of redundant fixed effects test the p-values of F-statistic (sum of squares) and likelihood ratio (chi squares statistic) reject the null hypothesis strongly. The results of test indicate that the fixed effects are statistically significant. It can be concluded that fixed effects estimation is appropriate. Results also indicate that pooled OLS estimates the model by hiding the heterogeneity of cross-sections which is not appropriate.

TABLE 4

Lagrange Multiplier Tests for Random Effects

Test Hypothesis	Cross-section	Time	Both
Breusch-Pagan	27.06	9.80	36.86
	(0.00)	(0.00)	(0.00)
Honda	5.20	3.13	5.89
	(0.00)	(0.00)	(0.00)
King-Wu	5.20	3.13	6.07
	(0.00)	(0.00)	(0.00)
Standardized Honda	12.43	3.39	4.01
	(0.00)	(0.00)	(0.00)
Standardized King-Wu	12.43	3.39	5.42
	(0.00)	(0.00)	(0.00)

Source: Author's estimates

Lagrange Multiplier (LM) helps to decide between regression through simple OLS and regression with some effects (random)[15]. The result of LM tests is reported in Table 4 which shows that there are uncounted for random effects in the residuals of pooled estimators. The value of p of all tests is well below the significance levels. Therefore, null hypothesis of pooled OLS model is adequately and strongly rejected.

[15]Oscar Torres-Reyna (2007)

TABLE 5

Correlated Random Effects-Hausman Test
(Test Cross-Section Random Effects)

Variables	Fixed effects (^{FE})	Random effects (^{RE})	Difference $\left[Var\left(\hat{\alpha}^{FE}\right) - Var\left(\hat{\alpha}^{RE}\right)\right]$
R&D Expenditure	0.0428358	0.029045	156813
Information and Communication Technology	0.0489163	0.0513346	0.0062979
Gross Domestic Investment (% of GDP)	0.0687915	0.0843477	0.0143962
Governance	0.045734	0.0548176	0.0286200
Financial Deepening	-0.0182978	0.049106	0.0159163
Exposure to external technology	-0.1227505	-0.1364684	0.0412488
Human capital	-0.0394796	-0.0597235	0.0378016
Electric power consumption (kWh per capita)	-0.1917364	-0.2248995	0.0351524
Interaction term	0.0112425	0.0131335	0.0045983

H_0: The RE estimator is consistent (Difference in coefficients is not systematic)

$$x^2 = \left(\hat{\alpha}^{FE} - \hat{\alpha}^{RE}\right)' \left[Var\left(\hat{\alpha}^{FE}\right) - Var\left(\hat{\alpha}^{RE}\right)\right]^{-1} \left(\hat{\alpha}^{FE} - \hat{\alpha}^{RE}\right) = 23.27^{*}$$

Prob.$> \chi^2 = 0.01$

*Note: * indicates rejection of null hypothesis at 1% level of significance*
Source: Author's estimates

In the above Table 5, the result of Hausman Test is given. The assumption of uncorrelated country specific effects is tested with help of this test. According to result the null hypothesis is strongly rejected which indicates that the estimation through fixed effects model is appropriate and must be preferred over random effects model. On the basis of results of varieties of diagnostic test performed in previously, it can be concluded that only the fixed effects (robust standard errors) estimation is appropriate.

TABLE 6

Fixed effects robust standard errors estimation results

Dependent variable Total Factor Productivity (TFP)			
Explanatory variables	Coefficient	t-statistic	p-value
R&D Expenditure	0.04	1.28	0.200
Information and Communication Technology	0.05*	3.07	0.000
Gross Domestic Investment (% of GDP)	0.07**	2.45	0.015
Governance	0.05***	1.93	0.055
Financial Deepening	-0.02	-1.21	0.230
Exposure to external technology	-0.12	-1.43	0.150
Human capital	-0.04	-0.95	0.342
Electric power consumption (kWh per capita)	-0.19*	-4.45	0.000
Interaction term	0.01	1.15	0.251
Intercept	5.93*	9.32	0.000
R-squared=0.78 Adjusted R-squared=0.75 F-statistic=33.42* Prob.(F-stat): 0.00			

*Note: * indicates significance at 1% level, ** at 5% level and *** at 10% level.*
Source: Author's estimates

The Table 6 reports the fixed effects robust standard errors estimation results with TFP as the dependent variable and its explanatory variables. The reported results show that the model as a whole is good fit and significant as the value of R^2 =0.78 and adjusted R^2 is 0.75 which means that 75% variation in TFP growth is explained by independent variables. According to results, the adoption and usages of information and communication technology (ICT) have positive and significant impact on TFP growth. The value of coefficient of ICT index is about 0.05 which indicates that 10% increase in the value of index leads to 0.5% growth of TFP. The result reflects the facts that presently, in knowledge based economies, the most effective tools for raising the productivity are ICT based. ICT has generated number of tools which work on information in digital form. Its impact is impressive as it is being used in every sector of the economy from agriculture to manufacturing and industries to services sector to Government. It is a key determinant of TFP because it represents a system of new technology that affects everything including "what to produce by economies, how economies produce and how this production is to organize and manage. It has important policy implication for economies especially for developing

countries to get benefit from ICT. Several steps can be taken to increase the penetration rate of ICT where it is low.

Research &Development expenditure which measures the national innovative capacity is another important determinant of TFP growth which is positively correlated with TFP growth but is not significant. The Asian economies need to build R&D capability in order to make it a significance contributor to TFP growth. Gross domestic investment as percentage of GDP has positive and significant effect on TFP growth. Gross domestic investment represents not only addition to the capital stock of the economy but also captures the improvement in the quality of capital stock. The coefficient has expected sign in accordance with theory as new machinery and equipment is more productive, therefore, it plays positive and significant role in enhancing the total factor productivity growth. The value of the coefficient is about 0.07 which indicates that 10% growth in gross domestic investment leads to 0.7% growth in TFP. This result is consistent with the findings of Ahmad (2011) and Farrokh and Martin (1995). Therefore, measures should be taken to promote both public and private investment which will be helpful in achieving sustainable economic growth by promoting TFP growth.

The impact of Governance on TFP also appears to be positive and significant. The value of coefficient of Governance index is about 0.05 which indicates that 10% increase in the value of index leads to 0.5% growth in TFP. The result is consistent with the previous findings. The result confirms that the economies with quality of governance and better institutions have higher productivity growth. Governance affects the productivity positively and significantly. Growth enhancing governance affects the productive by maintaining political stability rule of law, protection of property rights and control of corruption in the country. The impact of electric power consumption on TFP growth is negative which is consistent with the findings of Straub, Warlter and Vellutini (2008). The rapid population growth along with high economic growth has led to high domestic demand for electric power in most of the Asian economies. With fixed supply of electricity, the increasing domestic demand is causing shortage of electric power in production sector and therefore it appears to be negatively related with productivity growth.

The variable exposure to external technology and its interaction with R&D have no significant effect on TFP growth. This reflects the fact that these economies have not yet achieved a threshold level of internal capacity building like R&D and education attainment that is sufficient to learn and absorb external technology.

VII. CONCLUSION

The main objective of this study was to estimate total factor productivity and investigate its potential determinants in the sample countries. In this era of knowledge based economies having rapidly changing technology, innovation and digitization, it is very important to re-visit the sources of total factor productivity growth. For this purpose, the impact of increasing use of information & communication technology (ICT), human capital (HC), R&D, Governance (G), exposure to external technology (EET), financial deepening (FD) and other control variables on total factor productivity growth have been examined empirically by using Fixed Effect with Robust Standard errors estimation method. The indices of TFP, information & communication technology (ICT), exposure to external technology (EET), financial deepening (FD) and Governance (G) have been developed by using the appropriate statistical and mathematical procedure. This study analyzed a panel of 9 Asian emerging and growing economies for the period 1996 to 2015.

The results indicate that information & communication technology, Governance and capital augmentation as a result of gross domestic investment have positive and statistically significant impact on TFP growth of selected Asian economies. Research & development expenditure which measures the national innovative capacity is another important determinant of TFP growth which is positively correlated with TFP growth but not significant.

Policy attention must be committed to provide universal information & communication technology coupled with broadband connectivity to facilitate the ICT use, make substantial investments to improve R&D capability and quality of capital stock and improve Governance and education system to enhance TFP growth. Similarly, as good governance plays a very crucial role for enhancing productivity of country, therefore, policy making authorities should also focus on improving the overall quality of governance.

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CELEBRITY ADVERTISEMENTS AND BUYING BEHAVIOR OF TELEVISION VIEWERS

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Abstract. Various scholars have examined the effectiveness of celebrity advertisements to influence viewers and persuade them towards buying products. Findings of numerous studies largely support the fact that a positive relationship exists between celebrity endorsement and the purchase behavior of advertisement consumers. Employing the Ohanian's source-credibility scale, the current study intends to observe the effectiveness and influence that celebrity advertisements cast on the buying intentions of Pakistani youth (n=200). The findings of the study signify the relationship between celebrity endorsement and purchase behavior of respondents. It has been found that the presence of celebrity in television advertisement inspires the buying behavior of viewers and they are persuaded by the attractiveness and expertise of the superstars modeled in the advertisements. Results of the study show that physical beauty and expertise of endorser/celebrity have been found considerably influential towards purchase intentions. In addition, certain demographic characteristics of consumers i.e. gender and academic qualification have also been detected as contributing factors to the said influence.

Keywords: Celebrity advertisement, Celebrity endorsement, Purchase intention, Expertise, Credibility of celebrity

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I. INTRODUCTION

Cohen (1963) argues that most of the time, we gather our impressions about the world and societies from media. The pictures in our minds are formulated by the images that media depicts and communicates to us (Lippmann, 1922). It is, therefore, largely held that mass media has potential to influence the consumers (Andre, 2009; Gerbner & Gross 1976; Roy, 2013; Shukla, 2013; Soulliere, 2003; Stephanie, 2008; Weimann 2000; Zaheer, 2016a; 2016b) and shape reality (Hallgren, 2012).

Of different forms of media, advertising is an important way used to persuade the public towards certain products or services. Advertising is especially used as a marketing tool to attract consumers and enhance the sale of product(s). Every day, consumers are exposed to different types of communication massages in print and electronic media. So, it becomes quite a challenging situation for an advertiser to grab a person's attention. In view of this goal, advertisers tend to employ various tactics to clamp the attentiveness of their target audience. The ultimate goal of using diverse techniques is to make the advertisements influential and effective. In order to achieve this objective, using celebrities for the purpose of endorsing a brand, has become a prominent marketing strategy (Giridhar, 2012).

AIMS/OBJECTIVES OF THE STUDY:

The main purpose of the study is to examine the effects of the television advertisements on viewers with reference to their buying behavior. To examine this dimension is significant so that it could be examined whether or not the advertisement contents and endorsement of celebrities retain power to influence the purchase choices of the viewers; and in case, advertisement contents and presence of celebrities affect the behavior of the viewers then to what extent. Considering the aforementioned objectives, it seems important to discourse conceptual background of Celebrity endorsement and Ohanian's (1990) source credibility model; both are regarded meaningful when it comes to television advertisement.

II. CELEBRITY ENDORSEMENT

Celebrity endorsement is considered an important technique to cater the aim of advertising i.e. to influence the purchase behavior of consumers. Advertisers are known to the notion that positive image that celebrities retain and depict would make the message more persuasive (Choi & Rifon, 2007). Therefore, this technique of using prominent personalities and celebrities is practiced all over the world for the promotional activities (Pornpitakpan, 2004; Sunita, 2015). In the process of advertisement campaigns, the companies engage celebrities to feature in advertisements and the personality along with the features of the celebrity are matched with the image or aspects of promotional product.

The celebrity endorsement in advertisements and its impact on the consumers is an important area of examination and, therefore, various scholars have observed and discoursed it. Ohanian (1990) argues that the use of celebrity in advertisement does matter and contributes to make the advertisement more attractive, lively and appealing. The presence is equally good to gain the attention of the public. Probably, one of the reasons may be that most of the time people regard the celebrities as role models and idealize them or their qualities and as a result the personality appeals their attention. Therefore, the advertisers prefer celebrity endorsements to benefit from the potential influences of the personality.

In the field of advertising and marketing, the elements that influence consumer behavior in negative or positive way are called as "reference groups". In the words of Escalas and Bettman (2005), superstars and celebrities are considered to be most dependable reference groups in advertisement(s).

In a study, Lafferty and Goldsmith (1999) find that if consumers do not consider the qualities and attributes of product minutely, they prefer to follow celebrity endorsement. Therefore, the source endorser and the purchase intentions are thought to be positively associated with each other. Various research studies (Baker & Churchill, 1977; Goldsmith & Lafferty, 2000; Goel, 2013; Jain, 2011; Sternthal & Dholakia, 1978; Sunita, 2015) have examined the relationship of celebrity endorsement with buying intentions of the consumers and supported the notion regarding influence of celebrity endorsement.

There are certain features of a celebrity's personality that could be appealing to the consumers. For instance, Yoon, Kim and Kim (1998) examined the effects of celebrity endorsement on purchase intention and found the element of attractiveness more dominant and effective in terms of persuading the consumers. Contrarily, other scholars argue that only physical beauty is not the only important feature, rather credibility of the celebrity is equally essential. It has been observed that sometimes consumers like mere physical beauty and sometimes they prefer credibility and trustworthiness. It is reasoned that consumers are more influenced by the ad messages with which they feel a sense of similarity and an association. It means that consumers are much influenced by the celebrity when they trust the celebrity to have involvement or attachment with the product instead of mere modeling. Menon, Boone and Rogers (2001) endorse the notion and argue that involvement of celebrity in advertisements affects the level of acceptability of the advertised product and resultantly influence the purchase intentions of consumers in a positive way.

Amongst various features of the celebrity advertisements, the element of credibility matters a lot when it comes to influencing consumers and their purchase behavior. Various scholars (Goldsmith & Lafferty, 2000; Shimp, 2000; Zahaf and Anderson, 2008) have endorsed that credibility of advertisement and endorser retains potential to enhance the inclination of consumers towards buying the product(s). Khatri (2006) maintains the same thought in a different way and describes that celebrity endorsement does not assure the increase in sales or profit, rather it only makes the advertisement attractive and considering the credibility features of celebrity, consumers feel a sense of security to purchase the very product. Also Moynihan (2004) terms it the intangible magic of celebrity that works due to trustworthiness of celebrity. In a study conducted in 1982, Harmon and Coney find that more credible resource of communication iss more influential compared to less credible resource. Considering the scholarly arguments, it may be said that in order to influence purchase behavior of consumers and especially encourage brand switching, the use of credible resource is of highest significance.

Regardless of the positive characteristics attached with celebrity endorsement, its negative effects have also been observed. For instance,

despite the fact that presence of celebrity inclines the consumers in favor of product, people often lose their faith when celebrities endorse a lot of products simultaneously. Tripp, Jensen and Carlson (1994) have found that over-endorsement impacts the purchase intention negatively, thus declining the effectiveness of celebrity. In another study conducted by White, Goddard and Wilbur (2009) it has been noted that if some negative events are attached with the endorser, it will affect the buying behavior in an adverse way.

Furthermore, it must be remembered that there are many brands and products that receive the attention of the public without the tag of popular personality or celebrity. Endorsing this view, Chhajer, Naidu and Shah (2015) describe that despite the dependence on celebrity endorsements, few brands have implanted their image on consumers as the most consistent source.

III. THEORETICAL FRAMEWORK

This study is based on theoretical groundings of Ohanian's (1990) source credibility model. According to this model, the perceived attractiveness, trustworthiness and expertise affect the credibility of the endorser. Successively, the source credibility retains potential to affect the purchase intentions of consumers. The Source Credibility Model basically states that the effectiveness of a message depends on perceived level of expertise, trustworthiness and attractiveness of a celebrity in an advertisement. These factors are being discoursed in summary as under:

Attractiveness: The major aim of an advertisement is to persuade consumers towards changing their attitude towards certain brands (Solomon, 2002). In pursuance of this aim, advertisers often engage celebrities who are physically attractive. In this way, they get benefit from prestige and physical lure/charm of the superstars. Since physical appeal is considered a tool having a potential to change the attitude (Menon et al., 2001), Ohanian has added the element of attractiveness in the proposed model and opines that physical attractiveness positively affects the consumer behavior towards a product as compared to the product with unattractive celebrity.

Trustworthiness: Trustworthiness is thought to be an important factor in communication. Abdul Majid-Sallam and Wahid (2012) define

the element of trust in communication as "the listener's degree of confidence in, and level of acceptance of, the speaker and the message". According to Van der Waldt et al., (2009) trustworthiness is in fact the believability an endorser possesses in the eyes of public. Various researchers have found that trustworthiness makes advertising effective and has positive relationship with the attitude of the consumers (Lafferty & Goldsmith, 1999; Clinton, Holmes, & Strutton, 2008). Ohanian (1990) has added the dimension of trustworthiness in source-credibility model and argue that a trusted/trustworthy communicator could prove to be very persuasive, regardless of being expert or not.

Expertise: Expertise may be termed as the professionalism held by the endorser, which motivates the consumers to buy products (Goldsmith & Lafferty, 2000). It is often thought that a celebrity in advertisement with expertise is regarded more trustworthy and dependable compared to unreliable celebrity (Hung, Chan, & Tse, 2011). Ohanian, (1990) has added this dimension in the proposed model and contended that the expertise or proficiency of endorser affects the receiver in a positive way and inclines the receiver to the communicated information.

RESEARCH QUESTIONS

RQ1: Does celebrity endorsement correlate with the purchase intention(s) of consumer(s)?

RQ2. Are demographic characteristics of consumers correlated with source-credibility?

HYPOTHESES

H1: Attractiveness of celebrity is related with purchase intentions of consumers.

H2: Credibility of celebrity is related with purchase intentions of consumers.

H3: Expertise of celebrity is related with purchase intentions of consumers.

H4: Demographic characteristics of consumers are linked with attractiveness, credibility and expertise of celebrity.

IV. METHODOLOGY

In order to examine the hypotheses of the study, survey method was adopted. A total of 200 respondents were selected (age, M = 21.1, SD = 1.775 and female 54 %); the data was collected from the residents of Lahore city with a non-probability convenience sampling technique. The details of scale development have been mentioned as under.

Exposure to advertisements: In order to examine the exposure to TV, the respondents were asked to self-report the amount of time (i.e. hours) they usually spend to watch television in a week **(M=** 12.55**, SD=** 9.582**), and** frequency of seeing celebrities in advertisement(s) in a day (M= 2.83, SD= 1.118). The response options ranged from once a day (coded as 1) to more than 5 times a day (coded as 4).

Source-credibility Scale: Source-credibility scale proposed by Roobina Ohanian (1990) was used in the study. This scale is based on three-dimensions i.e. attractiveness, credibility/trustworthiness and expertise. This scale was used in this study with minor amendments, meant for making it consistent with the situation in Pakistan. In this 5-item scale (α= .801) respondents were to give their opinions regarding certain features of celebrity and their influences. The response options ranged from strongly disagree (coded as 1) to strongly agree (coded as 5). The scale was consisted of three variables i.e. attractiveness, credibility/ trustworthiness and expertise. The attractiveness included: because celebrity in the ad is attractive (strongly agree, 40.0%, M = 3.91, SD = 1.220), classy (agree, 38.5%, M = 3.88, SD = 1.084), beautiful (agree, 40.5%, M=3.92, SD= 1.081), elegant (agree, 40.0%, M= 3.89, SD= 1.111) and sexy (agree 31.5%, M= 3.37, SD= 1.128). Credibility/ Trustworthiness included, dependable (agree, 32.5%, M= 3.27, SD= 1.132), honest (agree, 43.0%, M= 3.51, SD= 1.037), reliable (agree, 47.5%, M= 3.68, SD= .891), sincere (agree, 49.0%, M= 3.74, SD= .882), trust worthy (agree, 44.0%, M= 3.73, SD= .992). Expertise included, expert (agree, 42.5%, M= 3.95, SD= 1.011), experienced (agree, 41.0%, M= 4.32, SD= 4.627), knowledgeable (agree, 49.5%, M= 4.43, SD= 4.617), qualified (agree, 49.5%, M= 4.10, SD= .821), and skilled (agree, 44%, M= 4.09, SD= .968).

Purchase Intension (PI): Purchase Intention measure was derived from the Ohanian (1990) and adopted after making it in line with

situation in Pakistan. In this regard, a 4-item scale was adopted (α= .716) in which respondents were asked to report different activities. The responses ranged from very unlikely (coded as 1) to very likely (coded as 5). Information asked included: after watching the ad, how likely you think/consider to try the product (likely, 40%, M= 3.33, SD= 1.182), how actively/keenly you search for the product in the store/market (unlikely, 44.5%, M= 3.39, SD= 1.021), considering the ad, how likely you purchase this product (likely, 49.5%, M= 3.41, SD= 1.003), does presence of celebrity in ad encourage you to buy (unlikely, 42.0%, M= 3.51, SD= 1.236).

Demographic factors: Demographic variables included in the study were gender (54.0% female, M= 1.54, SD= .5000), age (M= 21.1, SD= 1.775), monthly income (M= 47645, SD= 22902.43) and education (M= 1.33, SD= .471). The options for age ranged from 18 to 26 years, however, two options were given for education i.e. graduation and post-graduation.

V. FINDINGS

With the intention of pursuing the answer to first research question, three hypotheses were formulated and Pearson's Correlation test was applied to data. Statistical analysis indicated a significant relationship of purchase intentions with endorser's attractiveness ($r= .179$, $p< 0.05$), and expertise ($r= .230$, $p< 0.05$). However, no relationship ($r= .018$, $p> 0.05$) was found between credibility of celebrity and purchase intentions (see Table 1)

Thus, it may be interpreted that attractiveness and expertise of endorser in television advertisement(s) influence the purchase intentions of consumers to buy the product recommended in celebrity advertisement. Quite surprisingly, the element of credibility was found unpersuasive towards purchase intent of consumers. Hence, results support first and third hypotheses (H1 and H3) but did not verify second hypothesis (H2) of the study (see Table 1).

TABLE 1

Correlation Matrix of Key Variables

Variables	M	SD	1	2	3	4	5	6	7
TV ad Exposure	2.84	1.118	-						
Age	21.10	.91984	-.125	-					
Income	47654	22902.4	.010	.074	-				
Attractiveness	3.8650	.83418	.038	-.047	.067	-			
Credibility	3.5810	.76758	.088	-.104	-.070	.463**	-		
Expertise	4.0550	1.20517	.072	-.065	.026	.321**	.371**	-	
Purchase	3.4063	.83367	.077	-.115*	-.065	.179*	.018	.230**	-

Demographic factors and celebrity endorsement: In order to examine the relationship of celebrity endorsement with demographic factors (i.e. age, gender, income and education) of respondents, various statistical tests were applied according to the nature of data. Since data related to age and income was continuous in nature, Pearson correlation test was applied to the information. The results did not show any relationship of age and income with credibility, attractiveness and expertise of celebrity or endorser (see Table 1).

Subsequently, t-test was applied to data in order to examine the relationship of gender with source credibility. It was found that a significant difference existed across gender and attractiveness (t= .785, df= 187.536) of celebrity, mean difference indicated that males (M= 3.9352) were more influenced from the apparent beauty of celebrities in advertisement(s) than females (M= 3.8222).

Likewise, a significant difference was observed between gender and trustworthiness (t= .581, df= 187.700) of celebrity, and mean score indicated that males (M= 3.6152) were more influenced by the trustworthiness of celebrities than females (M= 3.5519). In the same way, a significant relationship was found between gender and expertise (t= 1.672, df= 127.178) of celebrity; males (M= 4.2087) were found more influenced from the expertise of celebrities compared to females (M= 3.9441) (see Table 2).

TABLE 2

Means, Standard Deviations, and T-test Results of Source Credibility Across Gender

	Gender	Mean	SD	*T*	Df	Sig. (2-tailed)
Attractiveness	Male Female	3.9352 3.8222	.86861 .80528	.785 .780	198 187.536	.524
Trustworthiness	Male Female	3.6152 3.5519	.79903 .74225	.581 .577	198 187.700	.638
Expertise	Male Female	4.2087 3.9241	1.56442 .76303	1.672 1.591	198 127.178	1.6

SD: standard deviation.
Total N = 200. Female N = 108. Male N = 92. Independent samples t-test by gender (equal variances not assumed).

In order to examine the relationship of qualification with source credibility, t-test was applied to data. Statistical results showed a significant difference with level of qualification with attractiveness (t= 1.536, df= 109.722), trustworthiness (t= .576, df=140.396) and expertise (t= .752, df= 195.899) of celebrities. Mean difference showed that graduate students were found more influenced by the celebrity endorsement compared to masters' level students (see Table 3).

TABLE 3

Means, Standard Deviations, and T-test Results of Source Credibility Across Qualification

	Gender	Mean	SD	*T*	Df	Sig. (2-tailed)
Attractiveness	Graduation Masters	3.9284 3.7364	.77339 .93884	1.536 1.438	198 109.722	.340
Trustworthiness	Graduation Masters	3.6030 3.5364	.79054 .72252	.576 .594	198 140.396	.414
Expertise	Graduation Masters	4.1000 3.9636	1.37535 .75072	.752 .906	198 195.899	.667

SD: standard deviation.
Total N = 200. Graduation N = 134. Masters N = 66. Independent samples t-test by qualification (equal variances not assumed)

VI. CONCLUSION AND DISCUSSION

The study aims at examining the influence of celebrity advertisements on purchase intentions of consumers. For the examination, a three dimensional source-credibility scale (Ohanian, 1990) has been employed. Considering the results of the study, firstly, it has been found that media contents retain the potential to influence the viewers/consumers. Insofar as the relationship of celebrity advertisements and buying behaviors of viewers is related, it is concluded that celebrity advertisements are persuasive enough to influence purchase-intentions of consumers. In this regard, two dimensions of source credibility i.e. attractiveness and expertise have noticed to be especially significant. It has been found that purchase intentions of consumers are positively linked with attractiveness and expertise of the celebrity endorser. It means that people after watching celebrities in television advertisements are impressed by their physical beauty as well as the expert opinion of superstars appear in the TV ads. Resultantly, they buy the recommended products when they go for shopping. In this study, the element of credibility or trustworthiness, which is often seen valuable to incline the consumers towards buying the product, has not been found associated with purchase intentions of viewers. The results of this study about the element of credibility contradict the inferences endorsed by previous studies (e.g. Clinton et al., 2008; Goldsmith & Lafferty, 1999; Harmon & Coney, 1982). However, the results of current study are compatible with the earlier studies in terms of attractiveness (e.g. Menon et al., 2001; Yoon et al., 1998) and expertise dimension (e.g. Daneshvary & Schwer, 2000; Hung et al., 2011).

Insofar, as the relationship of celebrity endorsement with demographic characteristics of consumers is related, the previous studies have found age (Pandey, 2011) and gender (Sliburyte, 2009) linked with celebrity endorsement. Current study has examined the influence of various demographic factors on celebrity endorsement. Results show that age and income of respondents are not linked with celebrity endorsement. However, gender and level of qualification have been found linked with the source credibility. In this regard, males have been found much more inclined to the products endorsed by the celebrities as compare to females. Contrary to this inference, common impression is that females are more inclined towards the superstars and celebrities.

In a nutshell, it may be concluded that the presence of celebrity inspires the buying behavior of viewers and they are particularly persuaded by the physical beauty and expertise of the superstars modeled in the advertisements. In the end, it is recommended that considering the popularity of Indian film stars in Pakistan and their presence in Pakistani advertisements, the future studies should conduct comparative analysis of the endorsement level of both countries' superstars so that their level of persuasion could be determined.

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INDIVIDUALISTIC ATTRIBUTES OF INFLATIONARY EXPECTATIONS: EVIDENCE FROM PAKISTAN

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Abstract. Macroeconomics today has evolved to a very dynamic nature in terms of the way it handles and approaches the macroeconomic modeling. Among the various pronounced features, the one that has acquired the central theme is the micro foundations. Individual entities, attributes, behaviors and tendencies which were more of a concern to microeconomic models have become a more acknowledged part of the contemporary macroeconomic models. Analyzing inflationary expectations and incorporating them in the models designed to evaluate the efficacy of economic policy is the biggest evidence of this paradigm shift. Owing to the critical role, inflationary expectations can play in transmission mechanism of policy, researchers are eager to explore them from measurement perspective and in terms of factors determining them. The study at hand is an attempt to explore inflationary expectations from individualistic perspective. The study is conducted based on the survey responses of salaried and self-employed individuals from twin cities of Pakistan; Rawalpindi and Islamabad. An ordinal Logit model is fitted based on the high, medium, low and stable forecast about the increase in general price level in upcoming year and is analyzed for

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various qualitative and quantitative determinants of inflationary expectations. The results suggest that the individualistic attributes including age, income level, degree of optimism, degree of myopia, degree of relative comparisons, economic literacy, and occupational differential significantly explain the choice of inflationary forecast on the part of respondents. High level inflationary expectations are tracked among the respondents who are more myopic, relatively makes more comparisons in evaluating their income, consumption choices and wage negotiations, hold more economic literacy, are occupationally salaried and belong to old age group, while low level inflationary expectations are observed among the individuals who belong to higher income group and those who are more optimistic. The findings of this study provide a strong case to advise policy makers to incorporate and anticipate these individualistic attributes while designing policies destined towards controlling inflation to make policies more effective.

Keywords: Inflationary Expectations, Qualitative attributes, Individualistic tendencies, Survey Method, Micro-foundations

JEL Classification: B22, B31, C25, C83, D84, E31, E71

I. INTRODUCTION

THEORETICAL AND PRACTICAL RELEVANCE

In macroeconomics "Inflationary Expectations" have been a critically discussed and versed phenomenon for a long time. Owing to their key role, macroeconomists and policy makers retain keen interest to capture expectations from various aspects and dimensions especially due to their policy relevance. For instance, it is believed that the efficacy and credibility of central bank's monetary policy is strongly linked with inflationary perceptions and expectations; for this reason, central banks around the world are engaged in their own inflationary expectation surveys and also rely on some other professional forecasts. Sausa and Yatmen (2016) in a seminal paper evaluate central banks across different countries in terms of their reliance on inflationary expectations surveys and report a significant increasing trend in this reliance overtime. Monetary authorities are concerned with reviewing these expectations from the prospect of macroeconomic stability. These expectations appear

to move in tandem with the goals and objectives of monetary policy, as stabilizing inflation is among the crucial goals of any monetary policy and stabilizing inflationary expectation now a day has become a complementary part. A quote of a renowned economist "Ben Bernanke" ex-governor of Federal Reserve Bank is worth quoting in the context of this discussion:

"*We expect inflation because we have it, and we have inflation because we expect it*".

The introduction of Fisher equation into macroeconomic literature accorded a special value to inflationary expectations and this real interest channel is a significant addition to the channels explaining the aggregate demand and demand pull inflation. As expected inflation increases, real interest rate decreases, which makes consumption relatively more attractive for individuals than to save and therefore, consumption spending increases. This positive relationship is justified in many studies where inflationary expectation serves as a cause and spending serves as an effect, (D. Acunto et al. 2015; Bachmann et al. 2015). Economists have perhaps realized that inflationary expectations are the driving force behind inflation inertia and its rising levels, that is why, special emphasis is placed in developing theoretical models which can explain the link between inflation and inflationary expectations (Nailwaik, 2016).

MEASUREMENT CHALLENGES

Measuring inflationary expectations is not as easy as it appears to be in literal language. Their measurement mostly involves subjective surveys and analysis which make their precise estimation a daunting and challenging task. Researchers have tried to adopt simplifying approaches to approximate subjective responses; consumer surveys seeking expectations on future increase or decrease in inflation are most prominent of this chain (e.g. EC consumer survey, NOP survey of inflation attitudes in UK, University of Michigan survey of Consumer attitudes for US). Quantification of qualitative survey responses on inflationary expectations have been a pronounced subject matter in literature; Carlson-Parkin method (Probabilistic Approach), regression method and balance method are among the most typical techniques employed by researchers to quantify them (Nardo, 2003). Most surveys on inflationary expectations involve questions on predicting inflation rate

or price level on 3, 6 or 12 months' basis (see for instance, Livingston survey). Sometimes the purpose of research is met by asking the direction of increase or decrease or no change (e.g. Michigan Survey), while other studies employ different strategy by asking question on 5-point scale in a format of most likely to increase to the other extreme of most unlikely to increase.

Although bulk of literature is available on measurement methodologies and quantification techniques, consensus is yet to be established on a common measure. Various studies suggest that inflationary expectations are quite sensitive to the time horizon used to extract forecast; for instance, some commonly used time horizons are one year ahead, two years and three years ahead used in different surveys. A study by Armantier et. al (2013) makes a comparative analysis of some prominent surveys and reports significant difference in inflationary forecasts based on time horizon. Evidence is also available where the wording scheme of questions, survey mode, belief of respondents and opportunity to revise responses cause a lot of differential in expectations about inflation (Bruin et al. 2017; Klaauw, 2008).

DETERMINING FACTORS

The determining factors of inflationary expectations encompass a very broad spectrum. The idea is beautifully comprehended by a renowned economist, Hicks in (1939) in the following words:

> *"It seems possible to classify three sorts of influences to which price-expectations may be subject. One sort is entirely non-economic: the weather, the political news, peoples state of health, their psychology. Another is economic, but still not closely connected with actual price movements; it will include mere market superstitions, at the one extreme, and news bearing on future movements of demand or supply (e.g., crop reports), at the other. The third consists of actual experience of prices, experience in the past and experience in the present; it is this last about what we can find most to say'. (p. 204)".*

Perhaps the researchers of current era have acknowledged this idea presented by Hicks long time before, that is why, we find this concept being explored based on economic and non-economic factors. Manifold studies are available which have focused upon inflationary expectations

and the mechanism through which they are governed in the perspective similar to what is proposed by Hicks. Some find adaptive learning dominating the rational learning as its principal determinant (Mariman & Sunder 1995; Barnasconi & Kirchkamp 2000; Hey 1994); some find beliefs (perceptions) and habits of individuals as a primary source of variations in inflationary expectations (Roetheli, 2011) and some focus on information owned by the respective agents especially financial/economic literacy and awareness as primary explanatory factors for heterogeneity in inflationary expectations (Briun et al. 2010; Burke & Manz, 2014).

Past studies have mostly analyzed inflationary expectations as per conventional approach that how these expectations are driven by some economic factors like income, wage, and consumption expenditures etc. But recent literature emphasizes on qualitative factors including demographic and age profiles, literacy, household size, family setup, perceptions, social and physical environment, awareness to the policy designs, understanding of economic variables and their policy covariates as determinants of inflationary expectations (Bobeica et al. 2017; Fritzer & Rumler, 2015). Analyzing perceptions and uncertainty faced by individuals (while quoting inflationary expectations) is a formal concept which appears to complement the paradigm shift in literature towards the identification of qualitative determinants of inflationary expectations. Economists try to rationalize the macroeconomic dynamics of inflationary expectations based on studies involving individual behavior. Binder (2017) is a classic example in this domain, which demonstrates how uncertainty about inflation relates with qualitative attributes such as age, income group, educational domain andmarket sentiment of investors.

RESEARCH MOTIVATION, UNIQUENESS AND OBJECTIVES

Although the received literature on topic of inflationary expectation is quite rich and broadly discussed in various themes, it is apparently limited to focusing on its measurement scales and quantitative determinants. A few studies which have focused on the qualitative attributes (including education, beliefs, perceptions, financial literacy etc.) are either of experimental nature or they deal with one or two attributes at a time. This scrutiny leaves us with a literature gap, which is to be filled with some additional predictors concerned more with

individualistic tendencies explored through subjective survey. Our study intends to explore the linkage of individual's behavioral aptitude with his/her expectations. The study is unique in the sense that it analyzes the individualistic qualitative attributes including (optimism/pessimism, spending tendencies, myopic tendencies, degree of relative comparisons, individual's satisfaction with his/her political/economic life, education level, occupational status and economic literacy) as determinants of inflationary expectations in an exploratory manner. Available research scantly addresses inflationary expectations in such dimensions particularly in terms of the variables we have brought upfront. Also, the study is unique of its nature particularly in case of Pakistan.

The way or the process through which an individual forms his/her expectations is tidily linked with the behavioral aptitudes he or she possesses. The way one makes expectations regarding general affairs of one's life cannot be considered independent from the way one forms expectations regarding a phenomenon like inflation. The processing or habitual scheme of expectation formation regarding general matters would also be reflected in expectations regarding inflation and this habitual scheme is strongly linked with the above mentioned behavioral attributes. These attributes should be regarded as critical determinants of inflationary expectations because they affect individual's capacity or ability to process information. This ability leads to create a differential in the information set possessed by different individuals which in turn is a documented determinant of asymmetries and differences in inflationary expectations (Pfajfar, 2013; Pfajfar & Santoro, 2008).

In nutshell, our study aims at the following two objectives:

1. To explore whether individuals hold high, low or stable inflationary expectations.
2. To relate these inflationary expectations with their various personal attributes.

II. DESCRIPTION OF VARIABLES

DEPENDENT VARIABLE (INFEXP)

Our dependent variable is inflationary expectations. Respondents have been asked to quote their future forecast regarding general price

level that whether it would increase, decrease or remain stable in upcoming year. As our study involves some piloting upon the questions, it is found that the respondents are more convenient with per year terminology rather than monthly or quarterly figures. This question is also complemented with another question which is supposed to be answered by those respondents who quote an increasing forecast in first question. The second question requires respondents to quote the magnitude of increase; that is, by what percentage they expect general price level to increase. Three figures are provided; one quoting a two-digit increase (representing high inflation), the other quoting a single digit mid-level increase or third specifies a mild single digit increase. It is a usual convention or belief that the inflationary environment serves as a mark of reference for inflationary forecasts or expectations. To categorize inflationary expectations as high, moderate and low one can use past few years' average trend or current value as a benchmark. Our survey was conducted in later half of year 2016, when actual inflation rate in Pakistan was at around 3.8% and average trend of preceding 4 to 5 years remained at around 6%. This average trend has been used as a guiding mark of reference for categorization of our dependent variable inflationary expectations. Respondents are allowed to choose between three options while reporting their expectations on inflation: (a 10% increase; a 5% increase and a 3% increase. The choice of 10% relative to our mark of reference (average trend of 6%) is termed as high, while a choice of 5% is termed as moderate/mid-level and finally the choice of 3% is termed as low relative to the benchmark. The construct and design of our dependent variable is purely based on the state of inflation corresponding to the time of survey. These questions are constructed under the guideline of Michigan Survey on consumer's inflationary expectations. Based on these two questions we construct a variable containing following five categories:

1. Individuals who expect high inflation (Coded as 5)
2. Individuals who expect an intermediate or mid-level inflation (Coded as 4)
3. Individuals who expect a low/mild inflation (Coded as 3)
4. Individual who expect inflation to remain stable (Coded as 2)
5. Individual who expect inflation to decrease (Coded as 1)

The mentioned categories specify our ordinal dependent variable having 5 ranks.

INDEPENDENT VARIABLES

Degree of Myopia (DOM)

Theoretical Justification

Human beings are observed to be quite short sighted in many affairs of their life. This feature is not only specific to their social or general affairs of life but also quite common in many economic decisions they make and expectations they form. Introduction of this concept "Myopia" in economic modeling is deeply rooted in literature, especially literature linked with intertemporal choice theory (Pashardes, 1986; Pollak, 1976). The investors' myopia is quite a well pronounced term in this relevance used in the literature of economic finance. This tendency defines a lot of upward and downward swings of stock market via role of myopia on investors' expectations regarding future (Rozmainsky, 2015). If history has witnessed that investors' expectations are driven by their myopic tendency, one can always assume inflationary expectations to be driven by this myopic tendency at individual level. This variable is included in the model to check if people who are myopic are more likely to expect high or low levels of inflation.

Construction of Variable

This myopic tendency in our context is captured by dividing the past life of respondents into two domains; near past and farther past. The respondent is then judged whether he places more weight on the instances of near past experiences of his life or farther past experiences. Any respondent who places more weight on the happenings of near past is termed as myopic and the one who places more weight on the events of farther past is termed as non-myopic. We cannot subjectively track the myopic tendency of an individual by directly asking him about his shortsightedness, therefore, the construction of this variable is carried out by quoting some examples from everyday routine matters and taking the opinion of respondents accordingly. Myopic tendency has been tracked by categorizing myopia into three dimensions: "Perceptive Myopia"

captured by the response of an individual against the quoted example at general level (Exemplary or conditional statements are specified for this dimension); "Self- Myopia" captured by addressing the respondent's view about how he would have behaved personally or feel about that condition himself, if he were to assume himself in the given scenario or state; "Reasoning Myopia" captured by the response of individual when he is allowed to rank shortsightedness among the various causative factors offered for the given examples or situations in the said questions. However, as the question capturing the first aspect captures the responses through Likert scale, questions on second aspect deal with the percentages, and the questions on third aspect deal with the ranking, we need to accord some common scores to the responses to get an average value of these three dimensions of myopia. The coding scheme is explained in Table 1:

TABLE 1

Dimensions of Myopia

	Perceptive Myopia					Self- Myopia					Reasoning Myopia				
	Likert Scale					% Response					Ranking				
Scale	1	2	3	4	5	>= 80%	>=60 – <80	>=40 – <60	>20 – <=40	<20%	1	2	3	4	5
Score	10	8	6	4	2	10	8	6	4	2	10	8	6	4	2

For perceptive myopia, any respondent who chooses option 1 which corresponds to strongly agree is assigned a maximum score of 10, likewise successively lower scores are assigned to the other options. For self-myopia, respondents who assume themselves to behave in a given manner in a given state by the highest percentage are assigned the highest score of 10, while successively lower percentages are associated with lower scores. For reasoning-myopia any respondent who top ranks shortsightedness for a given behavior is assigned a maximum score of 10, likewise low ranks are associated with successively low scores. The scores from all types of myopia are averaged to get to a final value used for our variable containing following five categories (Table 2); these categories are designed based on interval in which average value (*Avg.V*) falls.

TABLE 2

Degrees of Myopia

Categories	Highly Myopic	Myopic	Neutral	Non-Myopic	Highly Non-Myopic
Interval	$10 \leq Avg.V < 8$	$8 \leq Avg.V < 8$	$6 \leq Avg.V < 8$	$4 \leq Avg.V < 8$	$2 \leq Avg.V < 0$
Coded as	5	4	3	2	1

Spending Tendency (ST)

Theoretical Justification

This question subjectively asks respondents to quote their spending tendency whether they are more spendthrift, thrifty or in between the two extremes. High level of spending generates more demand for goods and services at the macroeconomic level and thus contributes to demand pull inflation. Living in an inflationary environment is theoretically thought to cause high inflationary expectations on the part of individuals. This variable is included to test this theoretical proposition.

Construction of Variable

The variable is accorded three categories in our theoretical model and the responses through questionnaire are utilized to construct our desired variable with the following classification:

TABLE 3

Categories of Spending Tendency

Categories	Spendthrift	Moderate	Thrifty
Coded as	3	2	1

Degree of optimism/pessimism (DOPT)

Theoretical Justification

One can never separate out expectations of one's life from the inevitable/inherent optimistic/pessimistic tendency of mind. It would be more plausible to propose that every expectation we make regarding future is screened through this optimistic/pessimistic filter. What we foresee is strictly tied to what we perceive, and our perceptions are

framed by our optimistic or pessimistic tendencies. Based on the strong theoretical link between expectations and this tendency of human mind we can always analyze inflationary expectations under this realm. People who are optimistic supposedly expect different levels of inflation as compared to people who are pessimistic. This tentative theory serves as an impetus behind the inclusion of this variable as independent variable in our theoretical model. Empirics also support the inclusion of this variable in our model based on the significant role it plays in affecting the economic variables. Optimism is believed to affect the investment decisions (David et al., 2006) and it is also shown to affect the saving behavior of individuals (Brown and Taylor, 2008). Inflation and inflationary expectations being within the domain of economic variables can always be tested for their reliance on degree of optimism.

Construction of Variable

Respondents are asked to quote their expectations regarding different future outcomes especially related to their external lives at country level and an index is constructed based on average score of respondents on Likert scale. As per construction scheme, a strong agreement to a positive statement is awarded a maximum score of 10, an agreement to a positive statement is assigned a score of 8, a score of 6 is attributed to a neutral response, a score of 4 is allocated to a disagreement against a positive statement and finally a score of 2 is specified against strong disagreements. The scoring scheme is reversed for any negative statement. Our questionnaire comprises of 12 such statements among which 10 is positive and 2 are negative statements. The score of all 12 statements are averaged to get to a value representative of our variable-degree of optimism (DOPT)- with following five categories. These categories are based on the following intervals of average scores (*Avg.V*).

TABLE 4

Degrees of Optimism

Categories	Highly Optimistic	Optimistic	Neutral	Pessimistic	Highly Pessimistic
Interval	$10 \leq Avg.V < 8$	$8 \leq Avg.V < 8$	$6 \leq Avg.V < 8$	$4 \leq Avg.V < 8$	$2 \leq Avg.V < 0$
Coded as	5	4	3	2	1

Degree of Making Relative Comparisons (DRC)

Theoretical Justification

Individuals who use to make more relative comparisons in their social, private and economic life tend to be more aware and informed as compared to individuals who behave in contrary manner. One could argue that information gathering is a by-product of making relative comparisons; for example, people who only focus on their absolute wage or income would be less informed about the job market as compared to people who compare their wage or income with the other economic groups. This happens because process of comparison in lieu provides many means to acquire information. Tendency of relative comparison does not only allow individuals to gather more information but also provide them an opportunity to evaluate a given concept from various dimensions. The way one considers the future to forecast inflation is linked with the information set one possesses regarding different variables affecting inflation. In this connection, tendency of relative comparison regarding wage, income, consumption, job market always helps to process the information necessary to make this forecast. Empirical literature on expectations is not silent on this front; bulk of literature is available which considers relative income to be more important than absolute income when income is made explicative in models of happiness and expected well-being (Caner, 2015). Evidence is also available where individuals adjust their expectations on the basis of their relative well- being (Konrad et al., 2015).

Construction of Variable

The tendency of making relative comparison on the part of respondents is captured on following three accounts: how do respondents weigh the increase in their income relatively; (what relative factors respondents utilize while making a choice or purchase of consumable items; and what relative factors respondents would utilize if they were to negotiate their salary or wage in job market? All these aspects are scaled on a 5-points Likert scale. The same scoring scheme is followed as has been explained for the previous variables and an index value is obtained based on average score of responses from these three questions. The resultant categorical variable accompanied with its coding scheme is given as followed:

TABLE 5

Tendency of Making Relative Comparisons

Categories	Extremely High	High	Medium	Low	Extremely Low
Interval	$10 \leq Avg.\ V < 8$	$8 \leq Avg.\ V < 8$	$6 \leq Avg.V < 8$	$4 \leq Avg.V < 8$	$2 \leq Avg.V < 0$
Coded as	5	4	3	2	1

Economic Literacy (EcoLit)

Theoretical Justification

Inflation being a variable of pure economic nature needs at least some elementary level understanding of economic concepts if it is to be forecasted for its high, medium or low levels. Economic literacy has been recently acknowledged as an important determinant of inflationary expectations. Individuals who are more economic literate can use certain different forecasting tools in making a forecast about inflation as compared to contrary. Awareness of economic policy making, policy making tools, controlling authorities, inflation control targets, different interrelated variables, and basic knowledge of linkages between economic variables are all such things which allow individuals to approach inflationary forecasts in an appropriate manner. We can also assign an empirical tag to justify the selection of this independent variable. A study by Bruin et al. (2010) reports high inflationary expectations on the part of individuals having lower financial literacy. Accounting such significance owned by economic knowledge and basic understanding, a variable named economic literacy is deemed desirable to be added in our empirical model to depict how high/low economic literacy is likely to affect high/low inflationary expectations.

Construction of Variable

Economic literacy of respondents has been evaluated by taking the two aspects into consideration: policy awareness; and basic theoretical understanding. Maximum score is assigned to the correct responses and minimum score to the wrong ones. A slight differential is observed in construction of interval for this variable; the sum of maximum score one can acquire if all responses are marked correct is used as benchmark for calculation of percentages. If aggregate score obtained by respondent

exceeds or equals to a certain percentage of maximum attainable score, it is termed as a distinct category. For instance, if aggregate score (Agg.S) obtained by the respondent exceeds or equals 80% of maximum attainable score (Max.S), it will be termed as "High economic literacy". Likewise, the other intervals are constructed based on different percentage ranges as mentioned in Table 6:

TABLE 6

Levels of Economic Literacy

Categories	High	Moderate	Weak	No Literacy
Interval	If Agg.S > 75% of Max.S	If Agg.S>=50% But <75% of Max.S	If Agg.S>=25% But <50% of Max.S	If Agg.S < 25% of Max.S
Coded as	4	3	2	1

Age (AgeGp)

Theoretical Justification

Inflationary expectations are usually analyzed to figure out those determinants of inflationary expectations which can be prescribed to the policy makers while designing a policy and controlling it. Age is among those variables which can be highlighted within the domain of this discussion as, by having knowledge of the trends different age groups follow in terms of inflationary expectations, authorities can have the option to make policies destined towards a larger group or population. Identifying age as a determinant of inflationary expectations is very important from policy perspective; if a country has a bigger proportion of old aged people, and if old aged people are found to expect high inflation, then this information plays a pivotal role in the construct of policy design. Empirical research has found diverse trends in terms of this variable. Some studies have found a U-Shaped curve of inflationary expectations with respect to age; old age and young age people are found to expect high inflation as compared to middle age people (see for example, Palmqvist & stormberg, 2004; Bryan & Venkatu, 2001). Other studies report old age people to expect high inflation as compared to middle or young age group.

Construction of Variable

As per collected sample of our survey, three age groups are identified and used in our empirical model.

TABLE 7

Classification of Age Groups

Categories	Age group 1	Age group 2	Age group 3
Interval	>=20 but <30	>=30 but < 40	>=40 but <=50
Coded as	1	2	3

Satisfaction Content (SCEP)

Theoretical Justification

Expectations about inflation are quite sensitive to the level of satisfaction individuals hold about their external environment especially the political and economic environment. People always associate a negative connotation to the word inflation; therefore, high inflation is usually sensed as something negative. Individuals who hold confidence and feel satisfied about the political and economic setup of their country usually hold positive perceptions and expectations. Inflationary expectations being the subset of this universal set of expectations supposedly should be low. Hypothetically individuals who are more satisfied with respect to the political and economic environment are likely to expect low inflation rather than high. Duke/CFO business outlook survey is one of the most renowned and frequently conducted surveys by the Duke University since 1996. One concrete finding of this survey helps us to justify the formulation of our hypothesis; the survey finds a strong linkage between political conditions of a region/country and pace/growth of multiple operating firms via expectations of the chief financial officers of these firms. Likewise, economic environment plays a pivotal role as well. Larina (2008) for example, scrutinizes employment status and income as determinants of optimistic expectations on part of individuals and finds significant relationship between employment status and expectations. Within this contextual framework, "Satisfaction Content" is included justifiably in our empirical model.

Construction of Variable

Four questions are designed to extract the satisfaction content of individuals in terms of political and economic environment they live in. Two questions directly address this concern by asking individuals about their satisfaction level while the other two questions indirectly capture the satisfaction level through respondent's opinion about any political and economic state they are subject to. The intended variable is constructed with three categories based on whether someone is fully satisfied (coded as 3), satisfied to some extent (coded as 2) or not at all satisfied (coded as 1).

Income Level (IncomeL)

Theoretical Justification

The infliction caused by high prices on rich and poor is not alike, likewise its impact on their expectations about prices should not be same. This suggests that inflationary expectations should differ across various income groups. Those income groups which are hurt more by the high levels of inflation would expect high inflation and the case should be different for the contrary. Hypothetically, lower income group should expect high inflation as compared to high income groups. A piece of evidence is found in Pfajfar and Santoro (2008), which narrates income levels as quite significant in causing asymmetries in inflationary expectations across various demographic groups. Another piece of evidence is reported in a study by Plamqvist and stormberg (2004), which reports high inflationary expectations on the part of low income households. The inclusion of this variable in our empirical model is aimed at examining these evidences in case of our selected sample.

Construction of Variable

Certain income ranges are provided to the respondents in our questionnaire and they are required to pick the range best suited to them or the domain in which their income lies. The accumulative responses are used to construct the following five categories of income levels (IL) with their respective coded scheme:

TABLE 8

Classification of Income Level

Categories	Fairly High	High	Moderate	Average	Low
Interval	If > 1Lac	>70 Th but < 1Lac	> 40 Th but < 70 Th	> 25 Th but < 40Th	< 25000
Coded as	25	20	15	10	5

Education Level (EduLevel)

Theoretical Justification

When it comes to compare low education level with high education level, there is a clear dividing line of mental grooming and maturity with every additional educational attainment. Highly educated individuals tend to be stronger in their information domain. They not only hold comparatively better information set but also enjoy competitive edge in their ability to process and utilize the given information. Educated people use to sit in company of intellectuals, they use to attend the academic seminars, conferences, and they use to keep themselves in touch with the ongoing happenings in the economic world around them. Their domain allows them to have access to more correct and authentic sources of information regarding inflation and utilize it accordingly in making expectation about it. One can say that these individuals are not the blind followers of exaggerated hype created in terms of figures regarding inflation rather they can review the facts and figures at their own. Supposedly, high level of education can either be associated with high or low inflationary expectations depending upon the current state of inflation and economic environment prevailing in the country. The variable education level holds its ground justifiably in our empirical model along these said propositions. An important empirical study by Abbas et al. (2015) provides evidence on the impact of education level on inflationary expectations. According to this study, inflationary expectations are exaggerated among individual with low education level.

Construction of Variable

As discussed in our sampling design the minimum qualification criterion for our survey respondent is at least intermediate level qualification. We, therefore, construct this variable for the following four categories:

TABLE 9

Categories of Education (Education level)

Categories	Intermediate	Graduation	Masters	M.Phil/PhD
Coded as	1	2	3	4

Dummy Variable for Categorizing Salaried and Self-Employed Individuals (DummyS)

Our final independent variable is a dummy variable which is used to differentiate the inflationary expectations of salaried from self-employed respondents. Code 1 is used for salaried and 0 is used for self-employed.

EMPIRICAL MODEL

Based on the above theoretical framework we propose the following empirical model for statistical analysis:

$$INFEXP = \alpha_O + \alpha_1 DOM + \alpha_2 ST + \alpha_3 DOPT + \alpha_4 DRC + \alpha_5 Ecolit + \alpha_6 AgeGp + \alpha_7 SCEP + \alpha_8 IncomeL + \alpha_9 Edulevel + \alpha_{10} DummyS + \varepsilon$$

III. DATA AND METHODOLOGY

The focus of the underlying research is to analyze the inflationary expectations at individual level and to relate these expectations with various individual characteristics owned by them. The data on inflationary expectations have been captured from a survey of 240 respondents including 120 salaried and 120 self-employed individuals from the domain of twin cities, Rawalpindi and Islamabad. The sample has been controlled for ethnicity and gender; only male candidates who are ethnically Punjabi are surveyed. This is done to ensure some homogeneity in the sample so that the real effects in terms of inflationary expectations can be judged in more pronounced manner. Secondly, if data had been categorized in terms of gender and ethnicity, it would require more respondents to be interviewed (larger sample size) which was considered infeasible as per resource requirement and cost constraint for this research. The data have been collected through personal enumeration with the help of 5 field enumerators in the period October to

December 2016. We adopt a purposive sampling design owing to the following requisites: (1) Our targeted respondent is assumed to be an "Economically Mature" agent because our questionnaire involves quite of few questions related to economic life including budgetary analysis, consumption and saving behavior, financial liabilities, inflation and inflationary expectations etc. It is necessary for our respondent to at least have some involvement in economic transactions within the domain of his family or household. As, until or unless an individual is personally engaged in managing the economic or financial matters personally, his subjective responses may not be regarded as representative or authentic.

(2) As our questionnaire involves some questions of technical nature, it is necessary that our respondent should be able to understand the meaning and essence of the asked questions. Therefore, it is desirable to target such people who qualify to some minimum defined level of education. Explaining these pre-requisites of our study, we define an economically mature agent as an individual who is an earning hand, have at least 4 to 5 years' work experience in his respected domain, having a status of either a sole bread winner or partial supporter within the domain of his family, having at least intermediate level of qualification. The minimum defined level of qualification could be argued as graduation or masters but as our sample involves both self-employed and salaried people, it is easy to find graduates or masters respondent in the salaried class but quite difficult to find in self-employed class. The said requisites qualify us for the choice of purposive sampling technique rather than the probability sampling.

IV. EMPIRICAL FINDINGS

The basic estimation of our specified ordinal logit model is carried out in SPSS, followed by the use of STATA to report the proportional odd ratios against each category of predictors. The computed coefficients, proportional odd ratios along with the preliminary tests for ordinal logit models are presented in the following sections:

PRELIMINARY TESTS

The results of some pre-requisites of ordinal logit model are presented in Table 10. Table 10 confirms that our finally fitted model is

better than the model without regressors or predictors as the null hypothesis is rejected based on significant P-value.

TABLE 10

Model Fitting Information and Test of Proportional Odd Assumption

	Chi-square	Degree of Freedom	Significance
Model Fitting Information			
Final Model	79.595	22	0.000
Goodness of Fit			
Pearson	656.94	671	0.644
Deviance	481.59	671	0.999
Test of Parallel lines			
General	50.012	44	0.24

Source: Author's Calculations

Table 10 also provides a verification of null hypothesis that our model is a good fit; the results are insignificant for both Pearson and Deviance static which is an accepted and established criterion to judge goodness of fit of a model. It is also a prerequisite of an ordinal model that the relationship between the independent variables and the response variable should be same across all categories of response variable. This is called "Parallel Line" assumption" or "Proportional Odd" assumption. This assumption is tested as a null hypothesis under the title "Test of Parallel lines". Results reported in Table 10 suggest that this requirement is met (acceptance of null hypothesis) in our case, therefore, we are legitimate in fitting ordinal logit model to our data set.

PERFORMANCE OF INDEPENDENT VARIABLES

TABLE 11

Pseudo R-Square (Explanatory Power of Independent Variables)

Cox and Snell	0.282
Nagelkerke	0.311
McFadden	0.138

A well-known criterion to analyze the performance of independent variables of a model is the explanatory power of these variables in terms

of capturing the percentage variation in response variable. Table 11 is comprised of those measures which are used to identify the percentage variation in dependent variable in response to independent variables. Researchers mostly rely on the second measure (Nagelkerke), which in our case states that 31 percent variation in our dependent variable is explained by independent variables, which in conventional norms represents a reasonable figure.

CLASSIFYING INFLATIONARY EXPECTATIONS

TABLE 12

Classification of Inflationary Expectations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stable inflation	53	22.1	22.1	22.1
	Mild level inflation	17	7.1	7.1	29.2
	Mid-Level inflation	51	21.3	21.3	50.4
	High level inflation	119	49.6	49.6	100.0
	Total	240	100.0	100.0	

Table 12 reports the classification of inflationary expectation in terms of the specified categories. The maximum proportion of our sample respondents expect high inflation in upcoming year (49.6%), while the second highest category labeled as mid-level inflation occupies third highest percentage that is 21.3% of the total sample. Stable inflationary expectations stand in second place in terms of their percentage weight in the total sample with 22.1% respondents while mild level inflationary expectations hold the meager 7% weight in the overall sample. The general outlook of this classification reveals that maximum proportion of respondents lie in the domain of high level inflationary expectations.

INTERPRETATION OF PARAMETER ESTIMATES AND PROPORTIONAL ODD RATIOS

Altogether there are 9 categorical (nominal) and one binary dummy independent variable in our model. Table 13 reports the estimated parameter coefficients, proportional odd ratios and significance across each category of these independent variables.

TABLE 13

Parameter Estimates & Proportional Odd Ratios

		Estimate ($\hat{\beta}$)	Std. Error	Wald Statistics	df	Sig.	Odd Ratios exp($\hat{\beta}$)
Threshold	[INFEXP = 2.0]	-0.23	0.83	0.08	1	0.78	
	[INFEXP = 3.0]	0.22	0.83	0.07	1	0.79	
	[INFEXP = 4.0]	1.39	0.84	2.73	1	0.10	
Location	[DOPT = 4.00]	-1.04	0.46	5.18	1	0.02	0.35
	[DOPT = 3.00]	-1.3	0.39	11.24	1	0.001	0.27
	[DOPT = 2.00]	0[a]	.	.	0	.	
	[DRC = 4.00]	0.28	0.40	0.48	1	0.489	1.32
	[DRC = 3.00]	0.17	0.398	0.17	1	0.677	1.18
	[DRC = 2.00]	0.96	0.46	4.42	1	0.036	2.62
	[DRC = 1.00]	0[a]	.	.	0	.	
	[AgeGr = 3.00]	0.85	0.42	4.11	1	0.043	2.34
	[AgeGr = 2.00]	0.18	0.32	0.30	1	0.585	1.19
	[AgeGr = 1.00]	0[a]	.	.	0	.	
	[EduLevel = 3.00]	0.11	0.45	0.06	1	0.807	1.18
	[EduLevel = 2.00]	0.18	0.365	0.24	1	0.625	1.195
	[EduLevel = 1.00]	0[a]	.	.	0	.	
	[DummyS = 1.00]	0.87	0.33	6.77	1	0.009	2.38
	[DummyS = .00]	0[a]	.	.	0	.	
	[EcoLit = 4.00]	0.77	0.57	1.84	1	0.174	2.17
	[EcoLit = 3.00]	1.69	0.49	12.15	1	0.000	5.44
	[EcoLit = 2.00]	1.38	0.47	8.53	1	0.003	3.95
	[EcoLit = 1.00]	0[a]	.	.	0	.	
	[DOM = 5.00]	2.003	0.896	5.001	1	0.025	7.41
	[DOM = 4.00]	0.88	0.33	7.17	1	0.007	2.41
	[DOM = 3.00]	0[a]	.	.	0	.	
	[ST = 3.00]	0.296	0.41	0.51	1	0.47	1.34
	[ST = 2.00]	-0.272	0.39	0.48	1	0.49	0.76

		Estimate ($\hat{\beta}$)	Std. Error	Wald Statistics	df	Sig.	Odd Ratios exp($\hat{\beta}$)
	[ST = 1.00]	0[a]	.	.	0	.	
	[SCEP = 2.00]	0.26	0.33	0.63	1	0.43	1.29
	[SCEP = 1.00]	0[a]	.	.	0	.	
	[IncomeL=25.00]	-0.58	0.79	0.54	1	0.46	0.56
	[IncomeL=20.00]	-1.83	0.59	9.53	1	0.002	0.16
	[IncomeL=15.00]	-1.08	0.50	4.62	1	0.032	0.34
	[IncomeL=10.00]	-0.91	0.47	3.74	1	0.053	0.40
	[IncomeL= 5.00]	0[a]	.	.	0	.	
Link function: Logit.							
a. This parameter is set to zero because it is redundant.							

Education level, spending tendency and satisfaction content are found insignificant across all categories. The rest of the variables degree of myopia, income level, economic literacy, age group, degree of optimism, degree of relative comparison and the dummy variable specified for categorizing salaried and self-employed are found significant either in terms of one or more than one categories. Some categories are merged in case of few variables based on small proportion of respondents in them. Degree of optimism initially designed for five categories has been interpreted in terms of three categories, whereby categories highly optimistic and highly pessimistic are dropped based on small proportion of individuals in them. The results of degree of optimism (DOPT) suggest that individuals who are optimistic rather than pessimistic (reference category) are less likely to expect high inflation rather than combined intermediate level, low-level and stable inflation. In terms of proportional odd ratio, we say that the proportional odd of expecting a high inflation rather than combined intermediate level, low level and stable inflation is 0.65 times lower for optimistic individuals than pessimistic individuals (reference category). Likewise, individuals holding a neutral approach are less likely to expect a high inflation rather than combined mid-level, low and stable inflation. In terms of proportional odds ratio, the proportional odd of expecting a high inflation is 0.63 times lower for neutral individuals rather than pessimistic individuals. Overall, we can argue that degree of optimism is negatively

linked with ratings on expected inflation; optimistic individuals tend to expect low inflation in general. The results are in line with the theoretical propositions we portrayed earlier.

Degree of relative comparison (DRC) is another hypothesized determinant of inflationary expectations in our model. As per results only one category of this variable proves to be significant. Out of five categories "Extremely high degree of making relative comparisons" has been merged into "High degree" based on small proportion of individuals lying in it. Reported results suggest that individuals who hold low degree of making relative comparison rather than extremely low level (reference category) are more likely to expect high level inflation as compared to combined mid-level, low and stable inflation. The proportional odd of expecting high inflation as compared to combined midlevel, low or stable inflation is 2.62 times higher for individuals lying in the low degree category rather than extremely low degree of making relative comparison. We can infer that increments in degree of making relative comparison is positively associated with the ratings on inflation; making more relative comparisons tends to make you expect high inflation. Age group is nevertheless important as individuals belonging to age group 3 (40 to 50 years) as compared to age group 1 (20 to 30 years) are more likely to expect high inflation rather than the combined midlevel, low and stable inflation. In terms of proportional odds ratio, the proportional odd of expecting high inflation as compared to combined mid-level, low, and stable inflation is 2.34 times higher for individuals belonging to age group 3 as compared to age group 1.

As per characteristic of our sample, as we have included both salaried and self-employed individuals the dummy variable (DummyS) for these categories reveals that salaried individuals as compared to self-employed individuals are more likely to expect high inflation rather than combined mid-level, low and stable inflation. The proportional odds of expecting high inflation rather than combined mid-level, low and stable inflation is 2.37 times higher for salaried individuals as compared to self-employed individuals. As our sample of self-employed people mostly comprise of individuals with self-owned businesses, affluence of this class might have been one attribute responsible for this behavior. This contemplation is well confirmed with the help of one of the independent variables we have analyzed, that is, income level. The results of this

predictor ridicule that individuals with high income level as compared to low income level are less likely to expect high inflation. The results are shown in Table 13 where three out of four higher income categories as compared to lowest income category are found with negative parameter coefficients. In terms of proportional odd ratio, we find that the proportional odds of expecting high inflation is 0.84 times lower for those individuals who earn between Rs. 70 thousand to 1 lac as compared to those who earn less than Rs. 25000 (base category). Likewise, this ratio is 0.66 times and 0.60 times lower for successive next two income categories as compared to base category. This gives us an impression that high incremental levels of income are negatively linked with ratings on inflation. Individuals belonging to high income groups expect less inflation as compared to individuals belonging to lower income group.

Next, we scrutinize the variable economic literacy (Ecolit); we infer that high economic literacy increases the likelihood of expecting high inflation as evident from the positive parameters estimates and proportional greater than 1 odd ratio against both categories of this variable. The proportional odds of expecting high inflation as compared to expecting a stable inflation is 5.44 times higher for individuals having moderate literacy rather than no literacy (reference category) and is 4 times higher for individuals having weak literacy rather than no literacy. Incidentally, we conclude that successively higher levels of economic literacy are associated with higher inflationary expectations. These results are against some empirical findings we have quoted before. The reason might be the lack of confidence Pakistani individuals hold on policy makers. Although Pakistan is now assumed to be in near inflation targeting regime especially after the introduction of "Interest rate corridor" in 2009, this result is an indication that our monetary policy is not properly able to anchor inflationary expectations. Inflationary expectations are believed to be anchored when economic agents including investors and private actors hold a consensus and trust on the long run inflationary targets pursued by central bank (Beechay et al., 2011). In our case this result suggests that despite owing policy awareness on the part of respondents this consensus is yet to be established. Finally, we discuss last significant predictor of our theoretical model degree of myopia (DOM). The initially proposed five categories of this variable are finally confined to three categories by

dropping the last two categories based on small response ratio in them. The results of first two categories (Highly Myopic) and (Myopic) as compared to reference category (Neutral) indicate that individuals with myopic tendency as compared to neutral tendency are more likely to expect high inflation rather than stable inflation. The likelihood of differential across each successive category is evident from the proportional odd ratios. Proportional odds ratio column in table 13 identifies that the proportional odd of expecting high inflation is 7.4 times higher for highly myopic individuals as compared to individuals carrying neutral tendency and it is 2.4 times higher for individuals carrying myopic tendency as compared to neutral tendency. On more practical side if we observe Pakistan's inflation rate over the course of last seven years, the figures remained as 14%, 12%, 9.7%, 7.6%, 7.2%, 2.52%, and 3.8%. For a non-myopic person, the figures overall seem to be an improvement whereby inflation rate has declined from a high level of 14% to a meager 3.8%. A non-myopic individual would place weight on both near past and farther past values and would expect stable or low-grade inflation. Myopic individuals on the other would be interested only in recent one or two figures (say 2.5% vs 3.8%) which lie in the existing near past and might expect a considerate increase in inflation based on recent rising trend.

V. CONCLUSION

The study is aimed at exploring some critical determinants of inflationary expectations in an unconventional manner. Conventionally, inflationary expectations are mostly linked with economic and demographic variables including age, gender, education, income, ethnicity etc. The current study, besides discussing the conventional determinants, additionally focuses on some common individualistic tendencies and personal aptitudes including degree of myopia, degree of optimism, degree of relative comparisons, sense of satisfaction with political and economic environment, individual's spending tendencies, and individual's aptitude in terms of economic literacy. Literature is not enriched in directly addressing inflationary expectations with such individualistic perspective although indirect discussions are available in some remote studies; therefore, the study is unique of such type and is verily of explorative nature.

Some concrete findings of the study include a positive association between degree of myopia and inflationary expectations, highly myopic individuals tend to expect high inflation. Degree of optimism tends to relate negatively with inflationary expectations; individuals with high optimism are found to expect low inflation rather than high. In lieu of testing the idea of "Relativism" posed by psychologists, sociologists and economists for its effect on inflationary expectations, our findings reveal that individuals who make more relative comparisons while making their decisions (especially economic decisions) tend to expect high inflation rather than low. High economic literacy and awareness cause individuals to expect high inflation as per reported results of our study. Incidence of expecting high inflation is observed in individuals belonging to old age group. Besides this, individuals who belong to higher income group hold lesser incidence of high inflationary expectations. Out of the two targeted categories in the sample, salaried individuals are found with a higher likelihood of expecting high inflation as compared to self-employed. Education level, spending tendency and sense of satisfaction are among the insignificant covariates of our model.

In the current era, as the macroeconomic modeling is done keeping intact the micro underpinnings, our study can prove to be provocative in highlighting some meaningful factors or individual characteristics which might become the agenda of interest for macroeconomists and policy makers. As efficacy of macroeconomic inflationary policy is dictated by the expectations individuals hold regarding inflation, having awareness of personality attributes which define these expectations can surely help the policy makers to design policy in more effective way. Monetary policy makers always face a challenge of continuous evolving and changing economy especially in setting up inflationary targets; the impetus behind this change is the individuals whose expectations are to be catered properly. Once the dynamics leading these expectations is understood with its defined foundations, the policy becomes more coherent. Existing literature on monetary policy has placed a lot of emphasis on identifying those factors which can affect the credibility of central bank's monetary policy in the eyes of market/economic agents. This credibility in turn proves to be consequential for meeting the announced targets of central bank and its commitment to these targets. Developing credibility requires effective communication between central bank and general public whose inflationary expectations ultimately matter for the final settlement of actual inflation level via decisions of public in their respective domains. Arguably, for

meeting the announced inflationary targets central bank must have the information which can potentially affect the inflationary expectations of the public it communicates with. It is not possible for monetary authority (central bank) to approach mass population and every segment of economy for communicating its targets and plans; rather a selected categorical subset of population is a viable solution.

Within the discussed context our research proves to be consequential in identifying that potential subset of population (with certain qualitative attributes) which must be approached while setting up monetary plans. For example, our study has categorized inflationary expectations of individuals with respect to different age group and income levels. It is neither possible nor viable for central bank to approach each age group and income level for communicating its policy plans to develop credibility rather a specific sub-group must be targeted. If in a given point of time central bank sets low level inflationary targets and information is made available regarding specific age group holding high inflationary expectations, communication can be made with that specific group rather than all age groups within population. Our research has tried to highlight how inflationary expectations relates with different age profiles of individuals and the results in essence are aimed at serving as a guiding principle.

Likewise, on deterministic front, myopic learning or tendency has been found significant in our empirical model. If myopic tendency has been a pronounced phenomenon underlying agents' expectations, then this must be accounted for, while setting up monetary policy target or inflationary targets. For example, consider a counter factual case: to pursue long term inflationary target if central bank compromises upon short term inflationary levels and these short term inflationary levels are perceived as stance of monetary policy by the myopic agents, they would account these levels in their decision making thus making long term targets pursued by central bank hard to be achieved. To cater this myopic tendency, central banks are advised to set short term and medium term inflationary targets rather than long term targets.

Exploring inflationary expectations from firm's perspective and incorporating detailed policy insights is the future agenda of our research.

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Annexure

Questionnaire

(Individualistic Attributes of Inflationary Expectations)

This questionnaire is merely designed for research purpose; the whole content of the questionnaire is meant to extract the individual responses regarding their expectation formation process. All responses would anonymously be kept confidential and will be used to represent the intended idea of research only.

Personal Information

Name	Age	Gender	Occupation	Ethnicity	Qualification

Q1. What is your average monthly income?

Options	1. < 25000	2. > 25000 but < 40000	3. > 40000 but < 55000
	4. > 55000 but < 70000	5. > 70000 but < 85000	6. > 85000 but < 1 lac	7. > 1 lac

Q2. Are you married? 1. Yes 2. No

Q3. If your response to question 5 is yes, how many children do you have? [_____]

Q4. Which locality you are residing in? Options | 1. Village | 2. Town | 3. City

Q5. How much satisfied are you with your overall life?

Options	1. Fully satisfied	2. Satisfied to some extent	3. Not at all satisfied

Q6. How much satisfied are you with the political, economic and social environment of your country?

Options	1. Political Environment	2. Economic Conditions	3. Social Environment
Fully Satisfied			
Satisfied to some extent			
Not at all satisfied			

Q7. What do you consider yourself?

1. Spendthrift (who prefer to spend a lot	2. Thrifty (who saves a lot)	3. Between 1 & 2

Q8. Your family profession is?

Options	1. Teaching	2. Farming	3. Business	4. any other (please specify)

Myopic/Non Myopic Tendency as an Attribute

Respond to questions 9 through 17 comprising of some behavioral examples from our everyday life.

(1 - Strongly agree, 2 - Agree, 3 - Uncertain, 4 - Disagree, 5 - Strongly Disagree)	1	2	3	4	5
Q9. It is often the case that we see certain events or happenings taking place and get moved emotionally and psychologically, for example; we see an accident that castes a threatening effect on our mind and we become cautious in our driving style but as time passes by we usually adopt the same driving style as we use to possess before.					

Q9.1 By what percentage you behave in a manner as mentioned in Q 9?	Choice
1. I 100% behave in the said manner.	
2. I 90% behave in the said manner.	
3. I 80% behave in the said manner.	
4. I 70% behave in the said manner.	
5. Any other (Please specify) _____ .	

Q9.2 What might be the probable reason for behavior mentioned in Q 9 ? Assign rank.	Rank
1. We behave in this manner because we are ignorant.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are ambitious (we think nothing can happen to us)	
4. We behave in this manner because we are stubborn.	
5. We behave in this manner because we are careless.	

Q10. We mostly love our dear ones and cannot even think of any departing in any situation from them but once inevitably they depart by a natural death we mourn and feel regret but as time passes by we feel psychologically healed and can only have a faded impression of our dear ones at the backend of our minds/memories.

Q10.1 By what percentage your psychology resembles the mentioned one in Q 10?	Choice
1. My psychology 100% matches with the mentioned one.	
2. My psychology 90% matches with the mentioned one	
3. My psychology 80% matches with the mentioned one.	
4. My psychology 70% matches with the mentioned one.	
5. Any other (Please specify) ----------	

Q10.2 What might be the probable reason for behavior mentioned in Q10 ? Assign rank	Rank
1. We behave in this manner because we are ignorant.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are practical (we consider it as normal course of life and believe that things go like that)	
4. We behave in this manner because we are stubborn.	
5. We behave in this manner because we are careless.	

Q11. Suppose you are hurt by the deeds or acts of someone say you experience a fight, or somebody deprives you from your right or somebody deceives you, it is very difficult for you to forgive those deeds or acts at the very next day but would rather be easy to exercise if those events become a part of a prolonged history back into your life.

Q11.1 What might be the probable reason for behavior mentioned in Q11? Assign rank	Rank
1. We behave in this manner because we are emotional.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are egoistic.	
4. We behave in this manner because we are sensitive.	
5. We behave in this manner because we are unkind.	

Q12. Suppose you go to a person who is your close friend for a very long time and has done many favors to you whenever required but has denied just once when you visited him the last time, you'll mind the last denial more than you would regard the previous jesters or favors and probably may not visit him again for asking any favor in your entire life

Q12.1 What might be the probable reason for behavior mentioned in Q12? Assign rank	Rank
1. We behave in this manner because we are emotional.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are egoistic.	
4. We behave in this manner because we are sensitive.	
5. We behave in this manner because we are unthankful.	

Q13. The famous Indian cricketer Yuvaraj Singh, who has served Indian cricket for a very long time and has won some exceptional matches for his country, in the recent T-20 world cup his performance suddenly shuffled and got the spectators so aggrieved and annoyed that they physically attempted to burn his house. This exemplifies that we as individuals often evaluate players based on recent performances ignoring the previous good ones.

Q13.1. By what percentage you overlook the good performance of your team or players?	Choice
1. I am very emotional and can't hold myself back at least from thinking in such extreme manner if not directly involved in such acts. (Dil karta ha goli maar dun)	
2. I am reasonably emotional and mostly involve in a light verbal criticism.	
3. I am rather sensible and consider the whole profile of a player or team in giving any verdict not just the recent performance.	
4. I am rather sensible and idealizes all the good years preceding the bad one and avoid criticism.	

Q13.2 What might be the probable reason for behavior mentioned in Q13? Assign rank	Rank
1. We behave in this manner because we are emotional.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are insensible.	
4. We behave in this manner because we are sensitive.	
5. We behave in this manner because we are unthankful.	

Q14. Government representatives win the public's confidence and revive their support by making stumbling claims of removing poverty, unemployment and starting flurry of constructive works just before the election process. This gesture convinces us to turn our votes in their favor.

Q14.1 By what percentage you are influenced by such acts of government representatives?	Choice
1. I am 100% influenced by such acts. 4. I am 70% influenced by such acts	
2. I am 90% influenced by such acts. 5. Any other (Please specify) _____	
3. I am 80% influenced by such acts.	

Q14.2 What might be the probable reason for behavior mentioned in Q14? Assign rank	Rank
1. We behave in this manner because we are ignorant.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are insensible.	
4. We behave in this manner because we are foolish.	
5. We behave in this manner because we are mean.	

Q15. The election held in 2008 in Pakistan is evident of the fact that the death of Mohtarma Benazir Bhutto was given such media hype that a large segment of population which was either not in support of PPP or which has discontinued supporting it for certain grievances and complaints turned into PPP's favor.

Q15.1 How do you expect yourself to behave at that moment of time?	Choice
1. If I were at that time, I would have done the same thing.	
2. If I were at that time I would have thought to behave in that manner.	
3. If I were at that time I would have taken that event neutral towards my voting decision.	
4. If I were at that time I had been among those people who would be convincing the people not to be influenced too much from that recent tragedy.	

Q15.2 What might be the probable reason for behavior mentioned in Q15 ? Assign rank	Rank
1. We behave in this manner because we are emotional.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we are insensible.	
4. We behave in this manner because we are ignorant.	
5. We behave in this manner because we are obsessive.	

Q16 . We have observed this thing in our society that whenever any calamity and disaster like flood or earthquake hits us we get awakened for a while, we consider this thing as a sign of God's anger due to our wrong deeds. At that moment of time we repent and make promise to ourselves and to our God that from now on we'll avoid sins and adopts piety but this spell mostly does not last long enough and we again tend get involve in the tempting and absorbing luxuries of life. Do you agree that this attitude generally prevail among us.

Q16.1. By what percentage this example matches your physical experience?	Chocie
1. It 100 % matches my physical experience 5. Any other (Please specify) _____	
2. It 90% matches my physical experience	
3. It 80% matches my physical experience	
4. It 70% matches my physical experience	

Q16.2 What might be the probable reason for behavior mentioned in Q16? Assign rank	Rank
1. We behave in this manner because we are ignorant.	
2. We behave in this manner because naturally we are shortsighted. (our farther past fades away)	
3. We behave in this manner because we consider dooms day to be far apart.	
4. We behave in this manner because we are emotional.	
5. We behave in this manner because we are stubborn	

Q17. Assign percentage weight in general to the events which have happened in the nearer past VS the events which have happened in the farther past in your life if you were to base your future expectations upon them.

		Choice
1.	100% to the nearer past, 0% to the farther past.	
2.	90% to the nearer past, 10% to the farther past.	
3.	80% to the nearer past, 20% to the farther past.	
4.	70% to the nearer past, 30% to the farther past.	
5.	60% to the nearer past, 40% to the farther past.	
6.	50% to nearer past, 50% to farther past.	
7.	40% to nearer past, 60% to farther past.	
8.	30% to nearer past, 70% to farther past.	
9.	20% to nearer past, 80% to farther	
10.	Any other (Please specify)	

Degree of Optimism/Pessimism

Q18. Quote your response regarding your expectations about the following state of affairs of your economy.
(1 - Strongly agree, 2 - Agree, 3 - Uncertain, 4 - Disagree, 5 - Strongly Disagree)

	1	2	3	4	5
18.1 You expect that the households and domestic consumers of gas will be given protection by discouraging the CNG culture in near future.					
18.2 You expect that prices will become stable in your economy against the tradition that happened to be the case in the past.					
18.3 You expect that the upcoming governments will make poor prone policies especially when it comes to imposition of taxes.					
18.4 You expect that energy crisis will be resolved in the near future.					
18.5 You expect that our country would soon join the pace of countries like china, Japan,					

Malaysia in terms of growth and development.	
18.6 You expect that Common man will have access at least to basic necessities of life in near future.	
18.7 You expect that we will soon get a leadership which would help Pakistan getting out of this vicious cycle of poverty, debt (reliance on IMF) and budget deficits.	
18.8 You expect that a day will come when we as nation would mitigate the errors in terms of corruption, mal handling of economic resources and concentration of wealth.	
18.9 You expect that your standard of living tomorrow will be better than what it is today.	
18.10 You expect that Islamic economic system will soon take over the existing capitalistic system.	
18.11 You are hopeful that the educational divide, culture of political affiliations, Kickback system will soon vanish.	
18.12 You are so desperate that you hardly can think of any improvement.	

Individual Tendency of making Relative Comparisons

Q19. Suppose you are expecting to get a certain increase in your salary/income in the upcoming budget/year, what is your way of analyzing yourself as better off or worse off as compared to your existing status?

Option 1	Option 2
I would always take the increase as a positive thing and consider myself as better off.	I would decide by making relative comparison of income with the following. (select relevant degree)

	1	2	3	4	5
Increase in expenses on daily consumables					
Increase in per capital income of economy					
Increase in utility bills					
Increase in children school fee					
Increase in transportation cost					
Increase in income tax					
Increase in sales tax					
Devaluation/Depreciation of rupee					

Q20. When you go to the market to make a purchase of any consumable or lasting item, what is your way of making a choice:

Option 1	Option 2
You randomly select the item of your choice.	You make choice by taking into account the following:

	1	2	3	4	5
Number of alternative items available in the market					
Relative price of items similar to that purchased by you					
Relative quality of items similar to that purchased by you					
Number of people who are using that product.					
Number of shops from where you can purchase that product					

Q21. Consider you visit a firm/factory in search of a job, how would you negotiate your wage/salary?

Option 1	Option 2
You accept whatever will be offered to you on the basis of your need.	Besides your need you will consider the following factors into consideration.

	1	2	3	4	5
Number of firms besides this where you can apply.					
Relative salary/wage offered to people like you in terms of qualification in the job market.					
Relative salary/wage offered to people like you in terms of skill/experience in terms of job market.					
Number of people who have applied for the post besides you.					
Overall level of inflation in the economy					

Information about Economic Variables, Policies and their Covariates

	Yes	No
Q22. Do you know what inflation is? If "Yes" proceed to Q23 – Q29, if "No" skip to Q30		

Q23. From where do you get the information about inflation? (You may choose more than one option)

	Options	Choice		Options	Choice
1.	Self-Assessment		5.	State bank's reports	
2.	News Bulletins		6.	Social Network/Friend's circle	
3.	News papers		7.	Seminars/Conferences	
4.	Economic survey of Pakistan		8.	Television Talk shows	

Q24. While making expectations about future inflation what weighted scheme do you follow?		Choice
1.	You fully consider past inflationary trends in your country.	
2.	You fully rely on current information of variables which can affect inflation in future.	
3.	50% weight to option 1 and 50% to option 2.	

Q25. While making expectations about inflation which among the following things you usually take into account. (Select your relevant variables of interest)

		Choice
1.	Government Budget Announcements	
2.	World oil prices	
3.	Policies of IMF and other international donor agencies.	
4.	Past inflation rate.	
5.	Level of money supply (growth rate of money supply)	
6.	Exchange rate	
7.	Interest rates in the market	
8.	Political state of economy	
9.	Literacy level in the economy	
10.	Government Budget deficits	
11.	Trade deficits	

Q26. On what basis you make forecast about future inflation?

(1 - Strongly agree, 2 - Agree, 3 - Uncertain, 4 - Disagree, 5 - Strongly Disagree)		1	2	3	4	5
26.1	You make forecasts about inflation on the basis of your exceptional sixth sense.					
26.2	On the basis of your complete market analysis from consumer's perspective.					
26.3	On the basis of your complete market analysis from producer's perspective.					
26.4	On the basis of information you extract by reading economic reviews, statistical Issues and bulletins.					
26.5	You rely on general perception prevailing around you.					
26.6	You make inflation forecasts randomly without having any definite variable of interest in your mind.					

Q27. How do you predict or expect future inflation rate in your country in next year?

1. It will increase		2. It will remain stable		1. It will decrease	

Q28. If your response to question Q27 is option 1, by what percentage you would expect it to increase?

1. It would increase by 10% or more		2. It would increase by 5%		3. It would increase by 3%	

Q29. If your response to question Q27 is option 1, which thing has led you to expect this increase?							
1. It has increased recently		2. It has increased in past few years		3. It always used to increase			

Economic Literacy
(Policy Awareness)

Q30. Do you know what is fiscal policy?					
1. Yes, I know it about it with precision		2. I have heard about it		3. I never heard about it	

Q31. If your response to Q30 is either option 1 or 2, can you identify who controls this policy?											
1.	Government		3.	Industrialist's		5. Businessmen		7. Don't know			
2.	Central Bank		4.	Agriculturist's		6. World Bank					

Q32. If your response to Q30 is either option 1 or 2, can you identify its main objective?	
1. The main objective of fiscal policy is to control inflation.	
2. The main objective of fiscal policy is to manage the budgetary affairs like monitoring deficits or surpluses; financing publicly oriented i.e. health care, educational, reformative, welfare projects and to stabilize the internal and external shocks faced by the economy.	
3. The main objective of fiscal policy is to keep check and balance on Central bank of the country.	
4. The main objective of fiscal policy is to channelize funds provided by the IMF, World Bank and other international donor agencies.	
5. The main objective of fiscal policy is to provide jobs to the people.	

Q33. Do you know what is monetary policy?					
1. Yes, I know it about it with precision		2. I have heard about it		3. I never heard about it	

Q34. If your response to Q33 is either option 1 or 2, can you identify who controls it?							
1.	Government		4.	Industrialist's		7. Don't know	
2.	Central Bank		5.	Agriculturist's			
3.	Businessmen		6.	World Bank			

Q35. If your response to Q33 is either option 1 or 2, can you identify its main objective?	
1. The main objective of monetary policy is to control population in the country.	
2. The main objective of monetary policy is to control inflation and manage supply of money in the economy.	
3. The main objective of monetary policy is to keep check and balance on the government.	
4. The main objective of monetary policy is to reduce unemployment in the economy.	
5. The main objective of monetary policy is to provide loans to the industrial and agricultural sectors.	

Economic Literacy (Theoretical Understanding)

Q36. What should a government do in order to control inflation?	Choice
1. Increase its spending and print more money.	
2. Increase its spending and print less money.	
3. Decrease its spending and print more money.	
4. Decrease its spending and print less money.	
5. No idea about it.	

Q37. Do you think government can always print as much money as it would like to?			
1. Yes		2. No (Quote reason) ----------	

Q38. Every year government announces a minimum wage rate/ salary in the budget, if this wage rate/salary is above the rate offered by the market, what would happen to employment?					
1.Employment will increase		2. Employment will decrease		3. It will not change	

Q39. In which shape money is adversely affected by increase in inflation?					
1. In form of Cash		2. In form of saving account		3. In form of stocks	

Q40. Is it risky to invest in one asset or multiple assets?	1. One asset		2. Multiple assets	

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AN EMPIRICAL ANALYSIS OF EDUCATIONAL INEQUALITIES IN PAKISTAN

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Abstract. The present paper aims to provide detailed analysis of inequality in education across Pakistan. The analyses are conducted for rural and urban areas of all provinces and Islamabad capital territory for 2014-15. In specific, we measure educational inequality across the whole population and across the employed population. The analyses are conducted separately for male and females having age equal to15 years or above and are not enrolled in any educational institute. We find that in general educational disparities are exceptionally high across the population. However, the intensity of educational inequality is relatively lower across employed population. Educational disparity is relatively better in urban areas as compared to rural areas. We also find that educational disparities are more severe among female than male. The region wise comparison reflects that inequalities are less in Islamabad but are more in Baluchistan and Sindh.

Keywords: Education, Inequality, Earnings

JEL Classification: I24, D63, E24

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I. INTRODUCTION

Human capital is one of the fundamental factors for economic development in a country. Witzke (1984) states that neither land nor physical capital but human capital and other human quality components are key factors for economic development. Schultz (1961) has also emphasized the importance of investment in human capital. A large number of studies has revealed that human capital is one of the most important factors for economic growth [see for example: Pelinescu (2015), Riley, (2012) and Mankiw *et.al*. (1992)]. We know that education is an essential ingredient for human capital. Hence, sustainable investment in human capital in the form of education is a prerequisite for sustainable economic growth. Pelinescu (2015) emphasizes that targets of high growth cannot be realized without a good education and training system. Education helps in the formation of human capital by making individuals more productive via increasing the potential of their earning.

A large number of studies have shown a positive impact of education on earning. [see for example; Nasir & Nazli (2000), Blundell, *et.al*. (2004), Devereur, & Fan (2011), Turcinkova & Stavkova (2012) and Heckman, *et.al*. (2016)]. Likewise, is the situation in Pakistan. The statistics in Table 1 show that on average more educated people earn more. The calculation is based on micro data of Pakistan Social and Living Standards Measurement survey (PSLM) for the year 2015-16.

TABLE 1

Average Earnings and Education in Pakistan

Education (measured in years)	Average Monthly Earnings in PKR
0 – 4	9,957
5 – 9	13,474
10 – 13	18,708
14 – 15	27,178
16 and above	34,582

Source: self-computation from PSLM (2015-16)

In addition, one can observe from Table 1 that the average earning increases with the level of education. For instance, the average earnings

of graduates are 3.5 times larger than the average earning of illiterate earners [1] This apparently seems to be a reasonable difference, but if the cost of education including time cost, opportunity cost and monetary cost is considered then the difference between average earnings of illiterates and graduates is not much high. One possible reason could be the earnings due to non–educational factors, such as in Pakistan a significant number of illiterates are small or medium level farmers. Likewise, some of them own established businesses through inheritance. Thus, the earnings of such people, which are much higher, cause an upward shift in the average earnings of illiterates.

The earnings of people with education level of primary (5–9) are about half more than the average earnings of illiterate people. This shows that, on average, every next level of schooling matter in term of productivity.

Education is the fundamental determinant of earning, so difference in education is among the root causes of differences in earnings. Estimates based on micro data of PSLM (2015-16), show that the Gini coefficient of earning inequalities in Pakistan is 0.474, which is too high [2]. The statistics presented in Table 1 also indicate that difference in educational attainments is a key source of earning differentials.

In the literature, we find that unequal distribution of education has a negative impact on per capita income. For example, Castello, and Domenech (2002) show that inequality in education is associated with lower investment rate and lower income growth rates. The study suggests that policies for promoting growth must take into account, both the level and distribution of education. Later on Hassan and Shehzad (2007) explore the impact of educational inequality in Pakistan on economic

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[1] As per Government of Pakistan (2008) literacy is defined as "Ability to read and write simple statements in any language and to be able to do simple calculations". In this study we have considered all those as illiterates whose years of schooling are blow 5 (which is primary education). The rationale behind this categorization is that primary is the basic level of education and education below primary do no really affect the earning potential of an individual. For instance, earners without any formal education and with education of 1 to 4 years are treated equally in the job market as this minor level of education does not increase their productivity.

[2] These are author's self-computations.

growth. The study finds that educational inequalities hamper economic growth. Yet in another study Demet, (2010) explores the relationship between human capital inequalities and economic growth for the provinces of Turkey and finds that educational inequality is a key factor in explaining variations in output growth. Recently Ibourk & Amaghouss (2013) also show that educational inequalities have negative impact on economic growth. Keeping in view the key role of educational inequality in growth, the present study aims to analyze the inequality in the distribution of education across Pakistan.

In Pakistan only few studies are conducted on the measurement of educational inequality. In this regard studies by Sarmad *et.al*. (1988), Madiha, (2005), Saeeda, (2009) and Khan, *et.al*. (2015) are notable. However, the focus of our study is different. We measured educational inequalities among male, female and combined population for rural and urban segments of four provinces and the capital territory of Islamabad. The focus of our study is on the population having 15 years of age and above and who are not enrolled in any educational institute. The same exercise is repeated for the employed population.

The rest of the paper is organized as follows. The methodological issues in the measurement of educational inequalities are addressed in Section 2. Section 3 explains the results. Summary and conclusion are given in Section 4.

II. METHODOLOGICAL ISSUES

MEASURES FOR ESTIMATING EDUCATIONAL INEQUALITY

There is no specific measure to estimate educational inequalities. Different researchers like Thomas and Wang (1999), Adelbaki,(2012) and Ibourk, & Amaghouss (2013) transformed Gini coefficient of income inequality for measuring educational inequalities. Gini Coefficient is one of the most commonly used measures of inequality, which is attributed to Gini (1912). Geometrically it is defined as the ratio of the area between the line of absolute equality and the Lorenz curve to the total area below

the line of absolute equality[3] The transformed Gini coefficient, as a measure of educational inequalities is written as:

$$G_E = 1 - \sum_{i=1}^{n} p_i \left(cy_i + cy_{i-1} \right)$$

where, G_E is the educational Gini coefficient based on the educational attainment of individual, p_i is the population share and cy_i is the cumulative educational share of the individual *i*, when all individuals are arranged in ascending order for years of schooling.

There are few advantages of employing Gini coefficient, such as it is invariant to proportional change in the education levels of all persons; it is independent of personal identity of a person and has interpretable limits. It lies between zero and one, where zero represents perfect equality and 1 represents perfect inequality.

DATA AND VARIABLES

The present study is based on the latest edition of micro level data of Pakistan Standard of Living Measurements (PSLM) for the year 2014-15. PSLM is periodically conducted by Pakistan Bureau of Statistics (PBS), Government of Pakistan. PSLM (2014-15) contains detailed information of 78,635 households comprising 513,945 individuals of which 295,310 are of age 15 years and above and among these 11,4500 are earners.[4]

We measure the educational attainment level by the successful years of schooling of an individual. Hence, we take 0 to 18 years of education as a measure of educational attainment. In our analysis, 0 represent illiterates, 1 represents 1 year of schooling, and so on. For degree in agriculture, computer and engineering total years of schooling are 16

[3] For detailed description of Gini Coefficient see Idrees & Ahmad (2017)

[4] The present study has confined itself to individuals of age 15 years and above due to the reason that at this age a large number of individuals enter the labor market and are not considered child labor. Moreover, first we shall focus on the entire population of this age group and then confine our analysis to earners only. By earners we mean all those individuals who are employed during the survey period. The comparison will enable us to understand the dynamics of educational inequality across all individuals and earners.

years. For degree in medicine we took 17 years of education and for M.Phil we took 18 years of education.[5] Moreover, we select only those individuals who have completed their education and are not currently enrolled. The reason is that comparing education of those who are currently enrolled might provide understated situation regarding educational inequalities.

III. RESULTS AND DISCUSSION

In this section we present the results of our analysis. We have already explained that the focus is on individuals who have completed their education and are not currently enrolled. We present the estimates of Gini coefficient for educational attainments in Table 2.

The statistics reported in Table 2 portray the presence of significant educational inequalities in all regions of Pakistan with the exception of Islamabad. Moreover, the statistics reveal that variations in educational attainment drop considerably for earners. For instance, the Gini coefficient measuring inequalities in education attainment among population ranges from 0.418 to 0.929 and among earners it ranges from 0.315 to 0.853. This decline is quite understandable, as earners are usually more educated as compared to non-earners, and thus variations in education shrinks between earners. The data reveal that average years of schooling for earners is around 5, while for non-earner the average years of schooling is around 2.24. Moreover 72% of population are illiterate while, this is 47% for earners. These statistics support relatively low educational variations among earners.

[5] HIES reports M.Phil. and Ph.D. collectively, so it is not possible to separate them, moreover duration of Ph.D. is not fixed. So for this category we have taken 18 years of schooling on the perception that 18 years is the minimum level of education for this group. It is also to be noted that the proportion of this category is less than one percent. Further, informal education is undefined as the years of schooling of informal education are not specified in the data. We consider informal education equivalent to primary. It is also to be mentioned that the proportion of people with informal education is also insignificant.

TABLE 2

Educational Inequalities in Pakistan

Region		Population age 15 years & above			Earners age 15 years & above		
		Overall	Male	Female	Overall	Male	Female
Khyber Pakhtoonkhwa	Rural	0.768	0.650	0.871	0.583	0.559	0.815
	Urban	0.644	0.539	0.744	0.431	0.418	0.535
Punjab	Rural	0.682	0.591	0.767	0.609	0.552	0.832
	Urban	0.531	0.479	0.582	0.424	0.402	0.533
Sindh	Rural	0.780	0.675	0.889	0.660	0.642	0.853
	Urban	0.597	0.520	0.677	0.460	0.443	0.615
Baluchistan	Rural	0.802	0.685	0.929	0.663	0.648	0.835
	Urban	0.699	0.569	0.840	0.489	0.477	0.588
Islamabad	Rural	0.490	0.418	0.556	0.359	0.315	0.528
	Urban	0.487	0.453	0.522	0.348	0.324	0.442

As mentioned above that educational inequalities are low in the federal capital that is Islamabad. The probable reasons are that it is one of the well planned regions within Pakistan. Here, on average, equal opportunities of education are available. Almost all sectors and areas within Islamabad have schools and colleges. Likewise, basic infrastructure and transport facilities are available to all citizens. Hence, education is relatively more accessible. In addition, households of Islamabad are relatively more conscious about the education of their children. It is also to be noted that Islamabad houses many government, semi-government and private organizations such as ministries, banks, NGO's, universities and foreign embassies. In all such organizations, the proportion of literate people is more than illiterate. This leads to higher demand for education, and is supplied as well.

The rural–urban comparison shows that educational attainment is more unequal in rural areas. This reflects that education facilities are not adequate in rural areas. Primary and secondary schools are though available in most of the villages, but colleges are rarely located in rural areas. Moreover, there is almost no concept of universities in rural areas of Pakistan. Consequently, a large proportion of individuals terminate their education after 10 years of schooling (Matric). Furthermore, the rural households are mainly engaged in agriculture and live-stock related activities. Such engagements do not require higher education and thus people might have little urge for higher education. Those, who are

interested and can afford, send their dependents to cities for getting higher education, but their proportion is too small. Eventually, a large educational disparity appears in rural areas.

The differences across provinces show that the educational disparity is maximum in Baluchistan followed by Sindh. One of the possible reasons is that the dynamics of these two provinces are different from Punjab and KPK. For example, the rural areas of Baluchistan and Sindh are mostly dominated by informal political system of Sardar/Vadara, who usually have least priority for education. They, thus, avoid improving educational system. It is interesting to note that during FY2016 Baluchistan and Sindh decrease funds allocated for new development projects of education, while the other two provinces significantly increased these funds. This is evident from the report of Economic Survey of Pakistan (2015-16). According to this survey Punjab and KPK increased the funds by 15.02% and 32.3% respectively, while Baluchistan and Sind decreased the funds by 11.5% and 1.5% respectively. Moreover, the numbers of educational institutions in Baluchistan are about 20 times less than the educational institutions in Punjab. It is worth mentioning that the population of Baluchistan is around 8 times less than population of Punjab.[6] The non-availability of educational institutions leaves a large proportion of population to terminate their education before entering to the next phase. Only well-offs (rich class) in these provinces afford to travel long for getting higher education. Consequently, educational disparities multiply in these provinces.

Table 2 also shows educational inequalities across gender. The same trend is found in all provinces and Islamabad. One of the probable reasons might be the strong family system in Pakistan. In a family system all economic responsibility is on male, while female is not supposed to earn and spend within a family. Hence, the education, whose main purpose is to secure a job and earn, might be male focused. In addition, the cultural values in Pakistan do not support free mobility of female. They have to take company of male members of family for travelling. Thus, the preferences for educating female drop within a family. Such

[6] Statistics extracted from Provincial Development Statistics (various issues)

values are stronger in rural areas; hence education appears to be a luxury good for girls in rural areas. Consequently, a large number of females discontinue education after exhausting the available facility at home town leading to educational disparities.

IV. SUMMARY AND CONCLUSIONS

Education is one of the main ingredients of human capital that leads to growth and development. Education empowers people by increasing their opportunities of participation in labor market. Higher is the education, lower is the probability to be among the poor. Hence, difference in education is likely to be one of the causes of poverty and income inequality. In this paper, we attempt to measure educational inequalities across Pakistan. We also compare the difference in educational inequality across rural and urban areas of all four provinces and capital territory. The analysis is based on the individuals from PSLM (2014-2015) having 15 years of age and above as well as who are not enrolled in any educational institute. PSLM (2014-2015) contains information related to education of 2,95,310 individuals having age 15 and above. Out of this population 38.8% are employed, while the rest are unemployed.

The findings show a significant presence of educational disparities across all population. Likewise, we find notable educational disparity in both rural and urban areas of all provinces in Pakistan. The estimated value of Gini coefficient for the entire population is higher than 0.417, which shows a significant educational disparity across Pakistan. The estimates of Gini Coefficient for employed population also show considerable educational inequalities. Nevertheless, the level of intensity of educational inequality in employed population is relatively low.

The level of educational inequalities, on average, remains high in rural areas as compared to urban areas. Likewise, educational disparities among female population are high as compared to male population. The level of educational disparities is highest in Baluchistan and Sindh followed by KPK and Punjab. The situation in Islamabad is significantly different from the rest of the country, where, educational disparities are relatively low.

The presence of educational disparities suggests that the policy makers must provide utmost importance to education in all regions of

Pakistan for both genders. In particular, necessary steps for improving access to education in Baluchistan and Sindh are required.

The present study is a preliminary effort for the measurement of educational inequalities in Pakistan. Future research can improve this work by removing the following limitations. We measured educational disparities based on the successful years of schooling, but we do not consider the quality and type of education. Likewise, we measure educational disparities based on the formal education, as PSLM does not report years of schooling for informal education. In addition, we did not find sectoral disparities, thus, future scholars can examine educational inequalities across various sectors of Pakistan.

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