Impact of Population Growth on Current Account Balance of Pakistan

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Abstract

Pakistan being 6th most populous country in the world has 177 million population with total fertility rate 3.5 per woman and population growth rate 2.05 percent. Family planning indicators reflect that Pakistan has comparatively lowest position in the region as well as in Islamic countries. Population growth rate is an important determinant of current account balance, however, no previous study has checked impact of population growth on CAB in Pakistan. This study investigates the impact of population growth on current account balance as percentage of GDP (CABGDP) of Pakistan by applying Autoregressive Distributive Lag (ARDL) approach of co-integration for the period 1984-2010. The findings of the study show that increase in population growth worsens CABGDP of Pakistan in the long run. The negative sign and significance of coefficient of error correction term in the short run model also confirms long run relationship between population growth and CABGDP in Pakistan.

Keywords: Current account balance, Population growth, Demographic transition.

Introduction

Pakistan, being 6th most populous country in the world has 177 million population with total fertility rate 3.5 per woman and population growth rate 2.05 percent (Economic Survey of Pakistan 2010-11). On the one hand, 60 percent population consists of working age, more than 30 percent of population consists of youth (15-29 years) and two third of population is below 30 years old thus providing opportunity of

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demographic dividend. On the other hand, labour force participation rate (LFPR) is merely 32.8 percent. Further, LFPR for female is just 15.6 percent as compared to 49.3 percent male LFPR (Labour Force Survey (2010-11)). Family planning indicators show that population growth rate (PGR), total fertility rate (TFR) and contraceptive prevalence rate (CPR) in Pakistan have worst position as compared to other regional and Islamic countries (see Table 1).

As the life cycle theory indicates that tendency of people towards savings differs at different stages of life. If with the increase in population growth the ratio of inactive dependent population increases, it will cause reduction in national saving rate. So population growth can be a considerable determinant behind deviation of saving rate from investment requirement in the economy which may ultimately disturb the current account balance of the country. Prati et al. (2011) confirmed that the population growth and fertility have a negative effect on current account if it is correlated with the share of young inactive people in the population. Furthermore, in presence of large inactive population a country is likely to borrow more money against future income which may cause deterioration in current account balance in long run. In case of developing countries, which are more dependent on imports, the importance of population growth for current account balance becomes more significant. As with the increase in inactive population the demand for imports will increase leading towards the depletion of foreign exchange reserves, and worsened current account balance.

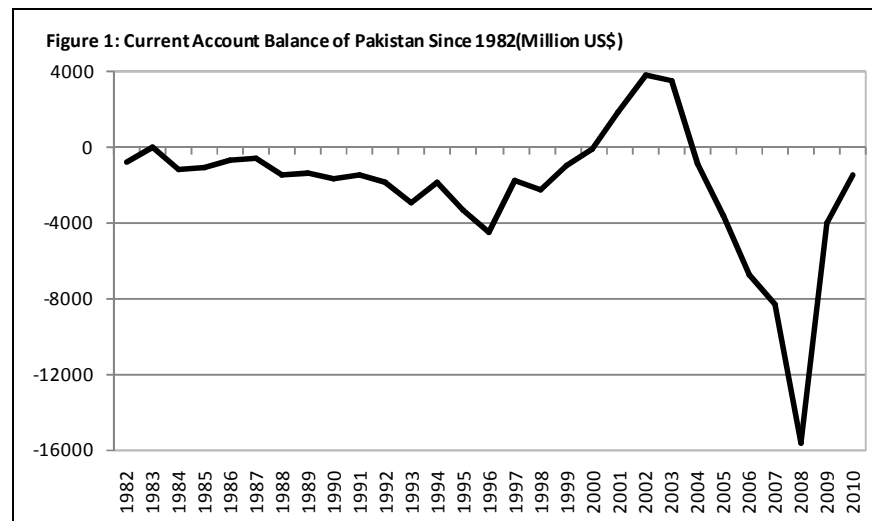Table.1: Comparison of Pakistan's Family Planning Indicators with Regional and Islamic Countries

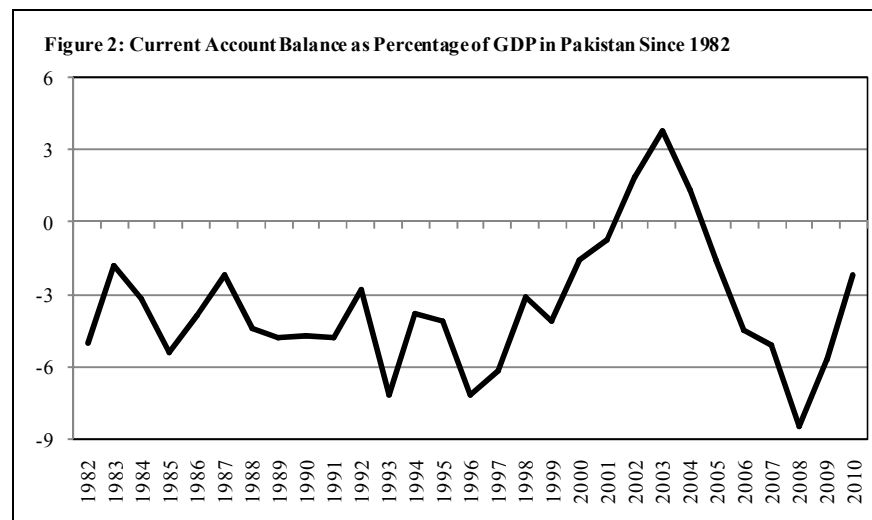| Asian Countries				Muslim Countries		
	TFR	CPR	PGR		TFR	CPR	PGR
Asia	2.4	67	1.1				
Bangladesh	2.8	58	1.7	Egypt	3.2	59	1.8
Bhutan	2.2	31	1.4	Morocco	2.4	63	1.2
India	2.8	56	1.5	Turkey	2.1	71	1.3
Maldives	2.6	39	1.9	Iran	2.0	74	1.4
Nepal	3.2	48	2.0	Indonesia	2.2	58	1.2
Sri Lanka	1.9	70	0.5	Malaysia	2.6	55	1.7
Pakistan	3.5	30	2.05	Pakistan	3.5	30	2.05

Source: Economic Survey of Pakistan2010-11

Since 1947, current account imbalances have been a constant feature of Pakistan's economy. The average current account deficit in 80's was 3.9 percent of GDP, in 90's it was 4.9 percent of GDP, however, it fell down to 2.07 percentage of GDP during 2000s. After 9/11 a sudden improvement in current account balance was observed in the coming years, however, the impact of global financial crisis in 2007-08 was

severe deterioration in current account balance of Pakistan (see Figure 1 & 2). During July-Mar FY12, CAB has recorded US$ 3.09 billion deficit mainly due to global commodity price slowdown, particularly, prices of cotton and food items. According to State Bank of Pakistan (SBP) forecasts CAB is expected to register US$6 billion deficit in FY12 as compared to US$0.3 billion surplus witnessed in FY11 (SBP Second Quarterly Report, 2012).

Owing to persistent current account imbalances in Pakistan and their macroeconomic repercussions for foreign exchange reserves, exchange rate, external debt, inflation, growth and unemployment, it is important to explore determinants of current account balance. In this regard, various studies have taken into account macroeconomic variables like trade openness, exchange rate, terms of trade, fiscal imbalance, foreign direct investment (Jaffri, 2006; Javid et al., 2010; Gulzar, 2008). However, in case of Pakistan no previous study has estimated the impact of population growth on current account balance of Pakistan. This study investigates the impact of population growth on current account balance of Pakistan by applying Autoregressive Distributive Lag (ARDL) approach of co-integration for the period 1984-2010.

Figure 1: Current Account Balance of Pakistan Since 1982(Million US$)

Figure 2: Current Account Balance as Percentage of GDP in Pakistan Since 1982

Literature Review

For coherent analysis of medium to long term determinants of real exchange rates, current account, and net foreign assets of low income countries Prati et al. (2011) used a multi pronged approach. In this study it was found that population growth, fertility, and financial liberalization have a negative effect on the current account balances.

Generally, most of the studies used saving-investment approach to examine current account trends and determinants. This approach states that if an economy consumes more than it produces, than it must import from other countries for its excess consumption and spending. This economy thus runs a current account deficit. On the other hand, if this economy spends less than it produces, than it runs a current account surplus. Investment demand in a country is closely related to the share of young people in an economy, through its link to the labour force growth, whereas savings supply should be related to the share of mature adults, through its relationship to retirement needs (Blanchard and Fischer (1988) and Higgins and Williamson (1996). which means that for a financially open economy, a shift in the population age distribution towards younger age should produce current account deficits as the increase in investment demand outweighs the fall in savings. Similarly, as the age distribution shifts towards the older working population, there would be a current account shift to a surplus as the rise in saving.

Thomas et al. (2010) examines current account balance for eleven smaller emerging market economies by using Ordinary Least square (OLS) technique on the sample period of 1970 – 2008. Study found that higher fiscal deficit reduce national savings and thereby

deteriorate current account balance. Both young and old dependency ratio has negative impact on current account balance. Higher population growth rate would have higher future work force, creating increasing demand for future investment, which would allow running higher current account deficit.

Wilson and Ahmed (2010) investigate the links between demographics, growth and current account balance as a percentage of GDP and illustrate how demographic shifts have driven global current account trends in the last 30 years, and what they imply about current imbalances. The position of current account depends upon the stage of life of the residents of the country, if the people are passing through the 'prime saving' age of 35-69 years of age, they will save more. So a tendency to save more across an economy will translate into pressure for current account surpluses and a flow of capital to other countries. Because people's savings behavior is generally different at different points in their life, in the young age people have fewer tendencies to save, hence put adverse effects on current account balance.

Mathew Higgens (1998) examines the relationship between age distributions, national savings and the current account balance by using time-series and cross-section data for 100 countries. The results indicate substantial demographic effects, with increase in both the youth and old-age dependency ratios are associated with lower saving rates. Particular high youth dependency rates exhibit a strong correlation with current account deficits. In particular, investment demand is closely related to the share of young (labor-force growth), while savings supply should be most closely related to share of mature adults (retirement needs).

Bloom et al. (2011) adopt a life cycle perspective, based on the fact that consumption pattern of people and their contributions differ over the different stages of life. Specifically, the ratio of consumption to production tends to be high for the youth and elderly and low for working-age adults. This means that key drivers of economic growth such as aggregate labor supply, productivity, consumption, and savings will tends to be depending on where most people fall in the life cycle. Other things equal, therefore, a country with large cohorts of youth and elderly is likely to experience slower growth, reflecting deteriorating current account balance.

By incorporating observations on 61 countries over the period of 1982-2003 Gruber and Kamin (2005) examine medium and long term determinants of current account balance. Per capita income, relative growth rates, the fiscal balance, demographic variables, and economic openness incorporated in the model as explanatory variables. A dummy variable is included to capture the effect of financial crises (banking crises) of USA. Results indicate that larger current account balances are

associated with higher per capita incomes, lower changes in growth, higher fiscal balances, higher net foreign asset positions, lower shares of youth and elderly in the population.

Methodology and Results

$$CABGDP = f(PG, DUM2008)$$
$$(-) \quad (-)$$

The variables incorporated in the model are: Current Account Balance to GDP ratio (CABGDP) as a dependent variable and Population Growth (PG) and Dummy variable (Dum, 2008) are independent variables. In order to capture the effects of global financial crises 2008, DUM2008 has been incorporated in the model. The signs in the parenthesis reflect the direction of expected relationship between CABGDP and explanatory variables as discussed in the literature.

Prati et al. (2011) showed that the population growth and fertility have a negative effect on current account if it is correlated with the share of young inactive people in the population. As the life cycle theory indicates that tendency of people towards saving differs at different stages of life. If with the increase in population growth the ratio of inactive dependent population increases, it will cause reduction in national saving rate. So population growth can be a considerable determinant behind deviation of saving rate from investment requirement in economy which may ultimately disturb the current account balance of the country. In case of developing countries, which are more dependent on imports, the importance of population growth for current account balance becomes more significant. As with the increase in inactive population the demand for imports will increase leading towards the depletion of foreign exchange reserves, and worsened current account balance (Rehman & Rashid, 2006).

The study used annual time series data from 1984-2010 and sources are International Financial Statistics (IFS) and Economic Survey of Pakistan. The reason of starting data period from 1984 is that on 8 January, 1982, the SBP adopted managed floating exchange rate regime before that fixed exchange rate regime was practiced in the country. Pakistan experienced a dual exchange rate system between 22 July, 1998 and 18 May, 1999. From 22 July, 1998 to 20 July, 2000 exchange rate regime was completely transformed from managed floating to free floating (Jaffri, 2010).

As a starting point of analysis, the stationarity of the variables is checked because it is quite useful to check stationarity to avoid the

spurious results. Dicky and Fuller (1979) proposed a standard test estimated as.

$$\Delta y_t = \delta\, y_{t-1} + \Sigma\, \beta_i\, \Delta y_{t-i} + \varepsilon_t$$

Where y_t is the relevant time series and ε_t is the residual term while t is the time trend. The distribution of DF tests is tabulated under the null hypothesis that $\delta = 0$ (i.e. unit root) and hence y_t is non-stationary while the alternative hypothesis is $\delta < 0$ (i.e. no unit root) and hence y_t is stationary (see Table 2).

Table 2: Augmented Dickey Fuller Test of Unit Root

Series in the Model	At Level		At first difference	
	With intercept	With trend & inter.	With intercept	With trend & inter.
CAB/GDP	-2.25(0)	-2.29(0)	-4.98(0)***	-4.68(0)***
PG	-2.23(2)	-5.07(6)***	-5.16(6)***	-5.50(6)***

***, **, * denotes the significance of test statistics at 1 percent, 5 percent and 10 percent level of significance respectively against the null hypothesis of unit root. Figures in the parenthesis represent lag selection based on SIC criterion.

Table 2 shows the order of integration of the variables included in the model. It indicates that the dependent variable (CABGDP) becomes stationary when differentiated once while independent variable (PG) is trend stationary. This situation indicates that for determining the long run relationship among the variables ARDL approach of co-integration is suitable technique .ARDL is applicable irrespective of the fact that underlying regreessors are purely I(o), I(1) or mutually co integrated (Pesaran et al., 2001). This test is basically based on two steps procedure. At first step, F values are calculated through Wald test restrictions for checking the presence of co-integration among the variables. At second step, long run and short run dynamics of the model are estimated.

As starting point, the lag length of the model is checked by standard criteria to avoid the over selection of the lags.

Table 3: Lag order selection based on VAR Model

Lag Order	Hannan-Quinn criterion	Akaike Information Criterion	Schwarz Information Criterion
0	6.319714	6.294881	6.319714
1	2.179449	2.104951	2.401167
2	1.296508	1.172346	1.666039
3	-1.239725	-1.413552	-0.722382*
4	-1.281060*	-1.504553*	-0.615905

The vector autoregressive (VAR) estimation shows that the Akaike Information Criterion (AIC) and Hannan-Quinn (HQ) are suggesting 4

lags as optimal lag length while Schwarz Information Criterion (SIC) reports 3 lags as optimal value. Following the SIC the following ARDL equation is estimated.

$$\Delta CABGDP = \gamma_0 + \gamma_1 \sum_{i=1}^{3} \Delta CABGDP_{t-i} + \gamma_2 \sum_{i=0}^{3} \Delta PG_{t-i} + \gamma_3\, CABGDP_{t-1} + \gamma_4 PG_{t-1} + \gamma_5\, DUM2008 + \varepsilon_t$$

H0: $\gamma_3 = \gamma_4 = 0$ (No evidence of long run relationships)
H1: $\gamma_3 \neq \gamma_4 \neq 0$ (Existence of long run relationships)

Table 4: Bound Test for Co-integration

	Dependent variable		
	CAB/GDP		
Critical Values	Peasran et al. (2001)		
	Lower bound Values	Upper bound values	K=3
1%	5.17	6.36	F-Statistic
5%	4.01	5.07	9.292
10%	3.47	4.45	

Critical values are obtained from Pesaran et al (2001), Table CI (V): Unrestricted Intercept and Unrestricted Trend.

According to the bound testing approach, presented by Peasran et al. (2001) a positive conclusive inference about the presence of co-integration relationship can be drawn only if the calculated value of F-statistics lies above the upper limit of its tabulated values. If this value lies below the lower limit the null hypothesis of no co-integration is accepted. While if the calculated value remains between the upper and lower limit the results will be declared inconclusive. The results of above table shows that the calculated F-statistics is greater than upper and lower limits of tabulated F-values at 1percent,5percent and 10 percent level of significance which confirms the presence of co-integration among the variables in the model.

In the next step long run relationship is estimated by applying the Ordinary Least Square (OLS) and results are reported below.

Table. 5: Long run Relationship among Variables

Variables	Coefficients	t-values	Probability
C	1.332222	0.753160	0.4597
CAB/GDP(-1)	0.449601	3.030696	0.0064
PG	-12.76139	-2.437146	0.0238
PG(-1)	11.20917	2.227339	0.0370
DUM2008	-4.661458	-2.295532	0.0321

Adj. R^2=0.56
Jarque –Bera $Chi^2(2) = 0.1413(0.9317)$
Engle's ARCH LM $Chi^2(1) =0.7165 (0.7300)$
Breusch-Godfrey LM $Chi^2(1) =0.8925(0.9199)$
Engle's ARCH LM $Chi^2(1) =0.7165 (0.7300)$

Source: Estimations of Study

The analysis of above reported results shows that there exists negative and significant relationship in population growth and current account balance in long run. Furthermore, it is also significantly influenced by the previous period of population growth as increased number of people in the previous time period put pressure on the demand by increasing consumption which will ultimately cause deterioration in current account balance. To check the goodness of the model diagnostic tests are carried out which include histogram normality test, ARCH LM test, Breusch-Godfrey LM test. The statistics reported above are showing that the model is normally distributed having no correlation and ARCH effects.

Now moving towards the next step of estimations the short run relationship of the model is estimated by using the error correction mechanism (ECM). It will be undertaken through the following equation.

$$\Delta CABGDP = \gamma_\circ + \gamma_1 \sum_{i=1}^{z} \Delta CABGDP_{t-i} + \gamma_2 \sum_{i=0}^{z} \Delta PG_{t-i} + \gamma_3\, CABGDP_{t-1} + \gamma_4 PG_{t-1} + \eta ECMt - 1 + \varepsilon_t$$

Table. 5: Error Correction Representation for the Selected ARDL-model (0,4), Dep. Variable: Δ CABGDP

Variables	Coefficients	t-values	Probability
C	1.738846	1.519796	0.1481
ΔPG	9.640234	0.261707	0.7969
Δ PG (-1)	28.04594	0.368619	0.7172
Δ PG (-2)	-78.71935	-1.087269	0.2930
Δ PG (-3)	63.62933	1.966435	0.0668
DUM2008	-5.186849	-2.072103	0.0548
ECM(-1)	-0.514997	-1.876599	0.0789

Adj. R^2=0.3024
DW Stat=2.30
S.E of Regression=2.059
F-statistic=2.589
Prob(F-statistic)=0.060
Akaike info Criterion=-4.528
Schwarz Criterion=4.874
Jarque –Bera $Chi^2(2) = 0.7786(0.6775)$
Breusch-Godfrey LM $Chi^2(1) =0.1275(0.2512)$
Engle's ARCH LM $Chi^2(1) =0.7504 (0.7643)$

Source: Estimations of Study

The results in the above table verified that the short run relationship holds in the model as error term is negative and significant. This situation shows that there is convergence towards the equilibrium. The coefficient of ECM shows that in one year 51 percent error is corrected towards equilibrium. To check the robustness of the model various diagnostic tests and stability test are conducted. These tests examined the presence of serial correlation, heteroscedasticity effects and stability of residuals. The test statistics of the diagnostic tests conclude that there is no serial correlation and autoregressive conditional heteroscedasticity is also not present in the short run model. The cumulative sum (CUSUM) and cumulative sum squares (CUSUMS) are used to test the stability of the coefficients, it can be seen from the results that the calculated values do not exceed the critical values of the test, confirming the stability of coefficients in short run model.

Conclusion and Policy Recommendations
Pakistan has 177 million population and growth rate of population 2.05 percent and other demographic indicators show lowest position in the region. High population growth rate means high future work force and more demand of investment to create employment for youth bulge and dependent population. If an economy consumes more than it produces, then it must import from other countries for its excess consumption and spending eventually country faces consistent deficit in current account balance. This study investigates the impact of population growth on current account balance of Pakistan by applying Autoregressive Distributive Lag (ARDL) approach of co-integration for the period 1983-2010. The findings of the study show that population growth worsens CABGDP in the long run. The negative sign and significance of coefficient of error correction term in the short run model confirms long run relationship between population growth and current account balance to GDP ratio in Pakistan. The policy recommendations based on the findings of the study are that provincial governments should pay special attention to bring Pakistans' TFR from 3.5 per woman to regional benchmarks. Further, female labour force participation should be especially increased by skill enhancement programs, financial empowerment and creating social acceptability for female workers.

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