Sources to Finance Fiscal Deficit and Their Impact on Inflation: A Case Study of Pakistan

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Theoretically, fiscal deficit is inflationary but the sources of financing fiscal deficit may differ in terms of their impact on inflation. Question arises that what should be the least inflation cost source of financing? This study attempts to answer this question and explore the long run relationship among the sources to finance fiscal deficit and inflation. In so doing, the estimations have been done in four stages on the basis of categorisation of the deficit financing heads. In the first stage it has been tested that fiscal deficit along with money supply are inflationary. In the second stage fiscal deficit is bifurcated into two components, domestic borrowing and external borrowing for fiscal deficit. In the third stage, domestic borrowing is further divided into two heads, bank and non-bank borrowing. While in the fourth and last stage, bank borrowing is further categorised into two parts, borrowing from scheduled banks and central bank, and non-bank borrowing which comprises borrowing from National Saving Scheme for budgetary support. The Johansen Cointegration Technique is used for the first stage of estimation, while Auto Regressive Distributed Lag Model is employed for the rest of the three stages. The study finds that there is a long run relationship among sources of financing fiscal deficit and inflation. Inflation is positively affected by domestic borrowing, bank borrowing and borrowing from central bank, while central bank borrowing is more inflationary in nature. Consequently, fiscal deficit should be financed through external sources, non-bank and scheduled bank borrowings.

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1. INTRODUCTION

Borrowing at the government level may be good as well as bad for economic development of any country like any other business borrowing. It is beneficial for the economy as long as it is exercised with diligence and economic rationality. For governments, the debt becomes a problem if their debt servicing capacity does not grow with the increase in their level of indebtedness. In such situation borrowing adversely impacts the economy as governments tend to borrow more for debt servicing, a situation widely known as the Ponzi Games. Besides inflation, high interest rate and unstable exchange rate are some of the major problems that may arise from such kind of

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borrowings. While inflation is generally related to monetary expansion [Agha and Khan (2006)], it is generally argued that in developing countries fiscal imbalances might play a key role in generating inflation [Catao and Torrens (2005)]. As Sargent and Wallace (1981) pointed out that those governments who have persistent fiscal deficit have to finance with monetisation, causing high inflation in the long run.

Fiscal deficit is financed through various methods i.e. printing of money, using foreign reserves, borrowing from external sources, and borrowing domestically [Fischer and Easterly (1990)]. In Pakistan domestic borrowing comprises of bank borrowing and non-bank borrowings. Bank borrowing is further categorised as borrowing from State Bank of Pakistan (SBP) and borrowing from scheduled banks, while non-bank borrowing is mainly through National Saving Schemes (NSS) and others [SBP (2010)].

Along with the overall fiscal deficit, each mode of financing has its own disadvantages [Fischer and Easterly (1990)]. The government may choose to borrow from domestic sources. This would cause the interest rate to rise, which can lead to inflation by reduction in investment and shift in aggregate supply [Tullius (2007)]. Financing from scheduled banks may result in higher cost of lending to the private sector which may crowd out private investment and contribute to inflation. On the other hand, deficit financed from central bank directly by seignorage would create excess demand in the economy thereby causing inflation [Fischer and Easterly (1990)].

The restrictions imposed by the autonomous central bank on government borrowing facility from the banking system may compel the government not to borrow more from the banking sector [Feltenstein and Iwata (2002)].[1] This hard ceiling suggests that the government must search for other sources of financing. The government may borrow from external sources which will swell the current account deficit and depreciate the real exchange rate, causing price level to increase in the economy [Pasha and Ghaus (1996)]. Given its limited access to foreign borrowing; non-bank borrowing may become the other source of financing for the government. After getting funds from the two sources (domestic banking sector, including central banks and foreign sources), the rest of the funds may be raised by the non-bank borrowing [Feltenstein and Iwata (2002)], which in the case of Pakistan is mainly from the National Saving Schemes (NSS).

It is generally believed that non-bank borrowing has low inflationary impact, but it has adverse effect on domestic debt sustainability. In Pakistan, NSS borrowing is very costly due to high servicing cost associated with it, becoming as high as 18 percent in 1996-97. This high interest rate not only leads to decrease in the bank deposits, which not only deteriorates the banking sector services but also adds to the high debt servicing obligations of the government. Hence more money creation will be required for repayment, which will bring more inflation [Agha and Khan (2006)].

In Pakistan, there may be several factors of supply side as well as demand side being responsible for inflation. From supply side, prices of food items and oil are considered very much responsible for inflation. Prices of most consumer goods fluctuate with oil price swings. However, the role of food prices is statistically insignificant [Khan, *et al.* (2007)], therefore high inflation may mainly result from persistent fiscal deficit [Khan and Agha (2006); Sarfarz and Anwar (2009)].

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[1]Although we found that there is no restriction on the government borrowings from central bank in Pakistan, in the act named as Fiscal Responsibility and Debt Limitation [FRDL (2005)], which is not strictly binding in Pakistan, is devoid of it [Qasim and Khalid (2012)].

The impact of borrowing on inflation varies by the source of borrowing i.e. borrowing from some sources will lead to inflation more than the other and the impact may vary in short term and long term. The question thus arise as to which source of financing the fiscal deficit is is less inflationary and thus optimal? This study attempts to answer this question empirically, by using the data from 1976 to 2014 of Pakistan. The analysis will help to identify economic cost through inflation associated with each type of borrowing so that government may choose such mode which would not hurt the economy severely in terms of higher inflation, besides looking at the accounting cost of borrowing.

The study is structured as follows. Section 2 presents a selected review of literature while Section 3 outlines the methodology and describes the data. Empirical findings are discussed in Section 4. Section 5 concludes with few policy suggestions.

2. SELECTED LITERATURE REVIEW

Starting from the classical debate, Sargent and Wallace (1981) questioned the statement of Friedman (1956) that inflation is always and everywhere a monetary phenomenon. They are of the view that inflation is a fiscal driven phenomenon because fiscal authority moves first and sets the budget independently about revenue generation through government bonds and seignorage. In such situation government will sooner or later monetise this budget deficit which will lead to inflation. But Leeper (1991) and Sims (1994) presented the idea of fiscal theory of price level (FTPL); strongly suggesting that inflation is a fiscal phenomenon. They put forward considerations that government deficit must be financed in a sustainable manner and inter temporal budget constraint should be adhered to. However FTPL is empirically tested for many countries with mixed results.

Different studies have been conducted to investigate the link between fiscal deficit and inflation. Developed economies show weak or no association between budget deficit and inflation.[2] While in developing economies, most of the studies show that there is a positive relationship between fiscal deficit and inflation in high inflation episodes [see Catao and Terrones (2005), Habibullah, *et al*. (2011) and Lin, *et al.* (2013)].[3] On the other hand, Koru and Özmen (2003) and Samimi (2011) established for Turkish and Iranian economies that no long run relationship between fiscal deficit and inflation holds. According to Catao and Terrones (2005) this may be because of selection bias, using wrong model specification and/or wrong econometric techniques. Once these limitations are addressed, the argument that fiscal deficit having inflationary impact is strongly supported.

The literature related to Pakistan also gives mix results. Kemal (2006), Malik (2006) and Qayyum (2006) found that inflation is a monetary phenomenon in Pakistan. But they ignored fiscal deficit as an important factor in the determination of inflation. Mukhtar and Zakaria (2010) included both money supply and fiscal deficit in their econometric modelling and found that inflation is a monetary phenomenon, while Shabbir and Ahmad (1994) reported that fiscal deficit is directly linked with inflation.

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[2]See also King and Plosser (1985), Catao and Terrones (2005), Vieira (2000).
[3]See also Chaudhary and Parai (1991), Anoruo (2003), Lozano (2008), Sahan (2010), Metin (1998), Kia (2010), and Erkam and Çetinkaya (2014).

Agha and Khan (2006), using Johanson Cointegration technique, also found that changes in inflation do not take place only by the money supply but also by the fiscal deficit. This supports the argument that in Pakistan inflation may be a fiscal phenomenon. Mughal and Khan (2011) showed that inflation is granger caused by fiscal deficit in Pakistan. Similar results were found by Jalil and Bibi (2014) using panel ARDL model. The results are in line with Chaudhary and Ahmed (1995), suggesting that money supply is not exogenous rather it is endogenous. They found that money supply and deficit financing from domestic sources especially from banking sector positively affect inflation.

Agha and Khan (2006) found that inflation is positively influenced by the total domestic bank borrowings. The study concluded that if there is increase of 1 billion rupees in domestic bank borrowing for budgetary support, the prices would go up by 0.0048 percentage points. Sarfaraz and Anwar (2009) found a positive relationship between total domestic borrowings, including banking and non-banking borrowings for financing fiscal deficit. Furthermore, it is concluded that borrowing from international sources are also inflationary in nature.

The review of the relevant literature shows that while there are a number of studies which have analysed the role of monetary and fiscal policies in inflation, no study has been conducted on the relationship between the sources of the deficit finances (bank borrowings, borrowings from commercial banks, borrowings from central bank and non-bank borrowings for fiscal deficit financing) and inflation. Also, the existing literature does not provide any empirical evidence on how the composition of borrowing impacts inflation and which source is more inflationary than the other. So this study aims to fill this literature gap for Pakistan.

3. THEORETICAL BACKGROUND AND ESTIMATION METHOD

According to Catao and Torrens (2005) inflation(CPI_t) is a function of fiscal deficit (FD_t) and may be written as:

$$CPI_t = f(FD_t) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3.1)$$

The above function shows that fiscal deficit is inflationary in nature. We have modified the function by extending it to incorporate the ways and means of financing fiscal deficit in Pakistan. Government can finance the deficit by making changes in money supply stock (dM_t); borrowing from domestic sources (dDB_t) as well as from external sources (dE_t), thus 3.1 can be written as follows:

$$CPI_t = f(dM_t, dDB_t, dE_t) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3.2)$$

Domestic interest bearing debt can be further categorised as bank(BB_t) and non-bank borrowings (NBB_t). Therefore 3.2 may take the following functional form:

$$CPI_t = f(dM_t, dBB_t, dNBB_t, dE_t) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3.3)$$

Similarly the bank borrowings are decomposed into borrowing from scheduled banks (SBB_t) and state bank(CBB_t), while non-bank borrowing is equal to the debt comprised of national saving scheme (NSS_t), thus 3.3 becomes,

$$CPI_t = f(dM_t, dCBB_t, dSBB_t, dNSS_t, dE_t) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3.4)$$

Equations (3.1), (3.2), (3.3) and (3.4) are estimated in four different stages. Data has been taken from *Pakistan Economic Survey* (various issues), Pakistan Bureau of Statistics and State Bank of Pakistan for the period of 1976 to 2014.

It is well known that most of the time series data follow a unit root process. So with the presence of unit root, simple regression analysis gives spurious results. If non-stationary data is converted into a stationary process, the results of regression analysis are only applicable for the short run analysis, while economists are generally interested in long run relationship. To solve this problem, Engle and Granger (1987), Stock and Watson (1988), Johansen cointegration technique (1988) and Autoregressive Distributed Lags (ARDL) can be used. This study uses Johansen's cointegration technique and ARDL method, as they are mostly used in the empirical work and are considered superior to others.

3.1. Data and Variables

This section discusses the data and construction of variables as follows:

3.1.1. *Consumer Price Index* (CPI_t)

In empirical analysis, CPI is the most commonly used gauge of the level of prices in an economy [Mankiw (2005)]. Therefore this study incorporates CPI as a measure of inflation.[4]

3.1.2. *Fiscal Deficit* (FD_t)

Budget deficit is the difference between total revenue and expenditure during a fiscal year. If BD_t is the budget deficit, SAB_t is the surplus of autonomous bodies and D_t is the discrepancy, then budget deficit can be converted into fiscal deficit (FD_t) as follows:

$$FD_t = BD_t + SAB_t - D_t$$

3.1.3. *Money Supply* $(M2_t)$

M2 is defined as the sum of currency in circulation, other deposits with State Bank of Pakistan, demand and time deposits, including resident foreign currency deposits with scheduled banks.

3.1.4. *Central Bank Borrowing for Budgetary Support* (CBB_t)

It is the government borrowing from State Bank of Pakistan directly for fiscal deficit financing through new money creation in the economy and/or borrowing through Ways and Means Advances.

3.1.5. *Scheduled Banks Borrowing for Budgetary Support* (SBB_t)

It is the bank borrowing from all commercial banks and specialised banks.

3.1.6. *Bank Borrowing for Budgetary Support* (BB_t)

Bank borrowing for budgetary support is the borrowing of a government from banking sector within the economy during a specific fiscal year.[5]

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[4]CPI is broader measure than WPI and SPI, comparison is given in Appendix I.
[5]The Sum of Central bank borrowing and scheduled bank borrowing is called the Bank borrowing.

3.1.7. *Borrowing from National Saving Scheme for Budgetary Support* (NSS_t)

NSS funds are generated through different schemes, i.e. Certificates,[6] Accounts[7] and prize bonds by Central Directorate of National Saving (CDNS) under Ministry of Finance (MOF).

3.1.8. *Non-Bank Borrowing for Budgetary Support* (NBB_t)

Non-bank borrowing includes the funds through NSS and other bonds, issued through SBP to the individuals and other Non-Bank Financial Institutions (NBFIs).

3.1.9. *Domestic Borrowing for Budgetary Support (DB)*

It includes both bank and non-bank sources of financing.

3.1.10. *External Borrowing for Budgetary Support (EB)*

External borrowing for budgetary support is the fiscal deficit financing through external sources of financing, including governments and international financial agencies.

3.1.11. *Data Sources*

The data is collected from State Bank of Pakistan (SBP), Ministry of Finance (MOF) and Pakistan Bureau of Statistics (PBS). [8]

4. RESULTS AND DISCUSSION

Table 4.1 provides the summary statistics of the data.

Table 4.1

Descriptive Statistics of the Data

	Mean	Maximum	Minimum	Std. Dev.
CPI_t	55.61309	189.58	8.191269	49.46567
FD_t	295889.5	1833864	12480	448859.5
$M2_t$	1980858	9807088	46417.6	2605489
$RGDP_t$	5380594	10640381	1737139	2652184
DB_t	234023.3	1835540	5711	403825.4
EB_t	61866.18	511727	−5900	91618.01
BB_t	126627.3	1457500	−73811	281231.5
NBB_t	107396	553330	−515	152628.2
CBB_t	101.0794	688.724	−249.238	214.8509
SBB_t	136.6532	939.5683	−134.173	273.3708
NSS_t	169500.1	553330	8050	178180.8

[6](a)Defense Saving Certificates (DSC), (b) Special Saving Certificates Registered (SSCR), (c) Regular Income Certificates (RIC), Bahbood Saving Certificates (BSC).

[7](a) Saving Account (SA), (b) Special Saving Account (SSA), (c) Pensioner's Benefit Account (PBA).

[8]All of the Variables are taken as flow variables in the analysis. All are measured in Millions of Pak Rupees except CPI.

The starting point of the analysis of time series data is to test the stationarity of the given series used in the analysis. For this purpose, Augmented Dickey and Fuller (ADF) test was used. The results of the unit root tests are presented in the following table.

Table 4.2

Results of ADF Test

	Variables[9]	At Level	At First Difference	Conclusion
DEPENDENT VARIABLE	cpi_t	−2.688	−3.117*	I(1)
CONTROL VARIABLE	$m2_t$	−3.357	−4.511*	I(1)
	$rgdp_t$	−2.376	−3.681*	I(1)
STAGE 1	fd_t	−2.442	−5.304*	I(1)
STAGE 2	db_t	−2.448	9.479*	I(1)
	eb_t	−6.689*	–	I(0)
STAGE 3	bb_t[10]	−5.347*	–	I(0)
	nbb_t	−5.507*	–	I(0)
STAGE 4	cbb_t	−3.837*	–	I(0)
	sbb_t	−3.927*	–	I(0)
	nss_t	−2.303	−3.588*	I(1)

The tests show that variables that are used in the first stage of estimation are stationary at first difference whereas variables of the second, third and fourth stage estimations are of mixed order of integration, i.e. some are integrated of order zero and some are one.

4.1. First Stage Estimation

In the very first stage this study shows that fiscal deficit and inflation has a long run relationship. The specified model[11] is given below.

$$cpi_t = \alpha_1 + \beta_1 fd_t + \beta_2 m2_t + \beta_3 rgdp_t + v_t \qquad \ldots \qquad \ldots \qquad \ldots \quad (4.1)$$

v_t is a stochastic process. Both fiscal deficit (fd_t) and money supply ($m2_t$) are considered as endogenous variables while real gross domestic product ($rgdp_t$) is employed as a control variable. Table 4.2 indicates that all of the variables used in the first stage estimation are of I(1) for long run relationship, therefore Johansen cointegration technique is used.

Results of the Johansen cointegration technique are given in Table 4.2. After specifying the appropriate lag length of 2 lags, the Trace test indicates that two

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[9] Small alphabets represent that variables are in log form.

[10] Unit root results are mentioned with trend and intercept in Level, except NBB, SBB and NSS, they have only intercept. There is no trend at first difference in all variables.

[11] Used by Agha and Khan (2006).

cointegrating vectors may exist in the system, whereas Maximum Eigen value test indicates only one cointegrating vector.

Table 4.3

Results of Johansen Cointegration Technique

Trace Test				
H_0	H_1	Trace Statistic	95% Critical Value	Probability
r = 0	r = 1	43.9145*	29.7971	0.0007
r = 1	r = 2	15.8346*	15.4947	0.0444
r = 2	r = 3	2.3965	3.8415	0.1216
Maximum Eigen Value Test				
H_0	H_1	Max-Eigen Statistic	95% Critical Value	Probability
r = 0	r ≥ 0	28.0800*	21.1316	0.0045
r = 1	r ≥ 1	13.4381	14.2646	0.0672
r = 2	r ≥ 2	2.3965	3.8415	0.1216

Note: *indicates rejection of null hypothesis at 5 percent level of significance.

According to Toda (1994) and Lutkipohl, *et al.* (2000) the trace test is size distorted; therefore we may conclude on the basis of Eigenvalue test statistic that there may be only one cointegrating vector.[12]

The estimated long run relationship is given below:

$$\widehat{cpi}_t = 0.1665 fd_t + 0.6644 m2_t \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \ (4.2)$$
$$\quad (0.02693) \quad\quad (0.05152)[13]$$

Equation (4.2) shows that inflation is positively affected by money supply and fiscal deficit in the long run. The results are in line with Shabbir and Ahmad (1994), Agha and Khan (2006) and Jalil and Bibi (2014), while these are in contrast to Mukhtar and Zakaria (2010).

4.1.1. *Vector Error Correction Model*

In three variables case, VECM is given in the following equations.

$$\Delta cpi_t = \alpha_0 + \sum \alpha_i \Delta cpi_{t-i} + \sum \beta_i \Delta fd_{t-i} + \sum \gamma_i \Delta m2_{t-i} + \varphi_1 \mu_{t-1} + \varepsilon_{1t} \ \dots (4.3)$$

$$\Delta fd_t = \alpha_0 + \sum \alpha_i \Delta fd_{t-i} + \sum \beta_i \Delta cpi_{t-i} + \sum \gamma_i \Delta m2_{t-i} + \varphi_2 \mu_{t-1} + \varepsilon_{2t} \ \dots (4.4)$$

$$\Delta m2_t = \alpha_0 + \sum \alpha_i \Delta m2_{t-i} + \sum \beta_i \Delta fd_{t-i} + \sum \gamma_i \Delta cpi_{t-i} + \varphi_3 \mu_{t-1} + \varepsilon_{3t} \ \dots (4.5)$$

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[12]If Trace test is true and we have two cointegrating vectors, Qayyum (2005) argued that conventionally the first vector may be used as a long run equation; otherwise we have to use restricted VECM. First the system should be identified then VECM results can be interpreted.

[13]In parenthesis standard error of the corresponding coefficient is mentioned. Both fiscal deficit and inflation are statistically significant at 1 percent level of significance. Their corresponding *t*-value are *t*-calculated for fd= 6.18 while for m2 it is 12.9.

If $\varphi_k < 0$ and statistically significant then the cointegration relationship is confirmed between variables based on the underlying theory. VECM results are given in Table 4.4.

Table 4.4

Results of VECM[14]

	Coefficient	Std. Error	t-Statistic	Prob.
ECM_{t-1}	–0.4649	0.0973	–4.7794	0.0001
Δcpi_{t-1}	0.5383	0.1460	3.6873	0.0010
Δcpi_{t-2}	0.1088	0.1368	0.7953	0.4334
Δfd_{t-1}	–0.0567	0.0201	–2.8218	0.0088
Δfd_{t-2}	–0.0560	0.0195	–2.8677	0.0079
$\Delta m2_{t-1}$	0.0090	0.1170	0.0773	0.9389
$\Delta m2_{t-2}$	0.0784	0.1095	0.7153	0.4806
Constant	5.2013	1.1359	4.5791	0.0001
$rgdp_t$	–0.3347	0.0729	–4.5937	0.0001
R-squared	0.7317	$\chi^2_{auto}(2)$	0.4561	
Adjusted R-squared	0.6522	$\chi^2_{ARCH}(2)$	0.3402	
$\chi^2_{Normality}(2)$	0.5650			

$\chi^2_{auto}(2)$ is the LM statistic of the autocorrelation test

$\chi^2_{Normality}(2)$ is the LM statistic of the Jerque-Berra Normality test

$\chi^2_{ARCH}(2)$ is the LM Statistic of the ARCH test.

Results of the VECM for Δcpi_t, as a dependent variable depict the short run dynamics. According to the above table, 46.5 percent of the disequilibrium in the short run will be corrected in the following year. The model qualifies all the diagnostic tests[15] i.e. autocorrelation, heteroscedasticity, normality and stability. On the basis of these results, we may therefore conclude that there is a long run relationship between fiscal deficit and inflation.

4.2. Second Stage Estimation

To estimate Equation (3.2) the econometric model may be treated as,

$$cpi_t = \alpha_2 + \beta_1 db_t + \beta_2 eb_{t^{16}} + \beta_3 m2_t + \beta_4 rgdp_t + v_{2t} \qquad \dots \qquad \dots \quad (4.6)$$

Where, db_t is domestic borrowing, eb_t is external borrowing and v_{2t} is white noise. As access to foreign funds is limited, therefore most of the financing relies on the domestic borrowings. So domestic borrowing is considered as endogenous while external borrowing is partly exogenous, but for comparison purpose external borrowing is also considered as endogenous variable.[17]

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[14]One cointegration equation is reported as per the convention in the presence of size-distorted trace test.

[15]The model is also checked for stability of the parameters by CUSUM and CUSUM-Square test. Parameters are stable in the system.

[16] As the stock of foreign debt is likely to be positively related to inflation but here we use foreign borrowing rather than foreign debt because of the following reasons: (1) we are interested in bifurcating the fiscal deficit, which is a flow variable, (2) the result remains almost the same even if we use the stock of foreign debt.

[17]As M2 carries both components, i.e. domestic borrowing and external borrowing, to avoid duplication in the data residual, part of the M2 should be used but due to data limitation we use M2 rather than the residual part of the M2.

4.2.1. *Results of Bound Test of Cointegration*

The existence of long run relationship is checked by conducting Bound test of cointegration. Results of the Bound test are given in Table 4.5.

Table 4.5

Results of Bound Test of Cointegration

Test Statistic	Value[18]	K
F-statistic	6.002	3
Critical Value Bounds		
Significance	I_0 Bound	I_1 Bound
10%	2.618	3.532
5%	3.164	4.194
1%	4.428	5.816

Note: Critical values are taken from Narayan (2005).

Even at 1 percent level of significance, F-statistic is greater than the critical bound; therefore the null hypothesis of no cointegration may be rejected. This allows us to establish the long run relationship between variables. The estimated long run relationship is expressed in Equation 4.7.

$$\widehat{cpi}_t = 4.539 + 0.055db_t + 0.006eb_t + 0.775m2_t - 0.772rgdp_t \qquad \dots \ (4.7)$$
$$(2.486) \quad (0.026) \quad (0.006) \quad (0.076) \quad (0.226)$$

Equation (4.7) shows that domestic borrowing money supply along with real GDP contribute to inflation in the long run as their coefficients are highly significant;[19] while external borrowing is statistically insignificant. The reason of external borrowing to be statistically insignificant may be that whenever a government borrows from external sources, it does not put upward pressure on the money supply to monetise the borrowing. Therefore external borrowing is insignificant. So in comparison with domestic borrowing, external borrowing is less inflationary.[20]

To verify convergence from short run to long run equilibrium, the results of the ECM are given in Table 4.6.

Table 4.6

Results of ECM

	Coefficient	Std. Error	t-Statistic	Prob.
ECM_{t-1}	−0.337	0.071	−4.767	0.0000
Δcpi_{t-1}	0.509	0.131	3.895	0.0005
Δdb_t	0.019	0.009	2.051	0.0494
Δeb_t	0.002	0.002	0.986	0.3324
$\Delta m2_t$	−0.057	0.106	−0.541	0.5929
$\Delta rgdp_t$	−0.260	0.101	−2.569	0.0156
R-Square	0.9995	$\chi^2_{ARCH}(1)$		0.9597
Std. Error of Regression	0.0215	$\chi^2_{ARCH}(2)$		0.1469
$\chi^2_{auto}(1)$	0.7913	$\chi^2_{Norm}(2)$		0.8386
$\chi^2_{auto}(2)$	0.8938	$F_{RESET}(1,28)$		0.7853

Note: P-values of the LM test are reported for Diagnostic test.[21]

[18]The bound test also shows long run relationship at 1 percent, even by the critical bound generated by Pesaran, *et al*. (2001).

[19] Real GDP has negative relationship with inflation; results are same with Aysha, *et al*. (2013).

[20] Even if external borrowing is considered as exogenous, same results will be found.

[21] Both LM and F-statistics have asymptotically same distribution, while in small sample F is preferred [Pesaran and Pesaran (1997)] therefore only chi square probability values are reported.

$\chi^2_{auto}(.)$Represents LM statistic of BG test.

$\chi^2_{ARCH}(.)$ Indicates LM Statistic of ARCH test.

$\chi^2_{Norm}(2)$is thep-value of LM statistic of Jerque-Berra Normality test.

$F_{RESET}(1,28)$ is p-value of F-Statistic of Ramsey RESET.

Same notes are applicable for results of ARDL in the third and fourth stage of estimations too.

The negative and statistically significant error correction term (ECM_{t-1}) confirms the long run convergence. Adjustment in the error is quite good, almost 34 percent per year and the model is also a good fit as it qualifies all the diagnostic; therefore, we may conclude that there may be long run relationship of borrowing from domestic sources, external sources and money supply with inflation.[22]

4.3. Third Stage Estimation

As it has been confirmed from the second stage estimations that there is a long run relationship between borrowing from domestic sources and inflation. Next we test whether bank borrowing is more inflationary than non-bank borrowing. For this, Equation (3.3) can be written as:

$$cpi_t = \alpha_3 + \beta_1 bb_t + \beta_2 nbb_t + \beta_3 m2_t + \beta_4 eb_t + v_{3t} \qquad \dots \qquad \dots \quad (4.8)$$

Where bb_t represents domestic bank borrowing for financing fiscal imbalances, nbb_t is non-bank borrowing to finance fiscal deficit. $m2_t$ is money supply and eb_t is external borrowing. Except external borrowings all of the variables are considered as endogenous.[23]

4.3.1. *Results of Bound Test of Cointegration*

The results of the Bound test of cointegration is given in Table 4.7

Table 4.7

Bound Test of Cointegration

Test Statistic	Value	K
F-statistic	4.575	3
Critical Value Bounds		
Significance	I$_0$ Bound	I$_1$ Bound
10%	2.618	3.532
5%	3.164	4.194
1%	4.428	5.816

Note: Critical values are taken from Narayan (2005) for 35 observations.

The null of no cointegration may not be accepted at 5 percent level of significance, as F-statistic (4.575) lies outside the upper bound (4.194). Therefore, long run relationship is concluded. The existence of long run relationship permits us to interpret

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[22] VECM have same diagnostics as of ARDL, not mentioned in Table 4.6.

[23]Although there are restrictions on bank borrowing which makes it partly exogenous, but they are not in practice and for comparison purpose too, it is considered as endogenous.

Bank borrowing is the part of total money supply (m2) but correlation between them is just 23 percent. So it is expected that multicollinearity problem may not be there.

the long run relationship among the variables. The estimated relationship between inflation, non-bank and banking sectors, in the long run are given in Equation 4.9.

$$\widehat{cpi}_t = 0.0354bb_t - 0.0088nbb_t + 0.5708m2_t + 0.0051eb_t - 4.0655 \ \dots \ (4.9)$$
$$(0.0209) \quad (0.0143) \quad (0.0197) \quad (0.0115) \quad (0.2501)$$

The long run estimates of the third stage analysis indicate that bank borrowing has positive impact on inflation at 10 percent level of significance, while non-bank borrowing decreases inflation. The non-bank borrowing is insignificant but has a negative sign. As quoted by Agha and Khan (2006), non-bank borrowing is theoretically non-inflationary in nature and historical context of the non-bank borrowing also shows negative association with inflation. In case of non-bank borrowing money goes in the hands of the government and aggregate demand remains the same causing no change in price level. So this may be the reason that non-bank borrowing is statistically insignificant, showing no impact on inflation. Another justification may be that borrowing from non-banking sector does not increase the monetary base, and hence does not contribute to inflation. Money supply plays an important role in determining inflation.

4.3.2. *The Error Correction Mechanism*

The ECM of the ARDL model shows short run fluctuations along with error correction. The results of the ECM is given in Table 4.8.

Table 4.8

Results of Error Correction Mechanism

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM_{t-1}	–0.1824	0.0568	–3.2123	0.0033
Δbb_t	0.0036	0.0021	1.7397	0.0929
Δnbb_t	–0.0016	0.0025	–0.6548	0.5179
$\Delta m2_t$	–0.2155	0.1312	–1.6423	0.1117
Δeb_t	0.0009	0.0021	0.4444	0.6602
Δcpi_{t-1}	0.5400	0.1327	4.0684	0.0003
R-Square	0.9993	$\chi^2_{ARCH}(1)$		0.4653
Std. Error of Regression	0.0229	$\chi^2_{ARCH}(2)$		0.3026
$\chi^2_{auto}(1)$	0.4969	$\chi^2_{Norm}(2)$		0.7077
$\chi^2_{auto}(2)$	0.6433	$F_{RESET}(1,27)$		0.2454

According to the short run analysis (Table 4.8) money supply and non-bank borrowing play no role in determining inflation, as they are statistically insignificant. The previous year's inflation plays a major role in determination of inflation in the short run. The reason may be that people expect more inflation in the next period, which may increase the demand for goods, increasing the price level in the economy. Correction in the error is 18.24 percent every year which is a bit low. This may be because of the insignificance of the major variables in the

model. However, on the basis of the analysis we can say that bank borrowing is inflationary in nature as compared to non-bank borrowing.

4.4.1. Fourth Stage Estimation

It has been confirmed that both bank and non-bank borrowing have long run relationship with inflation. To check which part of the bank borrowing and non-bank borrowing is inflationary, bank borrowing is further bifurcated into two components, central bank borrowing (CBB) and scheduled bank borrowing (SBB); while non-bank borrowing is comprised of National Saving Scheme (NSS), Pakistan Investment Bonds (PIBs) to individuals and other non-bank institutions. The privatisation proceeds are also included in non-bank borrowing, for budgetary support. But due to data limitations, NSS is calculated as non-bank borrowing minus privatisation proceeds.[24] In the same manner, central bank borrowing and scheduled bank borrowings are parts of broad money M2. So to avoid duplication, both CBB and SBB are subtracted from M2 and named as M2M.

In this stage we have tested which source of domestic financing of fiscal deficit is less inflationary, keeping external borrowing (EB) and M2 less CBB and SBB as exogenous, the following equation is tested:

$$cpi_t = \beta_1 cbb_t + \beta_2 sbb_t + \beta_3 nss_t + \beta_4 eb_t + \beta_5 m2m_t + v_{4t} \quad \ldots \quad \ldots (4.10)$$

Where v_{4t} is the white noise error term. Here cbb_t, sbb_t and nss_t are considered as endogenous while eb_t and $m2m_t$[25] are exogenously treated.

Since CBB and SBB data is available for 22 years only.[26] In such a small sample, to find the long run relationship, we are left with the choice of ARDL.[27] Narayan and Narayan (2005) used ARDL with 27 observations, and compared the computed bound test statistic with 30 observations critical bound given by Narayan (2005); while Pattichis (1999) used only 19 observations for ARDL and compared the bound test statistic with critical bound given by Pesaran, *et al.* (1996). These studies give some reliability to run ARDL with 22 observations, using the critical values used by Narayan (2005).

4.4.1. *Results of Bound Test of Cointegration*

The results of the bound test of cointegration are given in Table 4.9.

Table 4.9

Results of Bound Test of Cointegration

Test Statistic	Value	K
F-statistic	11.355	3

[24]As according to Agha and Khan (2006) and Ishrat Hussain (2007) non-bank borrowing is mostly comprised of NSS. Therefore it is assumed that NBB-Privatisation proceeds=NSS.

[25]M2 that part which is endogenously increased for fiscal deficit is removed from total m2. Therefore, only exogenous part is left.

[26]Thanks to Dr Mansoor Saleemi, SBP, who provided access to the data. Published data is only for 2001-14.

[27]In small sample ADF is biased while ARDL does not require pre-testing of unit root.

Critical Value Bounds		
Significance	I_0 Bound	I_1 Bound
10%	2.676	3.586
5%	3.272	4.306
1%	4.614	5.966

Note: Critical values are taken from Narayan (2005) for 30 observations

According to Table 4.9 there is a long run relationship among the said variables in the below equation, as the F-statistic lies outside the upper bound of the critical values.

$$\widehat{cpi}_t = -5.215 + 0.144cbb_t + 0.007sbb_t + 0.083nss_t + 0.007eb_t + 0.472m2m_t$$
$$(0.364) \quad (0.041) \quad (0.009) \quad (0.010) \quad (0.004) \quad (0.013)$$

This equation says that central bank borrowing (cbb_t), national saving schemes (nss_t) and exogenous money supply ($m2m_t$) contribute towards inflation, as they are statistically significant at 5 percent level of significance. In comparison, if significance is ignored, central bank borrowing is more inflationary than scheduled bank borrowing, as CBB has larger coefficient magnitude than SBB and NSS. Similarly NSS is more inflationary than SBB. So CBB is the most inflationary source of financing fiscal deficit in Pakistan

4.4.2. *The Error Correction Mechanism*

After confirmation of the long run relationship, the convergence to the long run mean is tested through ECM. The Results of the ECM is given in Table 4.9.

Table 4.10

Results of ECM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM_{t-1}	−0.522	0.088	−5.958	0.0001
Δcbb_t	0.041	0.018	2.256	0.0435
Δsbb_t	0.004	0.005	0.799	0.4399
Δnss_t	0.016	0.007	2.372	0.0353
Δeb_t	0.004	0.002	1.694	0.1161
$\Delta m2m_t$	0.247	0.043	5.780	0.0001
R-Square	0.9991	$F_{ARCH}(1)$		0.8248
Std. Error of Regression	0.1919	$F_{ARCH}(2)$		0.8371
$F_{auto}(1)$	0.9048	$\chi^2_{Norm}(2)$		0.4574
$F_{auto}(2)$	0.6583	$F_{RESET}(1,27)$		0.6072

There is negative and statistically significant ECM_{t-1} value which shows that long run convergence may take place if short run deviation occurs due to some unexpected shocks. Hence we may conclude that there is long run relationship respectively between borrowing from scheduled banks, central bank and National Saving Schemes with inflation.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The basic aim of this study has been to find the least inflationary source of financing fiscal deficit and to analyse the long run relationship between sources to finance fiscal deficit and inflation. For this purpose fiscal deficit was divided into different sources, which are in practice in Pakistan for financing. Estimations were done in four stages depending upon the categorisation of the sources of financing fiscal deficit. On the basis of unit root results, two techniques were used, Johansen Cointegration Technique and Autoregressive Distributed Lag model. The results of the first stage show that there is a long run relationship between fiscal deficit and inflation along with money supply, which is the standard result in most of the studies. While the second stage results indicate that there is a long run relationship between domestic borrowing, external borrowing and inflation, but domestic borrowing is more inflationary than external borrowing, again a standard result. In the third stage of estimation, it is shown that bank borrowing and non-bank borrowing (parts of domestic borrowing) have long run relationship with inflation. In this case bank borrowing significantly contributes to inflation as compared to non-bank borrowing. So bank borrowing is more inflationary in nature than non-bank borrowing. In the fourth and last stage of estimation it is found that central bank borrowing, scheduled banks borrowings (part of bank borrowings), National Saving Scheme (part of non-bank borrowing) have inflationary effects in the long run, on inflation. Central bank borrowing is the most expensive source of financing as compared to scheduled banks and National Saving Schemes.

(1) The study recommends financing of the deficit through external borrowing and non-bank borrowing as these sources are found to be least inflationary. Further studies need to be conducted to explicitly focus on the supply side factors as well as on low and high inflation regimes which may have different implications for the source of deficit financing.

REFERENCES

Agha, A. I. and M. S. Khan (2006) An Empirical Analysis of Fiscal Imbalances and Inflation in Pakistan. *SBP Research Bulletin* 2:2, 343–362.

Anoruo, E. C. (2003) An Empirical Investigation into the Budget Deficit-Inflation Nexus in South Africa. *South African Journal of Economics* 71:2, 146–154.

Catao, L. A. and M. E. Terrones (2005) Fiscal Deficits and Inflation. *Journal of Monetary Economics* 52:3, 529–554.

Chaudhary, M. A. and N. Ahmad (1995) Money Supply, Deficit, and Inflation in Pakistan. *The Pakistan Development Review* 34:4, 945–956.

Choudhary, M. A. and A. K. Parai (1991) Budget Deficit and Inflation: The Peruvian Experience. *Applied Economics* 23:6, 1117–1121.

Dickey, D. A. and W. A. Fuller (1979) Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association* 74:366a, 427–431.

Erkam, S. and M. Çetinkaya (2014) Budget Deficits and Inflation: Evidence from Turkey. *The Macro Theme Review* 3:8, 11.

Feltenstein, A. and S. Iwata (2002) Why Is It So Hard to Finance Budget Deficits? Problems of a Developing Country. *Journal of Asian Economics* 13:4, 531–544.

Fischer, S. and W. Easterly (1990) The Economics of the Government Budget Constraint. *The World Bank Research Observer* 5:2, 127–142.

Granger, C. J. W. and N. P. (1974) Spurious Regression in Econometrics. *Journal of Econometrics* 2.

Habibullah, M. S., C.-K. Cheah, and A. Baharom (2011) Budget Deficits and Inflation in Thirteen Asian Developing Countries. *International Journal of Business and Social Science* 2:9, 192–204.

Hussain, I. (2007) Choices for Financing Fiscal and External Deficits.

Jalil, A., R. Tariq, and N. Bibi (2014) Fiscal Deficit and Inflation: New Evidences from Pakistan Using a Bounds Testing Approach. *Economic Modelling* 37, 120–126.

Johansen, S. (1988) Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control* 12:2, 231–254.

Kemal, M. A. (2006) Is Inflation in Pakistan a Monetary Phenomenon? *The Pakistan Development Review* 45:3, 213–220.

Khan, A. A., Q. M. Ahmed, and K. Hyder (2007) Determinants of Recent Inflation in Pakistan. *Munich Personal RePEc Archive.*

Kia, A. (2010) Money, Deficits, Debts and Inflation in Emerging Countries: Evidence from Turkey. *The Global Review of Accounting and Finance* 1:1, 136–151.

King, R. G. and C. I. Plosser (1985) Money, Deficits, and Inflation. Paper presented at the Carnegie-Rochester Conference Series on Public Policy.

Leeper, E. M. (1991) Equilibria under 'Active' and 'Passive' Monetary and Fiscal Policies. *Journal of Monetary Economics* 27:1, 129–147.

Lin, H.-Y. and H.-P. Chu (2013) Are Fiscal Deficits Inflationary? *Journal of International Money and Finance* 32, 214–233.

Lozano, I. (2008) Budget Deficit, Money Growth and Inflation: Evidence from the Colombian Case: *Banco de la República.*

Lüutkepohl, H., P. Saikkonen, and C. Trenkler (2001) Maximum Eigenvalue Versus Trace Tests for the Cointegrating Rank of a VAR Process. *The Econometrics Journal* 4:2, 287–310.

Malik, W. S. (2006) Money, Output, and Inflation: Evidence from Pakistan. *The Pakistan Development Review* 45:4, 1277–1286.

Metin, K. (1998) The Relationship Between Inflation and the Budget Deficit in Turkey. *Journal of Business and Economic Statistics* 16:4, 412–422.

Mughal, K. and M. A. Khan (2011) Fiscal Deficit and Its Impact on Inflation, Causality and Co-integration: The Experience of Pakistan (1960-2010). *Far East Journal of Psychology and Business,* 5(2), 51-62.

Mukhtar, T. and M. Zakaria (2010) Budget Deficit, Money Supply and Inflation: The Case of Pakistan. *PrivrednaKretanja I EkonomskaPolitika* 20:122, 53–68.

Narayan, P. K. (2005) The Saving and Investment Nexus for China: Evidence from Cointegration Tests. *Applied Economics* 37:17, 1979–1990.

Narayan, P. K. and S. Narayan (2005) Estimating Income and Price Elasticities of Imports for Fiji in a Cointegration Framework. *Economic Modelling* 22:3, 423–438.

Pasha, H. A. and A. Ghaus (1996) Sustainability of Public Debt in Pakistan. Social Policy and Development Centre.

Pattichis, C. A. (1999) Price and Income Elasticities of Disaggregated Import Demand: Results from UECMs and an Application. *Applied Economics* 31:9, 1061–1071.

Pesaran, M. H. and B. Pesaran (1997) *Working with Microfit 4.0: Interactive Econometric Analysis;[Windows version]*. Oxford University Press.

Pesaran, M. H., Y. Shin, and R. J. Smith (2001) Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics* 16:3, 289–326.

Qasim, M. A. and M. Khalid (2012) Fiscal Responsibility: A Critical Analysis of FRDL (2005) Pakistan. *The Pakistan Development Review* 51:4, 117–129.

Qayyum, A. (2005) Modelling the Demand for Money in Pakistan. *The Pakistan Development Review* 46:3, 233–252.

Qayyum, A. (2006) Money, Inflation, and Growth in Pakistan. *The Pakistan Development Review* 47:3, 203–212.

Sahan, F. and Y. Bektasoglu (2010) A Panel Cointegration Analysis of Budget Deficit and Inflation for EU Countries and Turkey. Paper presented at the Empirical Studies in Social Sciences, prepared for the 6th International Student Conference, Izmir, Turkey.

Samimi, A. J. and S. Jamshidbaygi (2011) Budget Deficit and Inflation: A Sensitivity Analysis to Inflation and Money Supply in Iran. *Middle-East Journal of Scientific Research* 8:1, 257–260.

Sargent, T. J. and N. Wallace (1981) Some Unpleasant Monetarist Arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review* 5:3, 1–17.

Serfraz, A. and M. Anwar (2009) Fiscal Imbalances and Inflation: A Case Study of Pakistan. *Pakistan Journal of Social Sciences (PJSS)* 29:1, 39–50.

Shabbir, T., A. Ahmed, and M. S. Ali (1994) Are Government Budget Deficits Inflationary? Evidence from Pakistan. *The Pakistan Development Review* 33:4, 955–967.

Sims, C. A. (1994) A Simple Model for Study of the Determination of the Price Level and the Interaction of Monetary and Fiscal Policy. *Economic Theory* 4:3, 381–399.

Tekin-Koru, A. and E. Özmen (2003) Budget Deficits, Money Growth and Inflation: The Turkish Evidence. *Applied Economics* 35:5, 591–596.

Toda, H. Y. (1994) Finite Sample Properties of Likelihood Ratio Tests for Cointegrating Ranks When Linear Trends are Present. *The Review of Economics and Statistics,* 66–79.

Tullius, C. M. (2007) Assessment Framework of National Government Budget, 2008 Budget Briefer Retrieved from http://www.congress.gov.ph/download/cpbd/2007/02_Framework_DR_M.pdf.

Vieira, C. (2000) Are Fiscal Deficits Inflationary? Evidence for the EU. *Economic Research Paper* 7, 1–16.