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The Empirical Relationship between Fiscal Deficits and Inflation (Case Study: Selected Asian Economies)

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Abstract

The relationship between public sector deficits and inflation is one of the important and controversial issues in the academic literature as well as in economic policy field. On the other hand, a major objective of macroeconomic policies is to foster economic growth and to keep inflation on a low level. So keeping the price stability plays an important role in determining the growth rate of output. The main objective of this paper is to investigate the effects of budget deficit, broad money $M2$ supply, real GDP, import price index, interest rate and exchange rate on inflation (GDP price deflator) in selected Asian economics, namely China, Japan, Korea, India, Taiwan, and Singapore in the period of 1993-2013. By applying the Pooled Mean Group (PMG) estimation-based error correction model and the panel differenced GMM (General Method of Moment) Arellano-Bond estimator, the study finds out budget deficit, real GDP and exchange rate are statistically significant determinants of inflation in both methods of estimation.

Keywords: Inflation (GDP Price Deflator), Fiscal Deficit, Broad Money $M2$ Supply, PMG Estimation, Differenced Panel GMM Estimator, Asian Economies.

JEL Classification: C12, C23, E31, E63.

1. Introduction

Generally, objectives of macroeconomic policy emphasize the full employment, prices stability (Inflation controlling), fair distribution of income, and economic continuous growth. Due to worrying affects of inflation on the economy its control as one of objectives of macroeconomic policy has been ever taken into consideration by the economists (Fischer et al., 2002). In addition, increase of general level

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of prices (Inflation) is an important and effective phenomenon in the economy of each country, and its significance has made the policy-makers and economists to intend to deal with rooting and finding cause of this phenomenon accurately and its treatment ways. Meanwhile, financial reasons of inflation as a part of significant and influential factors on this phenomenon are ever taken into consideration. Out of these factors, relationship of the government's budget deficit with inflation is one of the most important discussions taken into consideration in the macroeconomic levels. Budget is the most important tool in order to gain access to economic stability (Including goals such as economic growth and price stability). In order to reach targets of economic stability which will be led to balance in the macroeconomy the government must focus their attention on optimum allocation of the budget (Molaei & Golkhandan, 2013). Policy of budget deficit is planned increase of the expenses compared to revenues. At the present time, this situation exists in majority of the world's countries, and aggregate demand and purchase power increases in the national economy through it. This policy was introduced at the time of big crisis and for the purpose of increase of demand and employment (King & Plosser, 2010). In the economic literature, there is not a general and accurate answer while responding to this question: what is the effect of the government's budget deficit on inflation? It's for this reason that economic effects of the government budget deficit will depend on how its existence, manner of its financial supply and conditions of macroeconomy (Solomon, 2004). Generally, on the basis of an active systemic analysis, relationship between budget deficit, money supply and prices level (Inflation) can be analyzed in such a way that increase of the government's budget deficit will be led to increase of governmental sectors debts and therefore, in crease of availability of the monetary basis and, in the next step, increase of money supply considering definition of the money supply. Now, considering positive relationship between general level of prices and cash flow, increase of money supply will be led to increase of general level of prices. On the other hand, increase of prices lead to decrease of real value of the government's expenditures in the next period, and the government will be proceed to increase rate of nominal expenditures in the next period for the purpose of compensation for reduction of value of its own

expenditures. But, increase of expenditures in the next period will be led to increase of budget deficit and repletion of above process again. Therefore, a cause and effect relationship is to be established between increase of government's expenditures (budget deficit) and general level of the prices (Hosseini-Nasab & Reza-Gholizadeh, 2001).

The remainder of this paper will be proceeding as follows: Section 2 outlines a review of literature about effects of fiscal deficit and money supply on inflation; Section 3 describes the data and theoretical basis; Section 4 presents the model and methodology; Section 5 represents empirical results, and final section provides conclusion and policy implications.

2. Review of Literature

The main objective of this paper is to investigate the effects of budget deficit, real GDP and exchange rate on inflation. This literature can be divided into sub-title to explain how each variable affects inflation. Thus this paper reviews the literature under two subsections, e.g. (1) The effects of fiscal deficit on inflation; (2) The effects of exchange rate on inflation; (3) The effects of money supply on inflation. We discuss them in turn below.

2.1 The Effects of Fiscal Deficit on Inflation

Several studies have exploited both the time and cross-sectional dimensions of data (panel data) to examine the relationship between fiscal deficits and inflation.

Karras (1994) investigated the effects of budget deficits on money growth, inflation, investment and real output growth using annual data from a sample of 32 countries in the period of 1950-1989 and finds that deficits are not inflationary. However, Cottarelli et al. (1998) found a significant impact of fiscal deficits on inflation in industrial and transition economies by using the dynamic panel data model in 47 countries from 1993 to 1996.

Fischer et al. (2002) utilized the data set of 94 developing and developed countries from 1960 to 1995, and found that the relationship between fiscal deficits and inflation is only strong inhigh-inflation countries during high-inflation episodes and weak in low-inflation countries and in high-inflation countries during low-inflation episodes.

Catão & Terrones (2005) applied the pooled mean group estimation method to a data set spanning 107 countries over the 1960-2001 periods. It is shown that, empirically, deficits have an impact on inflation and such an impact is stronger in high-inflation or developing countries. As mentioned by Catão & Terrones (2005), developing countries with less efficient tax collection, political instability, and limited access to external borrowing tend to have a lower relative cost of seignior age and thus a higher inflation tax.

Lin & Chu (2013) applied the dynamic panel quartile regression (DPQR) model under the autoregressive distributional lag ($ARDL$) specification, and examines the deficit-inflation relation-ship in 91 countries from 1960 to 2006. The DPQR model estimates the impact of deficits on inflation at various inflation levels and allows for a dynamic adjustment with the ARDL specification. The empirical results note that the fiscal deficit has a strong impact on inflation in high-inflation episodes, and has a weak impact in low-inflation episodes.

Jayaraman & Chen (2013) investigated the relationship between budget deficits and inflation in the four Pacific Island countries ($PICs$) by undertaking an empirical study of relation-ship between budget deficits in four $PICs$ through a panel econometric analysis. A multivariate framework is adopted with a view to avoiding bias arising out of omission of relevant variables and the methodology employed for estimating a long-run relationship between budget deficits and inflation is the Westerlund error correction based panel co-integration test procedure. The study's findings confirm the existence of a strong, direct relationship between budget deficits and inflation in all four PICs.

2.2 The Effects of Exchange Rate on Inflation

Most of empirical studies confirm a strong impact of pass-through effect from exchange rates to the prices in the frame work of inflation targeting policy. McCarthy (2000) stated that "whether a relation exists between inflation falling and changes in exchange rate" can be considered as a beginning of such researches in this scope.

In recent studies, the pass-through effect is being examined in the scope of "international macroeconomics". McCarthy (2000), Hunt &

Isard (2003), Hahn (2003), Campa & Goldenberg (2006), and Ihrig et al. (2006) are some of these studies. They examined the pass-through effect in the way of developed economies. Mihaljek & Klau (2000), Frankel et al. (2005), Choudhri & Hakura (2001), Hahn et al. (2007) can be given as some examples for the most important studies of developing economies in this scope.

Taylor (2000) stated that there is a strong and positive relation between inflation and pass-through effect. According to Taylor, decreasing the inflation rate means the decrease in pass-through effect. Also Honohan & Shi (2001) suggested that a strong and positive relation exists between dollarization and pass-through effect. The existence of dollarization prevents the running of monetary transmission mechanisms and brings to a halt the precautions against exchange rate shocks.

According to Mishkin (2008), the determination of beginning time and dimension of pass-through effect should be required for calculation of estimated inflation. Yet, this determination is required for performing monetary policy precautions against sudden exchange rate shocks. Hunt & Isard (2003) emphasized that inflation anticipation models should be restructured to calculate the size of this effect in the markets with high pass-through effect. In a sense, central banks should follow watchfully exchange rates and exchange rate volatility in the economies with high pass-through effect. This situation constitutes the one of the basic reasons behind "Fear of Floating Hypothesis". Bhattacharya et al. (2011) precipitated that pass-through effect has damaging influence on monetary transmission mechanism. That study, also discover some findings of decreasing in pass-through effect in economies, in low inflation.

According to Kara & Öğünç (2005), pass-through effect of exchange rates to the prices appeared in a time-lagged way from the middle of 90s to the beginning of 2000s. From the beginning to middle of 2000s this relation appeared in two and three time-lagged. Özçiçek (2007) specified that the biggest reaction against exchange rates changes occurs in Wholesale (Producer) Price Index (WPI). Exchange rate changes less affect the Consumer Price Index (CPI) than Wholesale Price Index. Aldemir (2007) stated that the sensitivity of import price index to exchange rates considerably shows that, it

would be decreased after disinflation policies. According to Peker & Görmüş (2008), the influence of crude oil prices on inflation are not strong. The influences of exchange rates on inflation are much more than monetary policies shocks and demand shocks. It is emphasized that 72% of improvements in inflation comes from exchange rate.

On the other hand, if there is depreciation in the exchange rate, this depreciation should cause inflation to increase. Depreciation means the currency buys less foreign exchange, therefore, imports are more expensive and exports are cheaper. Therefore, we get:

- Imported inflation. The price of imported goods will go up because they are more expensive to buy from abroad
- Higher domestic demand. Cheaper exports increases demand for UK exports. Therefore, there is an increase in domestic aggregate demand, and we may get demand pull inflation.
- Less incentive to cut costs. Manufacturers who export see an improvement in competitiveness without making any effort. Some argue this may reduce their incentive to cut costs, and therefore, we get higher inflation over the long term.

2.3 The Effects of Money Supply on Inflation

Most of empirical studies confirm a strong impact of money supply on inflation. McCandless & Weber (1995) examined data for 110 countries over a 30-year period. The study showed that there is a high (almost unity) correlation between the rate of growth of the money supply and the rate of inflation in long term. With regard to the relationship between money and prices, King (2002) showed that the strong correlation between them disappears as the time horizon shortens indicating that the effects of money growth should emerge in the changes in real variables. According to Walsh (2003), the high correlation between inflation and the growth rate of money supply supports the quantity-theoretic argument that the growth of money supply leads to an equal rise in the price level.

Nassar (2005) used a two-sector model to estimate the relation-ship between prices, money, and the exchange rate for quarterly data in Madagascar in the period of 1982-2004. The results showed that the money supply has significantly positive impact on inflation.

Oomes & Ohnsorge (2005) investigated the impact of money

demand on inflation for monthly data in Russia, from April 1996 to January 2004 by using the error correction model. The results confirmed that an excess supply of effective broad money is inflationary while other excess money measures are not and that effective broad money growth has the strongest and most persistent effect on short-run inflation.

Pelipas (2006) empirically investigated the money demand and inflation Belarus on the basis of the quarterly data for 1992-2003.Using co-integrated VAR and equilibrium correction model, the study notes the money supply is significantly positive correlated with inflation.

Hossain (2010) investigated the behavior of broad money demand in Bangladesh using annual data over the period of 1973-2008 by using the Johansen co-integration test and the error correction model. Empirical results suggest the existence of a causal relationship between money supply growth and inflation.

3. Data and Theoretical Basis

3.1 Data

In this paper, the panel data approach has been used for estimation of empirical model. The use of panel data allows not only the increase in the degrees of freedom and better estimators' large sample properties, but also the reduction in the endogeneity, due to the consideration of specific country effects ,omitted variables, reverse causality and measurement error. The data are extracted from Asian Development Bank (Key Indicators for Asia and the Pacific) for six Asian countries, namely China, Japan, Korea, India, Taiwan, and Singapore in the period of 1993-2013. In this study a four variable single equation model is employed. Budget deficit, GDP and exchange rate are treated as an exogenous variables and inflation (DEF[1]) as an endogenous variable. Therefore, the descriptive statistics is as follows:

1. implicit price deflator for GDP (GDP price deflator)

Table 1: Descriptive Statistics

Variables	Obs	Min	Max	Mean	Std.Dev.
Inflation (DEF)	120	1.2	48.5	3.862167	5.266451
Budget deficit (BUD)	120	-14.6	5.4	-2.345423	3.421839
Real GDP (RGDP)	120	768.4	1334.2	879.8151	146.9052
Broad money M2 (M2)	120	1.7	154.3	63.04432	32.84901
Government expenditure (GEXP)	120	1.1	36.5	18.84298	5.750192
Interest rate (INTE)	120	0.7	28.6	9.68561	4.835961
Exchange rate (EXC)	120	89.8	962.6	384.675	322.9976
Import price index (MPI)	120	2.3	45.2	17.45326	5.810021

Resource: Author Findings

3.2 Theoretical Basis

3.2.1 Theoretical Links of the Budget Deficit and Inflation

In the monetarist perspective money supply drives inflation. If monetary policy is accommodative to a budget deficit, money supply continues to rise for a long time. Aggregate demand increases as a result of this deficit financing, causing output to increase above the natural level of output. Growing labour demand increase wages, this in turn leads to the shift in aggregate supply in a downward direction. After some time the economy returns to the natural level of output. However, this happens at the expense of permanent higher prices.

According to the monetarist view, budget deficits can lead to inflation, but only to the extent that they are monetized (Hamburger & Zwick, 1981). In the monetarist (and neo-classical) models, changes in the inflation rate closely depend on changes in the money supply. Generally, the budget deficit per se does not cause inflationary pressures, but rather affects the price level through the impact on money aggregates and public expectations, which in turn trigger movements in prices. The money supply link of causality rests on Milton Friedman's famous theory of money, which dictates that inflation is always and everywhere a monetary phenomenon. The theory explains that continuing and persistent growth of prices is necessarily preceded or accompanied by a sustained increase in money supply. The expectations link of causality

works through the inter-temporal budget constraint, which implies that a government with a deficit must run, in present value-terms, future budget surpluses (Walsh, 2003). One possible way to generate surpluses is to increase the revenues from seignorage, so the public might expect future money growth. The deficit-inflation relationship is also discussed by considering direct effects of inflation on outstanding debts, tax revenues and expenditures. The dynamic interaction between public deficits and inflation could go in one of two directions. Either the effect of inflation to reduce the real value of debts dominates, or inflation worsens the fiscal position of the government due to collection lags, which reduces the government's real revenue (Dornbusch, 1990). This fall in the revenue, in itself, is accepted as a contributing factor in the inflationary process by increasing the money supply to finance these inflation-induced deficits (Tanzi, 1991; Aghevli & Khan, 1978).

Empirical work on the relationship between deficits and inflation has yielded conflicting results. Although the direction of the causation is generally accepted from deficits to inflation empirical evidence on this unidirectional causation is inconclusive (e.g. Abizadeh & Yousefi, 1998; Ahking & Miller, 1985; Barnhart & Darrat, 1988; Dwyer, 1982; Hamburger & Zwick, 1981; Hondroyiannis & Papapetrou, 1997). While some studies provide results to support the idea that inflation is caused by deficits, in many studies there is no significant evidence. On the other hand, Aghevli & Khan (1978), Ahking & Miller (1985), Barnhart & Darrat (1988), and Hondroyiannis & Papapetrou (1997) found bidirectional causation between deficits and inflation. Most of the empirical studies have adopted ad hoc approaches using econometric techniques. The relationship has been generally examined through the relationship between money growth and inflation. The monetarist assumption, which suggests that inflation is mainly a result of an increase in the money supply, is explicitly or implicitly held in many studies. Even some studies questioning the relevance of the unidirectional relationship between deficits and inflation presume a direct relationship between money growth and inflation (e.g. De Haan & Zelhorst, 1990; Hondroyiannis & Papapetrou, 1997; Hamburger & Zwick, 1981; McMillin & Beard, 1982).

The most common empirical method to examine the deficit-inflation relationship has been to employ a single equation model for

money growth or inflation, treating deficits as an exogenous variable among others (e.g. Abizadeh & Yousefi, 1998; Ahking & Miller, 1985; Hamburger & Zwick, 1981; McMillin & Beard, 1982). Conclusions have been based on these estimates, and a positive and statistically significant coefficient on the deficit variable has been taken as evidence to support the hypothesis that deficits 'cause' money growth and/or inflation. In such a single equation approach, a possibility for a reverse causation from inflation to deficits is generally ruled out.

It appears that the "budget deficit-inflation" link in fact exhibits a two-way interaction, i.e. not only does the budget deficit through its impact on money and expectations produces inflationary pressure, but high inflation then also has a feedback effect pushing up the budget deficit. Basically, this process works through significant lags in tax collection. The problem lies in the fact that the time of tax obligations' accrual and the time of actual payment do not coincide with payment usually made at a later date. In view of this, high inflation during such a time lag reduces the real tax burden. We may therefore have the following self-strengthening phenomenon: persistence of the budget deficit props up inflation, which in turn lowers real tax revenues; a fall in the real tax revenues then necessitates further increases in the budget deficit and so on. In economic literature this is usually referred to as the Olivera-Tanzi effect.

As Sachs & Larain (1993) showed the evidence of developing world of 1980's supports the conclusion of this self-strengthening process and may destabilize an economy and lead to a very high inflation. Some researchers also argue that budget deficit financing by means of accumulating domestic debt seems to only postpone the inflation tax. If government finances its deficit by printing money now, then in the future the burden of servicing existing stock of government debt will be easier. Interest payments that otherwise add to the next periods' government expenditures will not exert additional pressure on fiscal authority and the deficit will not increase over time. As Sachs & Larrain (1993) put it, "borrowing today might postpone inflation, but at the risk of even higher inflation in the future".

Sargent & Wallace (1981) observed that when the fiscal authority sets the budget independently, the monetary authority can only control

the timing of inflation. Recently a new direction of theory has emerged, which may also be seen as an extension of the deferred inflation hypothesis. There are two regimes for price determination, according to the new fiscal theory of the price level (e.g. Komulainen & Pirttila, 2000; Carzoneri, Cumby, & Diba, 1998). Under the so-called "monetary dominant" regime, monetary policy determines the price level, and fiscal policy remains reactive. The government balances its intertemporal constraint taking the inflation as given. In the "fiscal dominant" regime, in contrast, the price level is determined by the intertemporal budget constraint. If the future surpluses fall short of financing the deficit, the price level must adjust upwards, reducing the real value of the government debt. Monetary policy is reactive in a "fiscal dominant" regime: money supply reacts to price level changes to bring the money demand equation in balance (Carlston & Fuerst, 1999).

4. The Model and Methodology

4.1 The Model

The most common empirical method to examine the deficit-inflation relationship has been to employ a single equation model for money growth or inflation, treating deficits as an exogenous variable among others (e.g. Abizadeh & Yousefi, 1998; Ahking & Miller, 1985; Hamburger & Zwick, 1981; McMillin & Beard, 1982). In this study a four variable single equation model is employed. Budget deficit, GDP and exchange rate are treated as an exogenous variables and inflation (GDP price deflator) as an endogenous variable.

For the estimation of the influence of a budget deficit on inflation, one can start from the long run government budget constraint:

$$\frac{B_{t-1}}{P_t} = \sum \frac{1}{r_j}\left(\tau_{t+j} - g_{t+j} + \left(M_{t+j}\frac{M_{t+j}}{P_{t+j}}\right)\right) \qquad (1)$$

where:

$\frac{B_{t-1}}{P_t}$ = Government debt

r_j= The discount rate

τ_{t+j}= Total tax revenue

g_{t+j}= Total government expenditure

M_t= Broad money supply

Considering the particular case where the public debt cannot grow implies that the entire budget deficit is ultimately financed through seignorage. Imposing this restriction on the public debt, one obtains the short run budget constraint:

$$\frac{B_{t-1}(t)}{P_t} = \tau_t - g_t + \left(\frac{M_t - M_{t-1}}{P_t}\right) \quad (2)$$

where $\boldsymbol{B(t)}$ is the debt with the maturity in period $\boldsymbol{t}$ that has to be paid and is not rolled-over. This can be rewritten as:

$$\frac{B_{t-1}(t)}{P_t} = \tau_t + g_t + \left(\frac{M_t - M_{t-1}}{P_t}\right) \quad (3)$$

The term on the left hand side is the budget deficit formed from the fiscal deficit and repayment of public debt with the maturity in period t and the term on the right hand side is seignorage.

Seignorage revenue ($\boldsymbol{S}$) can be written as a function of the inflation rate and real money supply:

$$S = {f(\pi_t)M_t}/{P_t} \quad (4)$$

where $\boldsymbol{f(\pi_t)}$ is a reduced form money demand equation. Considering that seignorage is increasing with the inflation rate and combining equation 3 and equation 4 one obtain the equation estimated by Catao & Terrones (2001) that explains the inflation rate by the budget deficit and money supply:

$$\pi_t = \beta d_t P_t / M_t^S \quad (5)$$

where:

$\boldsymbol{\beta}$ is the inverse linear multiplier

$\boldsymbol{d_t}$ is the budget deficit which is $d_t = g_t - T_t - B_{t-1}$

$\boldsymbol{M/P}$ is the money supply

If one divides by nominal GDP (Y) one obtains a relation between the size of budget deficit *(D)* in GDP and the level of inflation:

$$\pi = D_t/Y_t / M_t/Y_t \quad (6)$$

The long run equation developed in this study includes the ratio of the budget deficit to GDP and the exchange rate as exogenous variables and the GDP price deflator, as the endogenous variable.

The influence of the budget deficit on inflation is positive. The higher the budget deficit, the greater will be the rate of inflation. The budget deficit affects inflation only if it is monetized to increase the monetary base of the economy. From Friedman's theory of money inflation is a monetary phenomenon. Accordingly if the budget deficit is monetized it increases the money supply thereby increasing the price level. When the budget deficit is monetized, an extremely high correlation exists between the budget deficit and money supply. The problem of multicollinearity and reducibility precludes one from using both money supply and the budget deficit as explanatory variables in the regression analysis. Therefore, in order to estimate the effect of the budget deficit on inflation, the budget deficit is used as explanatory variable instead of the money supply. The exchange rate has a deterministic effect on the level of prices in underdeveloped economies. It's included as a control variable in this paper that can explain inflation. In countries like this Asian countries, an exchange rate depreciation (appreciation) could increase (decrease) the price of imported commodities. These countries markets are heavily based on imported commodities, which imply the depreciation of the exchange rate, could be immediately reflected on an increase on the price of the consumer's basket of commodities. The third important explanatory variable is the level of GDP, which is negatively related with the level of inflation. According to theoretical and experimental studies, the total form of function used in this paper, is as follows[1]:

$$LDEF = f(LBUD, LRGDP, LM2, LEXC, LMPI, LGEXP, LINTE) \quad (7)$$

where:

LDEF is logarithm of the GDP price deflator;
LBUD is logarithm of the consolidated budget deficit;
LRGDP is logarithm of real gross domestic production;
LEXC is logarithm of the exchange rate;
LMPI is logarithm of import price index;
LM2 is logarithm broad money;
LGEXP is logarithm of government expenditure **and**

1. For estimation of the model, specified equation in form of linear or logarithmic linear can be estimated. In order to choose between these models Non-Nested Test is used in this study. The results obtained from this test have shown that the logarithmic linear model is better than linear model.

$\boldsymbol{LINTE}$ is logarithm of interest rates;

In this paper, we use implicit price deflator for GDP (GDP price deflator) as an inflation index.[1]

4.2 Methodology

4.2.1 PMG and GMM Method

Pesaran et al. (1997, 1999) proposed the PMG estimator that allows the short-term parameters to be heterogeneous between groups while imposing homogeneity of the long-term coefficients between countries. It is one advantage of PMG estimator. Furthermore, the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The heterogeneity of short-run slope coefficients allows the dynamic specification to differ across countries. However, the drawback of PMG estimator is that it cannot deal with the endogeneity of variables in the model.

The PMG estimation-based error correction model requires an existence of cointegration between dependent variable and explanatory variables. So, the study first tests the stationary of the variables by using the Fisher tests, developed by Maddala & Wu (1999) and then applies the co-integration test of Westerlund (2007).

The dynamic panel GMM estimation uses the appropriate lags of the instrumented variables to generate internal instruments and employs the pooled dimension of the panel data. So it does not put restrictions on the length of each individual time dimension in the panel. This enables use of suitable lag structure to exploit the dynamic specification of the data. However, this approach still has some important shortcomings (Anshasy, 2012). First, it only allows the intercepts -not slopes- to vary across groups. Pesaran et al. (1997; 1999) argued that the assumption of homogeneity of slope parameters

1. Inflation is defined as a sustained increase in the general level of prices for goods and services which is measured by measurable indices. These indices include wholesale price index (WPI), producer price index (PPI), retailed price index (RPI) and GDP deflator (implicit price deflator for GDP). The first and second indices measure inflation in the level of whole importer and producer, and they are generally influenced by exchange rate and commercial terms of trade. These are most proper indices in order to measuring the changes in cost of industrial productions. The third index measures level of cost living and finally, the forth index (implicit price deflator) calculate inflation in all level of goods and services which is involved in calculating the national products. This index implies the changes in values of national money. Therefore, as mentioned above, we use implicit price deflator for GDP (GDP price deflator) as an inflation index.

may not be proper when the time dimension of the panel is short. Second, cross-sectional dependence is not addressed.

4.2.2 The PMG Estimation-Based Error Correction Model

$$\Delta Y_{it} = \emptyset S_{it-1} + \sum_{j=1}^{P} \delta_{ij} \Delta X_{it-j} + \eta_i + \varepsilon_{it} \quad where \quad S_{it-1} = Y_{it-1} - \theta X_{it-1} \qquad (1)$$

Where Y is inflation; S_{it-1} is the deviation from long-run equilibrium at any period for group i, and $\emptyset$ is the error correction (speed of adjustment) coefficient. The vector θ captures the long-run coefficients which do not vary across groups; these coefficients represent the long-run elasticity of inflation with respect to each variable in X_{it-1} . The short-run responses of the X variables are captured by the vector δ. η_i is an unobserved time-invariant, country-specific effect and ε_{it} it is an observation-specific error term.

4.2.3 The Panel Differenced GMM Arellano-Bond Estimation

$$Y_{it} = \alpha Y_{it-1} + \beta X_{it} + \eta_i + \varepsilon_{it} \; ; i = 1, 2, 3, \dots, N \; ; t = 2, 3, \dots, T \qquad (2)$$

Where Y is inflation in first difference; X is a vector of variables in first difference including variables of fiscal policy (fiscal deficit and government expenditure), variables of monetary policy (broad money M_2 supply and interest rate) and some control variables (real GDP, exchange rate and trade openness); η_i is an unobserved time-invariant, country-specific effect and ε_{it} is an observation-specific error term.

The dynamic characteristics in (2) show that the country-specific fixed effects can be correlated with the lagged dependent variable and some explanatory variables may be endogenous. It can make OLS inconsistency and estimates bias. However the panel differenced Generalized Method of Moments (GMM) estimator, developed by Arellano & Bover (1995), and Blundell & Bond (1998), tackles these problems. It utilizes the lagged differences of the predetermined variable as instruments for their levels and the differences of the strictly exogenous variables (as in the standard IV procedure).

In addition, based on the information criterions BIC and AIC, the study uses lag orders $K = 2$ identical for all cross-units, respecting the condition $T > 5 + 2K$, which is important to guarantee the validity of the proposed tests, even with shot T samples (see Hurlin, 2004).

The matrix of Pearson correlation coefficients is summarized in Table 2. The results show that the pair of broad money $M2$ supply and trade openness has the biggest coefficient (0.8382). According to Evans (1996), the correlation level between them is relatively strong while that of others are moderate and weak. However, for the time series in finance, the correlation coefficient, lower than 0.8 is acceptable. Therefore, the study decides to use these all variables in the model.

4.2.4 Advantages and Disadvantages of GMM Method

This method cannot solve the problem of correlation between the descriptive variables and decrease or eliminate multicollinearity in the model. But, on the other hand, including and consideration of individual dissimilarity and more information and elimination of the available bias in the sectional regressions will be resulted in more accurate estimations, higher efficiency and less multicollinearity in GMM, which this task is counted as one of the advantages of this method. Totally, dynamic GMM method compared to other methods has the advantages as following:

- **Solution of Problem of Endogenous of the Institutional Variables**

The main advantage of approximation of the dynamic GMM is that all regression variables lacking correlation with residual term (including with delay variables and differential variables) can be instrumental variable potentially (Green, 2008).

- **Reduction or Obviation of Multicollinearity in the Model**

Usage of delay dependent variables leads to elimination of multicollinearity in model.

- **Omission of the Fixed Variables Over Time**

Application of this method leads to obviation of many variables which are fixed over time. And regarded as the factors influencing on the per capita income and inflation, and also, can cause to establish correlation and bias in the estimation of model (Baltaji, 2008).

- **Increase of Time Dimension of Variables**

Even though it is possible that sectional cutting can obtain the long term relationship between the variables, estimation of this type has not advantages of time series of statistics in order to increase effectiveness of the estimations. Usage of time dimension of the statistics series

allows that influence of all not-observed time fixed factors showing inter–countries differences of difference in per capita income is to be considered (Hsiao, 2003).

4.2.5 Advantages and Disadvantages of the PMG Panel Method

The PMG estimator allows the short-term parameters to be heterogeneous between groups while imposing homogeneity of the long-term coefficients between countries. It is one of the advantages of PMG estimator. It can be shown that estimation of MG with much and appropriate delay presents extremely adaptable approximations from the long term parameters (even, if the variables are collective in first order). Without existence of incompatibility (resulted from the heterogeneous dynamic relationships), PMG method uses efficiency of combinative estimation. In approximation through PMG method long term coefficients among the countries are equal, while short term coefficients are capable of changing. At the present time, existence of panel data which are relative-high time dimension is prevalent greatly. In this state, N regression of time series can be run and then, their average calculated (Estimator of group average of MG), or data can be combined and supposed that their slope and variance coefficients are similar. In this method, long term slope coefficients are supposed to be similar, but it is allowed that their short term slope coefficients and standard deviation are to be changed among the sectional units.

As mentioned in the section 3.1 and 4.2 related to data and methodology, this paper applies the PMG estimation–based error correction model to analyze the effects of budget deficit, real GDP and exchange rate on inflation.

5. Empirical Results

As mentioned in the section 3.1 and 4.2 related to data and methodology, this paper applies the PMG estimation–based error correction model to analyze the effects of budget deficit, real GDP, broad money $M2$ supply and exchange rate on inflation. Before carrying out it, the stationary tests needs to be done to make sure that all variables in the model are co-integrated.

The results of stationary tests in Table 3 show that variables inflation (DEF), budget deficit and exchange rate are significantly

stationary at levels less than 10% while variables broad money $M2$ supply and real GDP per capita and is not stationary. It means that in this model some variables have integration of zero order $I(0)$ and the others integration of first order $I(1)$.

Table 4 presents Westerlund panel co-integration tests. When all four tests reject the null of no co-integration, a covariate is considered co-integrated with the dependent variable. So the results show that fiscal deficit, broad money $M2$ supply, real GDP per capita, government expenditure, interest rate, exchange rate and trade openness are co-integrated with inflation.

The estimation of PMG-based error correction model is expressed in Table 4. In long run, the effects of budget deficit, real GDP and exchange rate on inflation are significantly positive at level of 1%. Impacts of budget deficit real GDP and exchange rate on inflation are consistent with previous empirical studies. In fact, Fischer et al. (2002), Catão and Terrones (2005), Lin and Chu(2013) and Jayaraman and Chen (2013) found fiscal deficit has strongly positive influence on inflation and Nassar (2005), Oomesand Ohnsorge (2005), Pelipas (2006) and Hossain (2010) confirmed broad money supply, budget deficit real GDP and exchange rate are positively correlated with inflation.

According to Bajo-Rubio, Díaz-Roldán, & Esteve (2009), the Fiscal Theory of the Price Level (FTPL) takes into account monetary and fiscal policy interactions and assumes that fiscal policy may determine the price level, even if monetary authorities pursue an inflation targeting strategy. This approach allows fiscal policy to set primary surpluses/deficits to follow an arbitrary process, not necessarily compatible with solvency. Therefore, the budget surplus/deficit path would be exogenous, and the endogenous adjustment of the price level would be required in order to achieve fiscal solvency. In this context, fiscal policy becomes “active”, with budget surpluses turning to be the nominal anchor; whereas monetary policy becomes “passive” and can only control the timing of inflation. Therefore, an increase in fiscal deficits as well as in two important instruments of fiscal policy, leads to high inflation.

Table 2: The Matrix of Pearson Correlation Coefficients

Variables	INF	BUD	$M2$	$RGDP$	EXC	$LMPI$	$GEXP$	$INTE$
$INF(DEF)$	1							
BUD	-0.0732*	1						
$M2$	-0.242***	0.1181	1					
$RGDP$	-0.0546	0.0640**	0.3298***	1				
EXC	0.3238***	0.1881**	-0.393***	-0.233***	1			
MPI	-0.2301	-0.403***	0.8382***	0.3771***	-0.0523	1		
$GEXP$	-0.0303	-0.505***	0.2882***	-0.0464	-0.0313	0.8382	1	
$INTE$	-0.5170***	-0.0642	-0.733***	0.0421	-0.053	0.8382***	-0.673	1

*, **, ***: statistically significant at 10%, 5% and 1% respectively.
Resource: Author Findings

The matrix of Pearson correlation coefficients is summarized in table 2. The results show that the pair of broad money $M2$ supply and interest rate has the biggest coefficient (0.733). According to Evans (1996), the correlation level between them is relatively strong while that of others are moderate and weak. However, for the time series in finance, the correlation coefficient, lower than 0.8 is acceptable. Therefore, the study decides to use these all variables in the model.

Table 3: Fisher Type Unit Root Tests with lags = 2

Variable	PP test		ADF test	
	$Prob > chi2$		$Prob > chi2$	
	With trend	Without trend	With trend	Without trend
$LDEF$	0.0431	0.0189	0.0000***	0.0000***
$LBUD$	0.5646	0.0159**	0.0151	0.0139
$LRGDP$	0.5053	0.8823	0.6501	0.4689
$LM2$	0.5862	0.7640	0.6566	0.0001
$LEXC$	0.6876	0.0719*	0.8883	0.3842
$LMPI$	0.5862	0.7640	0.6566	0.0001
$LGEXP$	0.6987	0.5288	0.0008	0.8534***
$LINTE$	0.0228**	0.8162	0.2672	0.0142
ΔLM_2	0.0026***	0.0000***	0.0000***	0.0000***
$\Delta LRGDP$	0.0032***	0.0000***	0.0000***	0.0000***

*, **, ***: statistically significant at 10%, 5% and 1% respectively
Resource: Author Findings

However, the influence of interest rate on inflation can be explained in two ways. One is based on cost of capital. According to Asgharpur, Kohnehshahri, & Karami (2007), the increased interest rate raises the cost of capital that results in higher production costs. This changes raise inflation by shifting the aggregate supply curve to the left side. The

second, the changing interest rate impacts on inflation through influencing the money volume. In the endogenous money models which money supply is a function of interest rate, the money supply is increased when interest rate goes up. So, according to quantity theory of money, the more money supply results in inflation in the short and long run.

In short run, broad money $M2$ supply, government expenditure and interest rate are significant determinants of inflation. In addition, the error correction coefficient is significantly negative at level of 1%, confirming that there exists a co-integration long run relationship in at least one of the panel countries.

Table 4: Westerlund Panel Co-Integration Tests (Normalized Variable: *DEF*)

Covariates	G_t	G_α	P_t	P_α
BUD	0.000***	0.000***	0.000***	0.000***
RGDP	0.000***	0.006	0.000***	0.000***
M2	0.000***	0.002	0.000***	0.000***
GEXP	0.000***	0.000***	0.000***	0.000***
INTE	0.007***	0.000***	0.000***	0.000***
EXC	0.000***	0.000***	0.000***	0.000***
LGEXP	0.000***	0.000***	0.000***	0.000***

*, **, ***: statistically significant at 10%, 5% and 1% respectively

Resource: Author Findings

Table 5: Error Correction Model (PMG Estimations)

Long run co-integrating vectors Dependent variable: *LDEF*				Short run dynamics (mean countries) Dependent variable: *LDEF*			
Variables	**Coeff**	**Std**	**Prob**	**Variables**	**Coeff**	**Std**	**Prob**
LBUD	0.51**	0.1090	0.001	Δ***LBUD***	-0.2310	0.1756	0.021
LM_2	0.02*	0.0155	0.000	ΔLM_2	-0.3513***	0.1106	0.001
LRGDP	0.002	0.0038	0.076	Δ***LRGDP***	-0.1666	0.1118	0.161
LGEXP	0.34***	0.1016	0.002	Δ***LGEXP***	-0.4284*	0.2559	0.096
LINTE	0.46***	0.0852	0.366	Δ***LINTE***	0.4665**	0.2441	0.048
LEXC	0.015	0.0098	0.300	Δ***LEXC***	-0.0258	0.0501	0.046
LMPI	0.27***	0.1089	0.001	Δ***LMPI***	-0.3873*	0.3242	0.000
				Error Correction	-0.8126***	0.0788	0.000

The results of diagnostics tests

Test Statistics	LM (CHSQ)	Prob-Level
Serial Correlation	2.6124	0.556
Functional Form	1.1589	0.135
Normality	4.1437	0.132
Heteroscedasticity	7.8621	0.218

*, **, ***: statistically significant at 10%, 5% and 1% respectively

Resource: Author Findings

Also the diagnostic tests are reported in table 5. The results obtained from diagnostic tests show that the estimated model has no the problems of serial correlation, functional form, model misspecification and heteroscedasticity at the 5% level.

Accordingly, the speed of adjustment in the short run to reach equilibrium level in the long run is 81.26% / year.

To confirm whether the above results of PMG estimator is reliable or not, the study continues to follow the differenced panel GMM Arellano-Bond estimations. The estimated results are out-lined in Table 6.

Table 6: Differenced Panel GMM Arellano-Bond Estimations (Dependent Variable: $LDEF$)

	Model 1	**Model 2**	**Model 3**
$DEF(-1)$	-0.2683***	-0.3068***	-0.3074***
$lBUD$	1.7988**	1.7529**	1.7609**
LM_2	-	-	-0.0419
$lRGDP$	-	0.0112	0.0118
$lEXC$	-	-	-0.0378
$lGEXP$	0.9123*	0.9262*	0.9530*
$lINTE$	1.6891***	1.7545**	1.7312***
$LMPI$	-	-	0.3287
Obs	110	110	110
$Sargant\ test$	0.389	0.367	0.391
$AR(2) test$	0.345	0.355	0.311
The results of diagnostics tests			
Test Statistics	**LM (CHSQ)**		**Prob-Level**
Serial Correlation	2.3212		0.326
Functional Form	1.2876		0.290
Normality	1.2124		0.231
Heteroscedasticity	7.8621		0.550

*, **, ***: statistically significant at 10%, 5% and 1% respectively

Resource: Author Findings

In order to check the robustness of the panel differenced GMM Arellano-Bond estimation, the estimated results are usually verified by removing/adding some variables. Accordingly, this estimation begins at Model 1, then continues with Model 2 and ends at Model 3 (the full variables model). All results from Model $1, 2, 3$ show that estimated coefficients are approximately unchanged. It confirmed that results of

the panel GMM estimation are strongly robust. Except for impact of broad money$M2$, effects of fiscal deficit(BUD), government expenditure ($GEXP$) and interest rate ($INTE$) on inflation($INF(-1)$) are completely consistent with the estimated results of PMG estimator, implying the impact of broad money $M2$ on inflation is not significant in panel GMM estimation. Accordingly, increase in money supply does not necessarily cause inflation. With increase in money supply interest rate is likely to fall and decline in interest rate may lead to higher investment and output and in that case money supply is not inflationary.

Also, the results obtained from diagnostic tests show that the estimated model has no the problems of serial correlation, functional form, model misspecification and heteroscedasticity at the 5% level.

6. Conclusion and Policy Recommendations

This paper applies the PMG estimation–based error correction model to analyze the effects of budget deficit, broad money $M2$ supply, real GDP, import price index, interest rate and exchange rate on inflation (GDP price deflator). But, in order to confirm whether the results of PMG estimator is reliable or not, the study continues to follow the differenced panel GMM Arellano-Bond estimations. Therefore, in this paper, we used two methods of estimation, the PMG estimator and the differenced panel GMM Arellano-Bond estimation, to analyze the effects of fiscal deficit and broad money M2 supply on inflation in Asian countries, namely China, Japan, Korea, India, Taiwan, and Singapore in the period of 1993-2013. The estimated results show that broad money M2 supply has significantly positive impact on inflation only in the method of PMG estimation whereas fiscal deficit, government expenditure and interest rate are the statistically significant determinants of inflation in both methods of estimation.

The policy recommendations of empirical results are very clear. Broad money M2 supply, fiscal deficit, government expenditure and interest rate are positively correlated with inflation. Therefore, when applying the fiscal and monetary policies to foster the economy, governments of Asian countries should be careful at money supply, fiscal deficit, government expenditure and interest rate because they can contribute to high inflation for the economy.

References

Abizadeh, S., & Yousefi, M. (1998). Deficits and Inflation: An Open Economy Model of the United States. *Applied Economics, 30*, 107-316.

Aghevli, B., & Khan, M. (1978). Government Deficits and the Inflationary Process in Developing Countries. *IMF Staff Papers, 25*(3), 383-416.

Ahking, F., & Mmiller, S. (1985). The Relationship between Government Deficits, Money Growth and Inflation. *Journal of Macroeconomics, 7*(4), 47-67.

Aldemir, Ş. (2007). The Impacts of Exchange Rates on Import Prices in Turkish Economy: 1988- 2004. *International Economic and Foreign Trade Policies, 1*(2), 53-57.

Anshasy, A. E. E. (2012). Oil Revenues, Government Spending Policy, and Growth. *Public Finance and Management. 12*(2), 120-146.

Arellano, M., & Bover, O. (1995). Another Look at the Instrumental Variable Estimationof Error Components Models. *Journal of Econometrics, 68*, 29-51.

Asgharpur, H., Kohnehshahri, L. A., & Karami, A. (2007). The Relationships between Interest Rates and Inflation Changes: An Analysis of Long-Term Interest Rate Dynamics in Developing Countries. *International Economic Conference on Trade and Industry (IECTI),* Retrieved from http://repo.uum.edu.my/2416/1/Hossein_Asgharpur.pdf.

Asian Development Bank (2013). *Key Indicators for Asia and the Pacific*. Retrieved from http://www.adb.org/statistics.

Bajo-Rubio, O., Díaz-Roldán, C., & Esteve, V. (2009). Deficit Sustainability and Inflation in EMU: An Analysis from the Fiscal Theory of the Price Level. *European Journal of Political Economy, 25*(4), 525–539.

Baltagi, B. H. (2008). *Econometric Analysis of Panel Data*. Chichester: John Wiley & Sons Ltd.

Barnhart, S. W., & Arrat, A. F. (1988). Budget Deficit, Money Growth and Causality: Further OECD Evidence. *Journal of International Money and Finance, 7*(2), 231-42.

Bhattacharya, R., Ila, P., & Ajay, Shah. (2011). Monetary Policy Transmission in an Emerging Market Setting. *Working Paper, 11/5*, Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.186.134&rep=rep1&type=pdf.

Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics, 87*, 115–143.

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

Campa, J. M., & Goldberg, L. S. (2006). Pass-Through of Exchange Rates to Consumption Prices: What has Changed and Why? *NBER Working Paper, 12547*, Retrieved from http://www.nber.org/chapters/c6982.pdf.

Carzonery, M., Cumby, R., & Diba, B. (1998). Is the Price Level Determined by the Need of Fiscal Solvency? *NBER Working Paper, 6471*, Retrieved from http://faculty.georgetown.edu/cumbyr/papers/fiscal_pricelevel.PDF.

Carlstron, C. T., & Timothy S. F. (1999). Money Growth and Inflation: Does Fiscal Policy Matter? *Federal Reserve Bank of Cleveland*, Retrieved from https://www.researchgate.net/profile/Timothy_Fuerst/publication/5028578_Money_growth_and_inflation_does_fiscal_policy_matter/links/09e41510a9a19bdd44000000.pdf.

Catao, L., & Terrones, M. (2001). Fiscal Deficits and Inflation: A New Look at the Emerging Market Evidence. *IMF Working Paper, 74/01*, Retrieved from https://books.google.com/books?hl=en&lr=&id=btF8bYwCkIEC&oi=fnd&pg=PA3&dq=Fiscal+Deficits+and+Inflation:+A+New+Look+at+the+Emerging+Market+Evidence&ots=b46Wu8zeLL&sig=4kBJBGYay_P5SsSDH7wWQlgBiz4.

Choudhri, E. U., & Hakura D. S. (2003). Exchange Rate Pass-Through to Domestic Prices: Does the Inflationary Environment Matter? *Journal of International Money and Finance*, Retrieved from https://www.researchgate.net/profile/Dalia_Hakura/publication/5123725_Exchange_Rate_Pass-Through_to_Domestic_Prices_Does_the_Inflationary_Environment_Matter/links/0c96052dffa421e7d2000000.pdf.

Cottarelli, C., Griffiths, M. E. L., Moghadam, R. (1998). The Non-Monetary Determinants of Inflation: A Panel Data Study. *IMF Working Paper, 98/23*, Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=882254.

Dornbush, R. (1990). *Extreme Inflation: Dynamics and Stabilization*. In Brookings Paper on Economic Activity, Brainard, W. C., & Perry, G. L. (Eds.) Brookings Institution, Retrieved from http://www.jstor.org/stable/2534504.

De Haan, J., & Zelhorst, D. (1990). The Impact of Government Deficits on Money Growth in Developing Countries. *Journal of International Money and Finance, 9*, 445-469.

Evans, J. D. (1996). *Straight Forward Statistics for the Behavioral Sciences*. Pacific Grove, CA: Brooks/Cole Publishing.

Fischer, S., Sahay, R., & Végh, C. A. (2002). Modern Hyper and High Inflations. *Journal of Economic Literature, 40*(3), 837–880.

Frankel, J., Parsley, D., & Wei, S. J. (2012). Slow Pass-Through Around the World: A New Import for Developing Countries. *Open Economies Review, 23*(2), 213–251.

Greene, W. H. (2008). *Econometric Analysis* (6th Ed.). New Jersey, Upper Saddle River: Pearson International.

Hahn, E., Michele, C. Z., & Marcelo, S. (2007). Exchange Rate Pass-Through in Emerging Markets. *ECB, Working Paper, 739*, Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.165.5066&rep=rep1&type=pdf.

---------- (2003). Pass-Through of External Shocks to Euro Area Inflation. *ECB, Working Paper, 243*, Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=457310.

Hamburger, M. J., & Zwick, B. (1981). Deficit, Money and Inflation. *Journal of Monetary Economics, 7*(1), 141-150.

Hondroyiannis, G., & Papapetrou, E. (1997). Are Budget Deficits Inflationary? *Applied Economics Letters, 4*(8), 493-96.

Honohan, P., & Shi, Anqing. (2001). Deposit Dollarization and the Financial Sector in Emerging Economies. *Working Paper, World Bank,* Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2002/01/25/000094946_02011704031216/Rendered/PDF/multi0page.pdf.

Hossain, A. A. (2010). Monetary Targeting for Price Stability in Bangladesh: How Stable is its Money Demand Function and the Linkage between Money Supply Growth and Inflation. *Journal of Asian Economics, 21,* 564–578.

Hosseini-Nasab, E., & Reza-Gholizadeh, M., (2001). The Investigation of Financial Factors of Inflation in Iran with Emphasizing on Budget Deficite. *The Economic Research Quarterly, 1,* 43-70.

Hsiao, C. (2003). *Analysis of Panel Data* (2nd Ed.). Cambridge: Cambridge University Press.

Hurlin, C. (2004). Testing Granger Causality in Heterogeneous Panel Data Models with Fixed Coefficients. *Mimeo, University of Orleans,* Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.528.7361&rep=rep1&type=pdf.

Hunt, B., & Isard, P. (2003). Some Implications for Monetary Policy of Uncertain Exchange Rate Pass-Through. *Scottish Journal of Political Economy, 50*(5), 567–584.

Ihrig, J.E., Mario, M., & Alexander, D.R. (2006). Exchange Rate Pass-Through in G-7 Countries. FED of Governors. *International Finance Discussion Paper, 851,* Retrieved from http://www.federalreserve.gov/Pubs/IFDP/2006/851/ifdp851.pdf.

Jayaraman, T. K., & Chen, H. (2013). Budget Deficits and Inflation in Pacific Island Countries: A Panel Study. *Working paper, University of South Pacific, 2013/03*, Retrieved from https://www.usp.ac.fj/fileadmin/files/schools/ssed/economics/working_papers/2013/WP-2013-03.pdf.

Kara, H., & F. Öğünç (2005). Exchange Rate Pass-Through in Turkey: It is Slow, but is It Really Low? *TCMB, RD Working Paper, 15/10*, Retrieved from http://www.tcmb.gov.tr/wps/wcm/connect/49d1a1b2-d022-4f05-a6c7-700cd172a158/WP0510ENG.pdf?MOD=AJPERES&CACHEID=49d1a1b2-d022-4f05-a6c7-700cd172a158.

Karras, G. (1994). Macroeconomics Effects of Budget Deficit: Further International Evidence. *Journal of International Money and Finance, 13*(2), 190–210.

King, M. (2002). *No Money No Inflation–The Role of Money in the Economy*. Bank of England Quarterly Bulletin, 162–177, Retrieved from http://www.cairn.info/resume.php?ID_ARTICLE=ECOI_088_0111.

King, R., & Plosser, C. (2010). Money, Deficit and Inflation. *Carnegie Rochester Conference Series on Public Policy, 22*, 147-196.

Komulainen, T., & Jukka, P. (2000). Fiscal Explanations for Inflation: Any Evidence from Transition Economies. *BOFIT Discussion Papers, 11*, Retrieved from https://helda.helsinki.fi/bof/bitstream/handle/123456789/13529/dp1100[1].pdf?sequence=1.

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

Maddala, G. S., & Wu, S. (1999). A Comparative Study of Unit Root Tests with Panel Data and a Simple New Test. *Oxford Bulletin of Economics and Statistics, 61*, 631–652.

McCandless, G. T. & Weber, W. E. (1995). Some Monetary Facts. *Quarterly Review, 19*(3), 2-11.

McCarthy, J. (2000). Pass-Through of Exchange Rates and Import Prices to Domestic Inflation in Some Industrialized Economies. *FRB of N.Y. Staff Report, 111*, Retrieved from http://www.bis.org/publ/work79.pdf.

McMillen, W., & V. Beard, T. (1982). Deficits, Money and Inflation: Comment. *Journal of Monetary Economics, 10*, 273-77.

Mihaljek, D., & Klau, M. (2000). A Note on the Pass-Through from Exchange Rate and Foreign Price Changes to Inflation in Selected Emerging Market Economies. *BIS Papers, 8*, 69- 81.

Mishkin, S. F. (2008). Exchange Rate Pass-Through and Monetary Policy. *NBER Working Paper, 13889*, Retrieved from http://www.nber.org/papers/w13889.ack.

Molaei, M., & Golkhandan, A. (2013). Long-Term and Short-Term Effects of Budget Deficit on Economic Growth of Iran. *Journal of Economic Strategy, 2*(5), 95-115.

Nassar, K. (2005). Money Demand and Inflation in Madagascar. IMF *Working Paper, WP/05/236*, Retrieved from https://books.google.com.

Nguyen, V. B. (2015). Effects of Fiscal Deficit and Money M2 Supply on Inflation. *Journal of Economics, Finance and Administrative Science, 20*, 49-53.

Oomes, N., & Ohnsorge, F. (2005). Money Demand and Inflation in Dollarized Economies: The Case of Russia. *Journal of Comparative Economics, 33*, 462–483.

Peker, O. & Görmüş, S. (2008). The Inflationary Effects of the Exchange Rate in Turkey. *Süleyman Demirel Uni. İ.İ.B.F. Journal, 13*(2), 187-202.

Pelipas, I. (2006). Money Demand and Inflation in Belarus: Evidence from Co-Integrated VAR. *Research in International Business and Finance, 20*, 200–214.

Pesaran, M. H., Shin, Y., & Smith, R. P. (1997). Estimating Long-Run Relationships in Dynamic Heterogeneous Panels. *DAE Working Papers, Amalgamated Series, 9721*, Retrieved from https://www.researchgate.net/profile/Hashem_Pesaran/publication/240099067_Estimating_long-run_relationships_from_dynamic_heterogeneous_panels/links/57801f4008ae01f736e4a1a0.pdf.

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association, 94*, 621–634.

Sachs, J., & Larrain, F. (1993). *Macroeconomics in the Global Economy*. New Jersey: Englewood Cliffs, Prentice Hall.

Sargent, T., & Wallace, N. (1981). Some Unpleasant Monetarist Arithmetic. *Monetarism in the United Kingdom*, Retrieved from http://link.springer.com/chapter/10.1007%2F978-1-349-06284-3_2/lookinside/000.png.

Solomon, M. (2004). The Effect of a Budget Deficit on Inflation: The Case of Tanzania. *Sajems NS, 1*, 100-116.

Tanzi, V. (1991). *Public Finance in Developing Countries*. London: Edward Elgar Publishing Limited.

Taylor, J. B. (2000). Low Inflation Pass-Through, and the Pricing Power of Firms. *European Economic Review, 44*, 1389- 1408.

Temple, J. (2000). Inflation and Growth: Stories Short and Tall. *Journal of Economic Surveys, 14*, 395–426.

Walsh, C. E. (2003). *Monetary Theory and Policy*. Cambridge, Massachusetts: The MIT Press.

Westerlund, J. (2007). Testing for Error Correction in Panel Data. *Oxford Bullet of Economics and Statistics, 69*, 709–748.