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The effects of income and inflation on financial development: Evidence from heterogeneous panels

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Abstract
This paper examines four unresolved issues regarding the effects of GDP and inflation on financial development: (i) Does GDP have uniform impact on financial development in heterogeneous income countries? (ii) Is the relationship non-linear? (iii) Does financial development vary with inflation rates? (iv) Does inflation moderate the effect of GDP on financial development? The authors employ the newly developed dynamic Common Correlated Effects (CCE) and dynamic panel system Generalized Method of Moments (GMM) on data from 125 countries. These techniques enable us to control for cross-sectional dependence, heterogeneity and endogeneity. They show that GDP has a positive impact on financial development in high and middle-income countries, and the relationship is non-linear in over 60% of the countries. The authors also reveal that inflation has a negative effect on financial development in high- and medium-inflationary countries. Besides, high inflation moderates the effect of GDP on financial development in over 70% of the countries. They also show the countries where higher GDP is better for financial development and where it is not. They recommend some policy options based on the findings.

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Keywords Financial development; income; inflation rate

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1. Introduction

In this article, we investigate four issues that remain inconclusive in the literature relating to the effects of real GDP and inflation on financial development. First, in the finance-growth nexus, the demand-following hypothesis posits that financial development responds to growth in real GDP per capita (hereafter referred to as GDP), since an increase in GDP engenders households and firms to increase their demands for financial products, services, intermediaries and institutions. To meet these increased demands, the financial sector embarks on innovations and technology which facilitate the development of the sector. The empirical literature on demand-following hypothesis found evidence suggesting that growth in GDP precedes financial development (Gozgor, 2015; Peia and Roszbach, 2015; Zang and Kim 2007). Yet, while Baltagi et al. (2009) and Law and Habibullah (2009) found that GDP is a significant determinant of financial development, Cherif and Dreger (2016) reported otherwise in emerging market economies. The differences in the empirical findings may be due to the inability of the studies to account for differences in the level of GDP across the countries. Thus, whether or not the impact of GDP or income[2] on financial development is uniform across countries with diverse income levels remains unresolved.

A second but related issue is whether the relationship between GDP and financial development could be non-linear. While GDP may accelerate the demand for financial products and services in the early stages of development, further expansions in GDP may exert only negligible effects. For instance, Huang and Lin (2009) noted that a developing economy offers more investment opportunities and generates greater demands for financial services relative to an advanced economy. Thus, there may be a threshold level beyond which further increases in GDP may only have negligible positive effects on GDP. In other words: Is higher income[3] really "better" for financial sector development?

Third, the theoretical literature opines that while high and volatile long-term inflation is repugnant to financial development, low and stable inflation aids the deepening of the financial sector. High and persistent inflation reduces the returns on savings thereby decreasing savings and savers, and causing credit scarcity in the economy (Bittencourt, 2011). Countries with higher inflation rates are also likely to have less efficient financial markets due to the higher interest rates that accompany higher inflation (Boyd & Smith, 1998; Huybens & Smith, 1999).

[2] Real GDP per capita and income are used interchangeably in this study.
[3] We measure "higher GDP" as GDP per capita squared.

The detrimental effect of inflation on financial development has been documented (Bittencourt, 2011; Boyd et al., 2001; Odhiambo, 2012). English (1999a), on the other hand, argued that inflation aids financial development. Higher inflation causes households to substitute purchased transactions services for money balances which increases the provision of financial services and enhances the size of the financial sector. However, Kim and Lin (2010) found that inflation only has a short-run positive effect which turned negative in the long-run. In contrast, Cherif and Dreger (2016) documented that the long-run effect of inflation on financial development is insignificant. Yet other empirical studies showed that the impact of inflation on financial development depends on the threshold level of inflation (Boyd et al., 2001; Khan et al., 2006). Boyd et al. (2001) argued that inflation has a negative effect on financial development when the rate exceeds a threshold level of 15% percent. Khan et al. (2006) corroborated the hypothesis but found the detrimental effect of inflation when it exceeds a lower threshold level of 3%-6%. The absence of consensus throws open the question if the effect of inflation on financial development varies with the level of inflation.

Finally, income and inflation are dynamically related with both the theoretical and empirical literature suggesting that high and volatile long-term inflation rate has adverse long-run effects on GDP growth (Bruno & Easterly, 1998; Hung, 2003). Specifically, Lopez-Villavicencio and Mignon (2011) reported that inflation has a non-linear impact on GDP, and turns negative when inflation rate rises beyond a certain threshold level. This implies that inflation accelerates GDP when inflation rate is low, but has the opposite effect when inflation rate is high. Thus, aside from the direct impact on both financial development and GDP, inflation may have an indirect impact on financial development via GDP. Rousseau and Wachtel (2002) and Ehigiamusoe, Lean and Lee (2018) have shown that inflation has an indirect effect on GDP growth via the financial sector, but the indirect effect of inflation on financial development via the GDP has not been thoroughly explored. This raises the issue of whether or not the inflation rate moderates the impact of GDP on financial development.

Hence, the specific objectives of this paper are to: (i) examine the impact of GDP and inflation rate on financial development (ii) investigate if the relationship between GDP and financial development is non-linear; (iii) assess if the inflation rate moderates the impact of GDP on financial development. These questions are examined using heterogeneous panels of countries divided into different income levels and experiencing different levels of inflation. We also investigate these issues in individual-specific countries.

This paper differs from previous studies, and makes some contributions to extant literature in several ways. First, previous studies have not looked at the impact of income and inflation on financial development in countries with different levels of income and different inflation rates. We fill this gap by dividing countries into different panels based on the levels of income and inflation rate, and offer new insights from heterogeneous panels. This is particularly important because knowing where income and inflation are determinants of financial development, and where they are not, is fundamental for policy formulations.

Second, we go beyond studies demonstrating a linear relationship between income and financial development, to uncover if a non-linear relationship exists. We used a quadratic model to examine the impact of higher GDP on financial development. The link between GDP and financial development could be U-shaped or inverted U-shaped; the former would suggest that higher GDP is better for financial development, whereas the latter would indicate otherwise.

Third, no previous study (to the best of our knowledge) has investigated the moderating role of inflation on the income-finance nexus. It is therefore uncertain if the impact of GDP on financial development varies with the level of inflation. Inflation may have a direct effect on both financial development and GDP, and an indirect effect on financial development via income. We use a multiplicative interaction model to show the marginal effects of GDP on financial development at various levels of inflation. An empirical finding on the moderating role of inflation on the income-finance nexus will be essential in formulating policies that enhances GDP and financial development without aggravating inflation.

Fundamentally, we examine these issues in the panels (as a whole) and at individual-specific country, thereby exploiting the merits of both panel and time series data. In essence, we account for various economic and econometric issues (e.g. dynamism, cross-sectional dependence, heterogeneity and endogeneity) so as to produce reliable and robust results which are essential for policy formulations.

The remaining part of the paper is structured into three sections. Section 2 presents the methodology and data employed in the study. Section 3 contains the empirical results and discussions, while the final section concludes with some policy options.

2. Methodology and Data

2.1 Model specification

Following the finance literature, we estimate the following baseline model to determine the impact of GDP and inflation rate on financial development (see Baltagi et al., 2009; Kim & Lin, 2010; Law & Habibullah, 2009):

$$fd_{it} = \alpha_1 fd_{it-1} + \alpha_2 gdp_{it} + \alpha_3 \inf_{it} + \alpha_4' x_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (1)$$

where fd_{it} = financial development (measured as credit to private sector relative to GDP, and alternatively by liquid liabilities relative to GDP for robustness checks), fd_{it-1} = one period lagged of financial development, gdp_{it} = real GDP per capita (2010 constant prices), $\inf_{it}$ = inflation rate (measured as a percentage change in consumer price index), x_{it} = control variables (such as government consumption expenditure relative to GDP and trade openness relative to GDP), η_i = unobserved country-specific effect, μ_t = time specific effect, $\varepsilon_{i,t}$ = independent and identically distributed error term.

We use credit to private sector relative to GDP to proxy for financial development since it measures the credits issued by the banking institutions to the private sector and excludes credits issued to governments, its agencies, public enterprises as well as credits issued by the central bank. It is the preferred and most commonly used proxy in finance literature (Baltagi et al., 2009; Levine et al., 2000). As a complement, we use liquid liabilities relative to GDP which measures financial depth and the overall size of financial intermediary sector. Since there is a considerable level of persistence in financial development (Baltagi et al. 2009) a one-period lagged financial development is included to capture this. Government consumption expenditure is used to measure macroeconomic stability, while trade openness accounts for external shocks (Bittencourt, 2011; Kim & Lin, 2010). All variables except inflation rate are transformed into natural logarithms.

The interaction term between GDP and inflation rate is included to ascertain the moderating role of inflation rate on the impact of GDP on financial development, as follows:

$$fd_{it} = \delta_1 fd_{it-1} + \delta_2 gdp_{it} + \delta_3 \inf_{it} + \delta_4 (gdp_{it} * \inf_{it}) + \delta_5' x_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (2)$$

where: $gdp_{it} * \inf_{it}$ = interaction term between real GDP per capita and inflation rate. Hence, the interaction term enables us to ascertain whether the impact of GDP on financial

development varies with the levels of inflation rates. Through the interaction term, we capture the marginal effect of GDP on financial development by taking the partial derivatives of Equation (2) with respect to GDP as follows:

$$\frac{\partial fd_{it}}{\partial gdp_{it}} = \delta_2 + \delta_4 \inf_{it} \tag{3}$$

The signs of the coefficients of δ_2 and δ_4 are important. If $\delta_2 > 0$ and $\delta_4 < 0$, it suggests that GDP has positive impact on financial development, and inflation rate adversely influences that positive impact. If $\delta_2 < 0$ and $\delta_4 > 0$, it denotes that GDP has negative impact on financial development, and inflation rate mitigates that negative impact. If $\delta_2 < 0$ and $\delta_4 < 0$, it implies that GDP has negative impact on financial development, and inflation rate aggravates that negative impact. However, a positive marginal effect ($\delta_2 + \delta_4 \inf$) implies that more GDP and inflation enhance financial development, but the opposite holds if the marginal effect is negative.

To determine the statistical significance of the marginal effects, Brambor et al. (2006) suggested that the corresponding standard errors and t-statistics should be computed for inferences. To compute the corresponding t-statistics of the marginal effects, we first employ the following formula to compute the variance from the coefficient covariance matrix:

$$\sigma^2_{\frac{\partial fd_{it}}{\partial gdp_{it}}} = \text{var}(\hat{\delta}_2) + 4\inf^2 \text{var}(\hat{\delta}_4) + 4\inf \text{cov}(\hat{\delta}_2\hat{\delta}_4) \tag{4}$$

The square root of the variance gives the standard error, and the marginal effect divided by the standard error gives the t-statistics. A large t-statistic suggests that the marginal effect is statistically significant.

Furthermore, to determine whether higher GDP is beneficial to financial development, we included GDP squared in the model, and estimated the quadratic model as follows:

$$fd_{it} = \beta_1 fd_{it-1} + \beta_2 gdp_{it} + \beta_3 \inf_{it} + \beta_4 gdp_{it}^2 + \beta_5' x_{it} + \eta_i + \mu_t + \varepsilon_{it} \tag{5}$$

where: gdp_{it}^2 = real GDP per capita squared. Again, the main focus will be the sign and statistical significance of β_2 and β_4. If β_2 is negative and β_4 is positive, it suggests a U-shaped relationship implying that higher GDP is better for financial development. But the relationship is an inverted U-shaped if β_2 is positive and β_4 is negative, implying that higher GDP reduces financial development.

The marginal effect at various levels of gdp can be computed with the following formula:

$$\frac{\partial fd_{it}}{\partial gdp_{it}} = \beta_2 + 2\beta_4 gdp \tag{6}$$

The corresponding standard errors and t-statistics can be computed from the variance given as:

$$\sigma^2_{\frac{\partial fd_{it}}{\partial gdp_{it}}} = \text{var}(\hat{\beta}_2) + 4gdp^2\,\text{var}(\hat{\beta}_4) + 4gdp\,\text{cov}(\hat{\beta}_2\hat{\beta}_4) \tag{7}$$

2.2 Empirical strategy

We employ the dynamic panel system Generalized Method of Moments (GMM) estimator proposed by Arellano and Bover (1995), and further extended by Blundell and Bond (1998). We use this estimator because it can control for country-specific effect, endogeneity and autocorrelation. The system GMM estimator combines the difference equation and level equation, as well as uses additional moment conditions as instruments. Since financial development, GDP, inflation rate, etc are quite persistent, system GMM is appropriate for this study.

However, the consistency of system GMM estimator is verified using two tests. First, the Sargan test of over-identifying restriction is used to test the joint validity of the instruments. We cannot reject the null hypothesis that the instruments are jointly valid if the p-value is greater than 5%. Second, the Arellano and Bond test for autocorrelation is used to test for the presence of first order and second order serial correlation. The null hypothesis of no second order serial correlation cannot be rejected at 5% level. We use the two-step system GMM estimator since it is more asymptotically efficient than the one-step estimator, and follow the approach of Windmeijer (2004) to compute robust two-step standard errors.

Furthermore, we employ the dynamic Common Correlated Coefficient (CCE) estimation procedure proposed by Chidik and Pesaran (2015) that can address cross-sectional dependence and provides estimates for individual-specific country. The dynamic CCE allows for slope heterogeneous coefficients, allows for endogenous regressors, and can be used in small sample time series since it has small sample bias correction. It is based on Autoregressive Distributed Lagged (ARDL) panel data model with cross-sectionally augmented unit-specific regressions.

Prior to the estimation of dynamic CCE, we conduct cross-sectional dependence tests to ascertain the presence of cross-sectional dependence using the scaled CD_{LM} and general CD tests proposed by Pesaran (2004), and the Bias adjusted LM test proposed by Pesaran et al.

(2008). Thereafter, we employ the Pesaran (2007) panel unit root test which can account for cross-sectional dependence to determine the existence of unit root, while Westerlund (2005) panel cointegration test was employed to determine the presence of cointegration in the panel.

2.3 Data description and sources

We employ both panel and disaggregated data of 125 countries for the 1981-2015 period. The panel data were averaged over 5-year non-overlapping periods to yield seven observations per country. The seven observations span included 1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2006-2010, and 2011-2015. The essence of taking 5-year non-overlapping average of the data is to validate the use of GMM estimator which needs large number of cross-section (N), and small number of time periods (T). Using a large number of T could increase the number of instruments thereby leading to too many instruments problems (Roodman, 2009a).

We conduct the panel analysis in two levels. First we categorized the countries into three groups namely low-income, middle-income and high-income countries based on World Bank (2017) classification of countries according to their income levels. The low income ($1,005 or below), middle income ($1,006–$12,235) and high income ($12,236 or above). Secondly, we categorized the countries into low-inflation, medium-inflation and high-inflation countries following similar procedure in Kim and Lin (2010) and Boyd et al. (2001). Countries with an average inflation rate of below 6% during the period were classified as low-inflation, while those with 6%-15%, and above 15% were categorized as medium-inflation and high-inflation countries, respectively.

Moreover, the disaggregated data enables us to conduct the analysis at country-specific level, and reveal the estimates of each country. The choice of sample countries was based on availability of data, and the lists of countries categorized based on income and inflation rate are presented in Appendix 1 and 2, respectively.

The data sources are as follows. The data for real GDP per capita (2010 constant prices), credit to private sector relative to GDP, government consumption expenditure relative to GDP, and trade openness relative to GDP were sourced from the World Development Indicators (May, 2017) of the World Bank. The data for inflation rates were sourced from the World Economic Outlook (April, 2018) of the International Monetary Fund, while the data for the liquid liabilities relative to GDP were obtained from the Economic Data (2018) of the Federal Reserve Bank of St Louis, USA.

3. Empirical Results

3.1 Descriptive statistics and correlation analysis

The descriptive statistics presented in Table 1 indicate wide variations in the variables among the different income groups. For instance, the standard deviations of financial development indicators (CPS and LLY) and GDP are higher in high income countries compared to middle and low income countries. Conversely, the standard deviation of inflation rate is highest in low income countries. It is apparent that as the countries move from low to higher income, financial development indicators improve, while inflation rate declines.

Insert Table 1 about here

The correlation analysis presented in lower panel of Table 1 reveals that GDP is positively correlated with financial development, while inflation rate is negatively related to financial development in all the income groups. Government expenditure and trade openness are positively related to financial development and GDP. Hence, the data suggest relationships between the variables which are worthy of further investigation

3.2 GMM estimation results of heterogeneous income groups

The results presented in Table 2 (Column 1 of all the panels) reveals that GDP has a positive and significant impact on financial development in high and middle income countries, while the impact is statistically insignificant in low income countries. This suggests that GDP is only a fundamental determinant of financial development in high and middle income countries. The differences in the impact of GDP on financial development between high and low income countries could be adduced to the differences in their income levels. For instance, the average GDP in low income countries during the 1981-2015 period was only USD572.38 compared to USD3970.20 and USD30323.22 in middle income and high income countries, respectively. This finding is consistent with some previous studies (see Baltagi et al., 2009; Bittencourt, 2011; Kim & Lin, 2010; Law & Habibullah, 2009) who reported a significant positive impact of GDP on financial development. However, this current study has advanced the extant literature by showing that the level of income is important in determining the impact of GDP on financial development. Therefore, low income countries should pursue policies that will enhance the level and growth of their GDP in order to develop the financial sector.

Insert Table 2 about here

Moreover, the results show that inflation has a negative and significant impact on financial development in middle and low income countries, whereas the impact is statistically insignificant in high income countries. This suggests that inflation is a fundamental determinant of financial development in middle and low income countries. This result could be due to the high level of inflation rate in middle and low income countries compared to high income countries during the period. For instance, the average inflation rates were 56.66% and 51.59% in middle income and low income countries, respectively compared to 6.49% in high income countries. This finding is consistent with some studies (see Bittencourt, 2011; Boyd et al., 2001; Kim & Lin, 2010) who documented a negative impact of inflation on financial development. Hence, we conclude from the above results that inflation is only detrimental to financial development when inflation rate is high. Therefore, policies that reduces inflation rate in low and middle income countries are capable of enhancing financial development.

In Column 2, we include the interaction between GDP and inflation in the model in order to ascertain whether the impact of GDP on financial development varies with the level of inflation rate. It also enables us to compute the marginal effects of GDP at various levels of inflation rate. The results show that the interaction term enters with a negative coefficient while the coefficient of the linear GDP is positive. This suggests that GDP has positive impact on financial development, but inflation rate adversely influences that positive effect in middle and low income countries. To determine whether the impact of GDP on financial development varies with the levels of inflation, we compute the marginal effects using Equation 3.

The lower panel of Table 2 indicates that the marginal effect of GDP on financial development declines as inflation rate rises. At the minimum level of inflation rate, the marginal effect is positive, but turns negative at the maximum level of inflation rate in middle and low income countries. Furthermore, we computed the corresponding t-statistics to ascertain the statistical significance of the marginal effects. We find some statistically significant marginal effects, implying that inflation rate diminishes the finance-income nexus.

Besides, we investigate further the impact of GDP on financial development by determining whether higher GDP is better for financial development using quadratic model (include GDP squared in the model). This model enables us to ascertain the non-linear relationship between GDP and financial development, which could be U-shaped or inverted U-shaped. We focus on the sign and significance of the coefficients of linear GDP and GDP squared. The results reported in Column 3 (Table 2) show that the linear GDP enters with a negative coefficient

while the coefficient of GDP squared is positive (albeit statistically insignificant) in middle and low income countries. Since the coefficient is statistically insignificant, there is no robust evidence to conclude that higher GDP is better for financial development. Nonetheless, the lower panel of Table 2 shows that the marginal effect of GDP on financial development increases as GDP rises.

As for the control variables included in the model, the coefficient of the lagged value of financial development is positive and significant, suggesting that the past history of financial development plays crucial role in determining future financial development. Baltagi et al. (2009) argued that the indicators of financial development whether asset-based or credit are likely to manifest persistence because the size of the bank system in any given year depends on its past history. Also, there are evidences of positive effects from government expenditure and trade openness on financial development (albeit weak in some cases). This finding is consistent with some studies (Cherif & Dreger, 2016; Kim & Lin, 2010).

The results of the Sargan test of over-identifying restriction reported in the lower part of Table 2 show that the insruments are valid since we cannot reject the null hypothesis of joint validity of the instruments (the p-value is greater than 5 percent). Moreover, the results of the Arellano and Bond test for autocorrelation reject the null hypothesis of absence of first order serial correlation, but cannot reject the null hypothesis of absence of second order serial correlation since the p-value is greater than 5 percent. This implies that there is no second order serial correlation in the model.

3.3 GMM estimation results of heterogeneous inflation groups

Although it could be assumed that most low income countries have high inflation rates while most high income countries have low inflation rates, but a cursory examination of the inflation rates across the panels reveal some fundamental facts. First, there are many low income countries that have low inflation rates. Second, there are some high income countries that have high or medium inflation rates. Third, there are several middle income counties that have high inflation rates. Finally, there are many middle income countries that have low inflation rates.

Therefore, to have panels of countries with similar inflation rates, we further divide the entire panel of 125 countries based on the level of inflation rates into three panels of low inflation (6% or below), medium inflation (6%-15%), and high inflation (15% or above) and redo the analysis. We focus on the sign and significance of the coefficients of inflation and the

interaction term. The results presented in Table 3 show that inflation enters with a negative coefficient in high and medium inflation countries, whereas the coefficient is positive in low inflation countries. This reinforces the fact that high inflation rate is deleterious to financial development, while low inflation rate is not.

Insert Table 3 about here

We also find that the interaction term enters with a negative coefficient in high inflation countries while the coefficient is positive in medium and low inflation countries, suggesting that inflation reduces the impact of GDP on financial development. The marginal effect of GDP on financial development declines as inflation rate rises in high inflation countries. Remarkably, we find that the coefficient of GDP squared is positive and significant while that of linear GDP is negative in high inflation countries. This suggests the existence of U-shaped relationship between GDP and financial development, implying that higher GDP could be beneficial to financial development in high inflation countries. Moreover, the diagnostic tests reported in the lower part of Table 3 show the Sargan test of over-identifying restriction and the Arellano and Bond test for autocorrelation are satisfactory.

3.4 Robustness checks

We conducted robustness checks to ascertain the robustness of the regression results. First, we used alternative proxy of financial development namely liquid liabilities relative to GDP and redo the analysis. The results (not reported for want of space but available upon request) are somewhat similar to the results obtained with private sector credit, as GDP and inflation are determinants of financial development especially in middle and high income countries as well as in medium and high inflation countries. The marginal effect of GDP on financial development decline as inflation rises in middle income and high inflation countries. We also found evidence that higher GDP is beneficial to financial development in medium inflation countries.

3.5 Dynamic Common Correlated Effects (CCE) estimations

Prior to the estimation of the dynamic CCE, we conduct cross-sectional dependence, panel unit root and cointegration tests. The results reported in Table 4 show that the null hypothesis of no cross-sectional dependence is rejected, an indication that cross-sectional dependence exists in the panel. Similarly, the results of the panel unit root test shown in Table 5 indicate the presence

of unit root in the panel, while the results presented in Table 6 reject the null hypothesis of no cointegration, suggesting the existence of cointegration relationship among the variables.

Insert Table 4 about here

Insert Table 5 about here

Insert Table 6 about here

The results[4] of the dynamic CCE of the first model show that GDP is a significant determinant of financial development in 66 countries, while inflation has significant impact on financial development in 69 countries. The results of the second model reported in Table 7 indicate that the interaction term between GDP and inflation enters with a significant coefficient in 88 countries, implying that inflation moderates the impact of GDP on financial development. More precisely, inflation reduces the impact of GDP on financial development in 40 countries, while inflation does not impede financial development via GDP in the remaining countries.

Insert Table 7 about here

Finally, the results of the third model reported in Table 8 show a non-linear relationship between GDP and financial development in 77 countries. Specifically, GDP enters with a positive coefficient while the coefficient of GDP squared is negative, suggesting an inverted U-shaped relationship in 39 countries. Conversely, we find U-shaped relationship in 38 countries, with the coefficient of GDP negative while that of GDP squared is positive. This implies that higher GDP is better for financial development in those countries. It is important to note that the differences in the empirical outcomes across the countries could be attributed to differences in the level of GDP and inflation across the countries. In all the models, we find that the control variables (e.g. government consumption expenditure and trade openness) explain financial development in most of the countries. The Jackknife bias correction procedure was used to correct for small sample time series bias in dynamic CCE estimator (see Chudik & Pesaran, 2015). Finally, the post estimation test using Pesaran (2015) test rejects the null hypothesis that the errors are weakly cross-sectional dependent.

Insert Table 8 about here

[4] The results are not reported for want of space, but available upon request.

4. Conclusion

This paper examined the effects of GDP and inflation on financial development in heterogeneous panels of 125 countries. It also determined the moderating effect of inflation on income-finance nexus, as well as ascertained whether higher GDP is better for financial development. It employed the newly developed dynamic Common Correlated Effects (CCE) and dynamic panel system GMM estimator for data covering 1981-2015. The study showed that GDP has robust positive impact on financial development in high and middle income countries, while the impact is weak in low income countries. We also found that inflation has negative effect on financial development in high and medium inflation countries. Moreover, there was evidence indicating that inflation rate diminishes the impact of GDP on financial development, as the marginal effect of GDP on financial development declines as inflation rate rises. We found some evidences to show that higher GDP is better for financial development in some countries. These findings are robust to various diagnostic tests, alternative proxy of financial development and alternative estimation technique.

The implication of this paper is that GDP increases financial development, while high inflation rate decreases it. Hence, financial development can be enhanced in an environment of high GDP and low inflation rate. Therefore, the adoption of the appropriate fiscal and monetary policies to control inflation should be a fundamental agenda in the development strategy of many countries. They should formulate policies and programmes that can accelerate GDP with a view to boosting the development of the financial sector. This is essential because as countries move from low income to high income, the beneficial effects of GDP to financial development increases while the adverse effects of inflation rate declines. It is essential to promote the development of the financial sector since extant literature have shown that high level of financial development has significant growth-enhancing and inequality-reducing effects. A well-developed financial system efficiently mobilizes savings and allocates resources; alleviates asymmetry of information and transaction costs; diversifies risks; facilitates productive investment in physical and human capital; enhances capital accumulation and productivity growth. Financial development is also capable of mitigating macroeconomic volatility because credit market frictions could propagate and intensify business cycle fluctuations. Hence, an insight into the causes of financial sector development is fundamental with a view to promoting economic advancement.

This paper has unveiled the differential impact of GDP and inflation on financial development using banking sector development variables. Hence, it is recommended that future researches

should investigate the subject matter using stock market development variables in order to capture the entire financial sector for policy formulations.

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Table 1 Descriptive statistics and correlation analysis

	CPS	LLY	GDP	INF	GOV	TOP
High Income						
Mean	80.628	82.989	30323.22	6.491	18.786	98.747
Maximum	312.118	399.11	111069.2	585.8	76.222	455.415
Minimum	6.590	6.870	4135.303	-7.358	6.115	15.924
Std. Dev	47.151	56.133	18137.23	23.307	5.768	74.152
CPS	1					
LLY	0.564	1				
GDP	0.471	0.447	1			
INF	-0.144	-0.117	-0.166	1		
GOV	-0.245	-0.206	0.040	0.069	1	
TOP	0.101	0.529	0.117	-0.073	-0.213	1
Middle Income						
Mean	36.450	46.030	3970.204	56.661	14.622	76.672
Maximum	166.504	353.020	25732	13109.5	70.377	531.737
Minimum	1.542	4.460	361.225	-17.640	2.736	6.320
Std. Dev	28.216	36.158	3168.749	514.856	6.185	44.092
CPS	1					
LLY	0.644	1				
GDP	0.145	0.083	1			
INF	-0.043	-0.063	-0.026	1		
GOV	0.056	0.095	0.028	0.097	1	
TOP	0.185	0.159	0.068	-0.055	0.276	1
Low Income						
Mean	13.597	22.429	572.389	51.589	13.652	54.910
Maximum	103.632	82.570	1807.663	23773.1	63.935	140.695
Minimum	0.198	0.001	130.437	-72.729	2.047	11.087
Std. Dev	10.031	11.171	259.653	805.849	5.980	21.689
CPS	1					
LLY	0.642	1				
GDP	0.388	0.256	1			
INF	-0.067	-0.084	-0.033	1		
GOV	0.319	0.102	0.158	-0.053	1	
TOP	0.396	0.281	0.285	-0.037	0.288	1

Notes: CPS= Credit to private sector relative to GDP, LLY= Liquid liabilities relative to GDP, GDP= real GDP per capita, INF= Inflation rate, GOV= Government consumption expenditure relative to GDP, TOP= Trade openness relative to GDP.

Table 2 Results of dynamic panel system GMM estimation of heterogeneous income groups

Variables	High Income			Middle Income			Low Income		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Lagged dependent variable	0.693***	0.707***	0.700***	0.609***	0.644***	0.599***	0.818***	0.837***	0.825***
	(0.077)	(0.075)	(0.079)	(0.177)	(0.149)	(0.201)	(0.131)	(0.125)	(0.147)
GDP	0.388***	0.379***	1.666	0.539***	0.490**	-0.734	0.159	0.129	-0.477
	(0.137)	(0.136)	(1.977)	(0.184)	(0.197)	(1.616)	(0.252)	(0.664)	(25.09)
INF	-0.001	-0.081	-0.001	-0.002***	0.059***	-0.002***	-0.001***	0.005	-0.008*
	(0.003)	(0.049)	(0.003)	(0.004)	(0.022)	(0.004)	(0.001)	(0.034)	(0.005)
GDP*INF		0.009			-0.008***			-0.001	
		(0.006)			(0.003)			(0.006)	
GDP^2			-0.064			0.078			0.049
			(0.097)			(0.092)			(1.989)
GOV	-0.161	-0.163	-0.114	0.399	0.306	0.430	0.234*	0.250	0.254
	(0.343)	(0.342)	(0.317)	(0.279)	(0.255)	(0.269)	(0.139)	(0.175)	(0.198)
TOP	-0.043	-0.044	-0.049	0.291**	0.193	0.304**	0.622**	0.690	0.615
	(0.128)	(0.117)	(0.121)	(0.142)	(0.162)	(0.148)	(0.287)	(0.421)	(0.661)
Constant	-2.022	-2.036	-8.546	-2.816	-3.047	1.882	-4.149***	-4.288	-2.129
	(1.344)	(1.303)	(10.489)	(2.377)	(2.536)	(6.689)	(1.472)	(3.335)	(79.82)
Sargan test (p-value)	23.604	23.639	23.590	16.592	19.695	16.210	19.955	19.746	19.833
	(0.211)	(0.210)	(0.212)	(0.219)	(0.103)	(0.238)	(0.397)	(0.410)	(0.405)
First order serial	-2.023	-2.018	-1.996	-2.689	-3.088	-2.355	-2.193	-2.238	-2.286
correlation test (p-value)	(0.043)	(0.044)	(0.046)	(0.007)	(0.002)	(0.018)	(0.028)	(0.025)	(0.022)
Second order serial	-1.530	-1.550	-1.521	-1.418	-1.383	-1.449	-0.959	-1.013	-0.939
correlation test (p-value)	(0.126)	(0.121)	(0.128)	(0.156)	(0.167)	(0.147)	(0.334)	(0.311)	(0.348)
No. of instruments	26	27	27	22	23	23	26	27	27
Observations	294	294	294	399	399	399	182	182	182
No. of countries (N)	42	42	42	57	57	57	26	26	26
Marginal effect									
Minimum		0.367***	0.586		0.524***	0.189		0.135	0.017
Mean		0.437***	0.369		0.037	0.511		0.077	0.136
Maximum		2.289	0.185		-46.234***	0.834		-6.388*	0.253

*Notes: ***, ** and * indicates statistically significant at 1%, 5% and 10%, respectively. All models are estimated using two-step dynamic panel system GMM. Robust standard errors are reported in parenthesis. Dependent variable is financial development proxy by credit to private sector relative to GDP, GDP= real GDP per capita, INF= Inflation rate,* GDP*INF *=interaction term between real GDP per capita and inflation rate,* GDP^2 *= real GDP per capita squared, GOV= Government consumption expenditure relative to GDP, TOP= Trade openness relative to GDP. Time dummies were included in all the regressions, but the results are not reported to save space.*

Table 3 Results of dynamic panel system GMM estimation of heterogeneous inflation groups

Variables	High Inflation			Medium Inflation			Low Inflation		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Lagged dependent variable	0.694***	0.683***	0.757***	0.813***	0.803***	0.822***	0.941***	0.962***	0.971***
	(0.163)	(0.144)	(0.173)	(0.102)	(0.114)	(0.113)	(0.176)	(0.180)	(0.198)
GDP	0.653***	0.664***	-0.751	0.355***	0.351***	-0.595	0.288*	0.282*	1.078
	(0.215)	(0.239)	(0.879)	(0.085)	(0.092)	(1.029)	(0.157)	(0.158)	(0.894)
INF	-0.001**	-0.001	-0.001***	-0.012**	-0.002	-0.011**	0.010	-0.007	0.016
	(0.003)	(0.004)	(0.003)	(0.489)	(0.040)	(0.005)	(0.009)	(0.044)	(0.014)
GDP*INF		-0.001			0.005			0.002	
		(0.006)			(0.005)			(0.006)	
GDP^2			0.092**			0.058			-0.043
			(0.048)			(0.061)			(0.045)
GOV	0.073	0.114	-0.147	0.422***	0.444***	0.419***	0.101	0.063	0.172
	(0.268)	(0.317)	(0.236)	(0.137)	(0.149)	(0.142)	(0.185)	(0.154)	(0.232)
TOP	0.153	0.138	-0.145	-0.063	-0.066	-0.013	0.071	0.068	-0.018
	(0.218)	(0.240)	(0.231)	(0.136)	(0.140)	(0.141)	(0.159)	(0.181)	(0.173)
Constant	-3.885***	-3.954***	1.278	-1.318	-1.321	2.719	-1.368	-1.239	-4.566
	(0.897)	(0.913)	(2.637)	(1.290)	(1.307)	(5.015)	(0.979)	(0.978)	(3.819)
Sargan test (p-value)	21.727	22.725	22.382	20.781	20.783	21.204	15.889	15.637	14.731
	(0.298)	(0.249)	(0.266)	(0.349)	(0.345)	(0.326)	(0.255)	(0.269)	(0.325)
First order serial	-2.637	-2.609	-2.558	-2.474	-2.363	-2.569	-3.061	-3.075	-2.923
correlation test (p-value)	(0.008)	(0.009)	(0.011)	(0.013)	(0.018)	(0.010)	(0.002)	(0.002)	(0.004)
Second order serial	-1.449	-1.451	-1.352	-1.862	-1.871	-1.789	-0.887	-0.761	-0.856
correlation test (p-value)	(0.147)	(0.147)	(0.177)	(0.063)	(0.061)	(0.074)	(0.375)	(0.447)	(0.392)
No. of instruments	26	27	27	26	27	27	22	23	23
Observations	217	217	217	252	252	252	406	406	406
No. of countries (N)	31	31	31	36	36	36	58	58	58
Marginal effect									
Minimum		0.664	0.177		0.329	0.026		0.269*	0.579
Mean		0.526	0.676		0.401	0.306***		0.288*	0.302
Maximum		-5.853	1.160		0.609	0.646		0.333	0.083

*Notes: ***, ** and * indicates statistically significant at 1%, 5% and 10%, respectively. All models are estimated using two-step dynamic panel system GMM. Robust standard errors are reported in parenthesis.*

Table 4 Results of cross-sectional dependence tests

Tests	Model 1	Model 2	Model 3
Pesaran Scaled LM	25.765***	25.471***	25.889***
Bias-Corrected Scaled LM	23.871***	23.577***	23.995***
Pesaran CD	8.332***	8.401***	8.134***

Note: *** denotes statistical significance at 1% level, and a rejection of the null hypothesis of no cross-section dependence (correlations) in residuals.

Table 5 Results of Pesaran (2007) panel unit root test

Variables	I(0)	I(1)
CPS	2.180	-14.082***
LLY	-0.532	-12.989***
GDP	-1.077	-9.842***
INF	-10.249	-22.905***
GOV	-1.140	-14.734***
TOP	-3.773	-14.247***

*Notes: *** indicates statistically significant at 1%, implying a rejection of null hypothesis of no unit root.*

Table 6 Results of Westerlund (2005) panel cointegration test

Variance Ratio Statistics	Model 1	Model 2	Model 3
Group mean	-7.124***	-5.733***	-6.516***
Panel	-4.039***	-3.712***	-3.930***

*Notes: *** indicate statistically significant at 1%, implying a rejection of the null hypothesis of no cointegration. The alternative hypothesis of the Group mean test is that some panels are cointegrated, while the alternative hypothesis of the Panel test is that all panels are cointegrated.*

Table 7 Results of dynamic Common Correlated Effects (Mean Group) estimations of interaction model

S/N	Country	CPS_{t-1}	GDP	INF	GDP*INF	GOV	TOP
1	Algeria	-1.186	33.857	-1.497	0.174	2.805	-2.948
2	Angola	0.413	0.378***	0.025	-0.003	-0.604	0.619
3	Antigua & Barbuda	0.842**	-1.667***	-0.656***	0.073***	-0.629**	-0.062***
4	Argentina	0.864	1.268**	-0.052	0.006	0.398	0.374*
5	Australia	0.284***	2.117***	-2.714**	0.255**	0.783***	0.304***
6	Austria	-0.340***	1.391***	0.003***	-0.001***	2.118***	0.137***
7	Bahamas	0.830	1.288***	8.839	-0.880	-1.001***	0.679***
8	Bahrain	0.554***	0.559***	-3.612**	0.363**	-0.048***	-0.316***
9	Bangladesh	0.149***	-1.309***	0.471**	-0.069***	0.325***	-0.013***
10	Barbados	0.507***	-0.971***	0.021***	-0.002***	0.267***	-1.023*
11	Belgium	0.260***	-6.855*	-1.911***	0.179***	-5.360*	-1.506***
12	Belize	-0.404***	0.161***	0.138***	-0.015***	-0.253***	0.901***
13	Benin	0.019***	-1.916***	-3.174	0.490	0.452**	0.032***
14	Bhutan	0.055***	2.294	0.332	-0.045	0.923	-0.025***
15	Bolivia	0.522***	2.488***	-0.004***	0.001***	0.109***	0.308***
16	Botswana	0.533	-0.420***	0.249***	-0.029***	0.633**	0.009***
17	Brazil	-0.913	-2.232**	-0.177	0.019	2.480	0.836
18	Bulgaria	0.673	2.695	0.322***	-0.039***	-0.028***	-0.606***
19	Burkina Faso	0.173***	1.231***	0.186***	-0.032***	0.291***	0.138***
20	Burundi	-1.052	-1.148**	-1.278	0.239	1.352	-0.490
21	Cameroon	0.030***	1.361*	-0.892***	0.126***	0.373***	0.023***
22	Canada	-0.304***	-1.040***	-2.061***	0.196***	-0.029***	-1.927
23	Cape Verde	0.539**	-0.262***	0.038***	0.001***	-1.334**	-0.956
24	CAR	0.194***	0.016***	0.326**	-0.057**	-0.169***	0.120***
25	Chad	-0.233***	-0.844	-0.066***	0.011***	0.240***	0.343
26	Chile	0.197***	-1.829*	-0.663***	0.075***	0.518***	-0.158***
27	China	0.404***	0.976***	0.002***	-0.001***	0.482***	0.098***
28	Colombia	0.442***	5.152	-0.252***	0.028***	0.493***	-0.333***
29	Comoros	-0.957	-10.344	-3.889	0.573	-0.411***	-2.359
30	Congo DR.	-0.506	1.532	0.006	-0.001	1.072	-0.277**
31	Congo Rep.	0.235	-4.245	1.391	-0.180	-0.528	2.563
32	Costa Rica	-0.041***	5.618	-0.421***	0.049***	-2.505**	-2.189*
33	Cote d'Ivoire	-0.786**	1.615	-1.208***	0.168***	-1.123	-1.829
34	Cyprus	0.301***	-0.443***	0.079***	-0.006***	0.559***	0.232***
35	Denmark	0.424	29.164	6.811	-0.629	10.895	-0.722***
36	Dominica	0.560*	-2.627**	0.666***	-0.079***	-0.406***	0.552***
37	Dominican Rep.	-0.023***	-0.435***	-0.070***	0.008***	0.920	0.990**
38	Ecuador	0.345	-1.085***	0.899**	-0.109**	-0.584***	-1.612
39	Egypt	-0.059***	3.589**	0.335***	-0.045***	0.228***	-0.089***
40	El Salvador	0.666	9.900	-0.971	0.128	0.945**	-2.712
41	Equatorial Guinea	1.247	0.955	-0.222	0.033	1.449	-0.349
42	Fiji	1.130	-3.831	0.782*	-0.108	-0.122***	-1.852
43	Finland	0.522***	0.902***	-0.121***	0.013***	0.848***	-0.602***
44	France	0.509***	0.817***	0.364***	-0.035***	0.306***	-0.064***
45	Gabon	0.167***	0.847	3.739	-0.402	0.649**	0.217***
46	Gambia	-0.323**	1.933***	3.983	-0.636	0.188**	0.339***
47	Germany	-0.364***	0.962***	-0.156***	0.016***	0.118***	-0.254***
48	Ghana	0.145***	1.436**	-0.212	0.029	0.108***	0.973
49	Greece	0.103***	1.291***	-0.424***	0.041***	1.506**	0.368**
50	Guatemala	-0.291***	-2.852**	0.083***	-0.013***	0.113***	-0.665*
51	Guinea	0.357**	-10.689	-1.544	0.257	0.675*	0.202***
52	Guinea Bissau	-0.476	0.773***	2.056	-0.331	-5.827	0.579
53	Haiti	-1.318	-1.119***	-4.352***	0.665	-0.429**	1.832
54	Honduras	0.492**	-1.484***	-0.100***	0.013***	-0.154***	-0.723**
55	Hong Kong	0.463***	2.043***	-0.158***	0.016***	-0.064***	-0.975**
56	Hungary	1.300	-1.349***	-0.006***	-0.001***	-0.191***	0.194***
57	Iceland	1.037	-2.655**	-0.596***	0.058***	0.110***	0.478***
58	India	-0.179***	-2.649***	0.026***	0.001***	0.449***	0.592***
59	Indonesia	0.033***	4.908	0.873	-0.113	2.134	1.379
60	Iran	1.023	-0.647***	-0.389***	0.045***	0.955	-0.718
61	Ireland	0.122***	-0.235***	0.259***	-0.026***	1.173**	-0.128***
62	Israel	-0.733***	0.076***	0.073***	-0.007***	0.203***	0.138***
63	Italy	0.294***	1.049***	0.749***	-0.070***	0.863***	0.040***

Table 7 continued

S/N	Country	CPS_{t-1}	GDP	INF	GDP*INF	GOV	TOP
64	Jamaica	-0.185***	-1.381***	0.474**	-0.056**	0.029***	-0.188***
65	Japan	0.554**	0.324***	7.057	-0.660	-1.819***	-1.117**
66	Jordan	0.429***	-1.103***	0.040***	-0.006***	0.243***	-0.048***
67	Kenya	0.239***	1.682***	-0.914***	0.135***	0.536***	-0.012***
68	Korea Rep.	0.959	-2.971	-0.888*	0.093*	-2.561**	-0.413***
69	Kuwait	1.761	4.629	13.599	-1.259	1.427	-2.116
70	Lebanon	1.657	2.990	0.196	-0.022	1.155	0.727
71	Luxembourg	-0.812**	2.422***	0.829***	-0.078***	0.634***	0.742***
72	Madagascar	0.920	-0.069***	0.617	-0.101	0.092***	0.269***
73	Malawi	0.171**	1.865*	0.375*	-0.058**	0.658	-1.279
74	Malaysia	-0.447***	2.833**	-2.477**	0.266**	-2.653**	0.121***
75	Mali	0.697*	0.242***	0.681	-0.112	0.465	0.631**
76	Malta	0.329***	-0.845***	1.405***	-0.145***	0.613***	0.364***
77	Mauritania	0.629***	-3.522	0.301***	-0.044***	0.641	-0.256***
78	Mauritius	-0.149***	1.982**	0.394**	-0.047**	-0.151***	-0.463***
79	Mexico	0.285***	-1.353***	-0.306***	0.035***	1.921	0.348***
80	Morocco	-0.042***	-8.358***	-0..835***	0.107***	-0.899***	-0.895***
81	Mozambique	0.661	0.798***	-0.004***	-0.001***	-0.481**	-0.131***
82	Namibia	0.124***	0.298***	-0.673***	0.080***	-0.229***	-0.344***
83	Nepal	-0.097***	-5.594***	0.416**	-0.066**	0.963**	1.937*
84	Netherlands	-0.048***	-2.536***	-0.669***	0.065***	-0.408***	-0.975***
85	New Zealand	0.421*	-4.140***	-2.653**	0.258**	-2.763	-0.018***
86	Nicaragua	-0.024***	-0.876***	0.004*	-0.001*	0.228	-0.607**
87	Niger	0.555	1.317**	1.211**	-0.207**	-0.385**	-0.715**
88	Nigeria	0.594***	0.928***	0.716	-0.099	0.276**	0.275**
89	Norway	0.791*	3.495**	4.203	-0.373	1.051***	0.899***
90	Oman	0.755	0.634***	-1.334**	0.136**	0.740***	0.304***
91	Pakistan	-0.066***	3.622*	-0.262***	0.038***	-0.636*	0.162***
92	Panama	0.240***	2.379	0.839***	-0.092***	0.394***	-0.438***
93	Papua New Guinea	0.079*	-0.443***	-0.413***	0.059***	-0.719**	-1.473**
94	Paraguay	0.678	-0.275***	-0.717***	0.089***	-0.285***	-0.841
95	Peru	1.232	-0.274***	0.005***	-0.001***	-1.509	0.014***
96	Philippines	0.578	0.791***	-0.476***	0.006***	0.559***	0.442***
97	Poland	0.202**	-2.839	-0.076	0.009	2.454	3.729
98	Portugal	0.640	1.628***	-0.833**	0.094**	1.234***	0.486***
99	Romania	0.229***	3.217	0.368	-0.043	0.482***	-0.390***
100	Rwanda	0.489**	1.822**	0.408	-0,072	0.183***	0.992**
101	Saudi Arabia	-0.595**	1.547***	-2.942**	0.304**	0.596**	0.109***
102	Senegal	-0.114***	1.021***	-0.638	0.092***	0.107***	0.059***
103	Seychelles	0.289**	1.127	-0.136***	0.016***	-1.287	0.965
104	Sierra Leone	0.533	-2.159	-0.406***	0.062	0.091***	-0.633
105	Singapore	0.715**	-0.240***	0.854**	-0.078**	0.438***	-0.768**
106	Spain	0.283***	4.049*	0.250***	-0.033***	-0.435***	-1.262*
107	Sri Lanka	0.573	5.273	0.335	-0.041	0.639***	-0.265***
108	South Africa	-1.174	-0.111***	0.673***	-0.074***	-5.723	-1.481*
109	Sudan	0.295	5.343	0.067***	-0.009***	0.189*	2.673
110	Suriname	0.861	-1.416***	-0.001***	-0.001***	-1.084	0.306***
111	Sweden	1.296	-7.691	-2.085**	0.193**	-12.344	0.461***
112	Switzerland	0.626***	-4.092***	-1.214***	0.112***	-1.239***	0.589***
113	Tanzania	-0.062***	1.202***	-0.009***	0.011***	0.496	2.206
114	Thailand	0.797	0.354***	-0.588***	0.074***	-0.029***	-1.505*
115	Togo	-0.869	2.522	-1.055***	0.162***	1.062	-0.815
116	Trinidad & Tobago	0.305***	-0.662***	-0.299***	0.032***	0.476**	0.385***
117	Tunisia	0.083***	-1.591***	-0.244***	0.017***	1.110***	0.139***
118	Turkey	0.384***	4.949	-0.142***	0.016***	-0.984**	0.883
119	Uganda	-0.829	1.721***	0.077***	-0.013***	-0.076***	0.925**
120	United Kingdom	0.403***	3.483**	-4.002	0.371	1.715	0.947***
121	United States	-0.330***	2.079***	0.121***	-0.008***	-0.066***	-0.076***
122	Uruguay	0.340**	-1.969	0.392*	-0.044*	0.989***	-2.057
123	Venezuela	0.385	1.244***	-0.155***	0.016***	0.441***	1.241
124	Vietnam	-1.369	-9.200	-1.402	0.236	20.947	5.125
125	Zimbabwe	-0.311	1.265	0.231	-0.034	-0.179**	1.575

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

Table 8 Results of dynamic Common Correlated Effects (Mean Group) estimations of non-linear model

S/N	Country	CPS_{t-1}	GDP	INF	GDP^2	GOV	TOP
1	Algeria	0.321	2.077**	-0.033	-12.989**	-1.071	2.249
2	Angola	0.682	-0.453	0.001	2.889	-0.607	-0.162**
3	Antigua & Barbuda	0.638**	-0.001***	-0.021***	-0.043***	-0.331**	-0.185***
4	Argentina	1.140	1.039	0.001	5.542	-0.038	1.434
5	Australia	0.126***	1.311***	0.001**	-6.114***	1.371**	-0.963**
6	Austria	0.232***	0.662***	-0.014***	-3.123***	1.040***	0.414***
7	Bahamas	0.471**	-0.258***	-0.011***	-1.274***	0.038***	0.571***
8	Bahrain	0.600***	0.297***	-0.037***	-1.329***	-0.304***	-0.331***
9	Bangladesh	-0.184***	-0.021***	0.015**	0.203***	-0.799**	-0.024***
10	Barbados	0.593**	2.331	0.002***	-12.287	-0.475**	0.306***
11	Belgium	0.459	-1.729*	-0.105	8.399*	-5.023**	-3.038
12	Belize	0.130***	0.149***	0.028*	-0.899***	-0.309***	-0.482**
13	Benin	0.222	2.387	0.004**	-18.188	0.188***	-0.725
14	Bhutan	0.387	0.017***	0.050	0.023***	1.313	0.779
15	Bolivia	0.664	0.809	0.001	-5.479***	0.519**	-0.084***
16	Botswana	0.432	0.264*	-0.012**	-1.458**	1.112	-0.595***
17	Brazil	0.183**	-2.508***	0.001	14.011	-1.624	-0.231***
18	Bulgaria	0.909	0.180***	-0.001	-0.751***	-0.046***	-0.216***
19	Burkina Faso	0.602	-0.445**	-0.021	3.854**	0.602*	-0.860***
20	Burundi	0.264	0.485	0.006*	-4.295	-0.336	0.106**
21	Cameroon	-0.220***	0.627**	-0.014	-4.313**	0.789*	-0.673
22	Canada	-0.528	-5.314	0.104	25.078	0.482***	-1.145
23	Cape Verde	-0.104***	0.447	0.009**	-2.934	-0.868***	0.299**
24	CAR	-0.006***	-1.245	-0.032	10.444	-0.613	-0.494*
25	Chad	1.155	-0.365	-0.014	2.659	-1.164	-0.252
26	Chile	-0.414***	-0.268***	-0.002***	1.459***	0.972*	-0.466***
27	China	1.117**	-0.016***	-0.005***	0.158***	1.182***	0.169***
28	Colombia	0.034***	0.885***	-0.008***	-5.038***	0.584**	0.005***
29	Comoros	-0.414	0.957***	0.001***	-7.175***	-0.065***	0.713*
30	Congo DR.	-0.401	0.740	0.001	-5.713	-0.340	-0.548
31	Congo Rep.	-0.049***	-2.949	-0.002***	-18.465	-0.347	0.099***
32	Costa Rica	-0.102***	-0.566*	0.001***	3.201*	-0.354***	-0.788**
33	Cote d'Ivoire	-0.558**	0.466***	0.005***	-3.189***	-0.208***	-0.609*
34	Cyprus	0.102***	0.430**	0.037*	-2.218**	-0.538**	0.295***
35	Denmark	0.763	3.936	-0.001***	-17.690	-1.464***	0.524***
36	Dominica	0.397***	0.117***	0.019***	-0.781***	0.738***	0.503**
37	Dominican Rep.	1.007	-0.025***	-0.016***	0.037***	0.754	1.726
38	Ecuador	0.680	-1.357	0.001	8.111	1.767	-1.097
39	Egypt	0.432**	0.200***	-0.001***	-1.029***	0.039***	0.212***
40	El Salvador	0.397	-0.099**	0.006***	0.948***	0.154***	-1.037
41	Equatorial Guinea	0.539	0.037	0.008	-0.091	0.356	-0.577
42	Fiji	0.867	-2.323	-0.064	14.302	-0.533	0.776
43	Finland	1.051	-1.126**	-0.025***	5.529**	0.994***	-0.852***
44	France	0.316***	-2.944***	0.001***	14.302***	1.309***	-0.475
45	Gabon	0.029***	-0.520***	-0.015	2.723***	-0.646	-0.483
46	Gambia	0.615	10.821	-0.016	-8.636	0.220**	-0.475
47	Germany	-0.088***	-0.350***	0.001***	1.651***	-1.057***	-0.096***
48	Ghana	0.103***	-0.903	-0.013	5.892	0.604	1.176
49	Greece	0.426***	-0.314***	0.009	1.582***	0.684*	0.559*
50	Guatemala	-0.190***	-4.461	-0.009***	28.384	-0.452	0.263**
51	Guinea	-0.502	0.578***	-0.001***	-5.194***	0.113***	1.157
52	Guinea Bissau	-0.206	12.835	0.001***	-10.110	-0.821	0.261**
53	Haiti	0.924	0.767***	-0.008***	-5.665***	-0.326**	-0.368***
54	Honduras	0.058***	-0.497***	-0.004***	3.285***	0.152***	-0.339***
55	Hong Kong	-1.066*	0.355*	0.002***	-1.753***	0.176***	-1.661
56	Hungary	0.559	0.901*	-0.005***	-4.821***	1.406**	0.063***
57	Iceland	1.951	1.903	-0.010**	-9.039	-1.140***	-1.168*
58	India	1.352	-0.534	-0.022*	3.733	0.722	0.878
59	Indonesia	0.084***	0.113***	-0.001***	-0.456***	1.000	2.082
60	Iran	1.047	0.588*	-0.006	-3.539*	0.098	-0.432
61	Ireland	-0.491*	-0.354***	-0.057	0.138***	0.663***	0.427**
62	Israel	-0.804*	0.070***	0.001**	-0.356***	0.664***	0.108***
63	Italy	0.514***	-1.077***	0.012***	5.169***	0.185***	-0.381***

Table 8 continued

S/N	Country	CPS_{t-1}	GDP	INF	GDP^2	GOV	TOP
64	Jamaica	-0.547***	1.375	-0.008	-8.312	-1.264	1.697
65	Japan	-0.743**	1.195***	-0.003***	-5.691***	-0.459***	-0.255***
66	Jordan	0.314***	-1.003	0.003***	6.223	-0.869***	-0.243***
67	Kenya	-0.501***	-0.640***	-0.009***	4.432***	0.470***	0.135***
68	Korea Rep.	-0.046***	-0.008***	0.016***	0.020***	-0.863***	-0.954
69	Kuwait	0.744	0.751***	0.002***	-3.587***	0.537	-2.419
70	Lebanon	-0.135***	-0.249	0.001	1.458	0.921	-0.137***
71	Luxembourg	-0.675	-0.300***	-0.002***	1.291***	-0.831**	-0.446***
72	Madagascar	1.097	-1.241*	-0.009	10.185*	-0.087***	0.524***
73	Malawi	-0.661**	-0.630*	0.015	5.208*	0.992	-1.153
74	Malaysia	0.543	-0.220***	0.008***	1.317***	-0.711**	-0.454***
75	Mali	-0.337**	-0.200***	-0.009	1.563***	0.403	-0.166**
76	Malta	0.257***	0.153***	-0.001***	-0.824***	0.411***	0.285***
77	Mauritania	-0.371***	-0.926**	0.018	6.428**	-0.072***	0.279***
78	Mauritius	-0.224***	0.482*	0.009	-2.982*	-0.956**	-1.725
79	Mexico	0.626***	5.154	0.004	-28.259	-0.969	0.272***
80	Morocco	0.644	0.332***	0.044	-2.409***	0.248***	0.079***
81	Mozambique	-0.599	0.037***	-0.001***	-0.293***	-1.114	-0.140***
82	Namibia	0.554	1.064	-0.044***	-6.261	1.144	0.777*
83	Nepal	0.295***	0.374***	0.011	-2.863**	0.810	0.700
84	Netherlands	0.443***	0.165***	0.037**	-0.849***	-1.275**	-0.873***
85	New Zealand	-0.247	2.086	-0.009**	10.376	-2.556	-0.577***
86	Nicaragua	-0.293	-0.134***	-0.001	0.559***	0.699	-1.291
87	Niger	-1.653	-2.176	0.015	18.688	-0.441	-0.722
88	Nigeria	-0.569	-0.542	0.001***	3.673	0.415	-0.688
89	Norway	0.372	1.660	0.049	7.513	1.372**	1.071
90	Oman	0.155	-0.498***	0.001***	2.651***	0.385***	0.684
91	Pakistan	0.170***	-0.027***	-0.004***	0.412***	-0.315***	0.268***
92	Panama	0.031***	0.118***	0.037***	-0.574***	1.377*	-0.009***
93	Papua New Guinea	0.444	0.448	-0.008***	-3.149	-0.272***	0.073***
94	Paraguay	0.891	-1.072***	-0.025	6.824	0.113***	-0.496
95	Peru	0.538	-0.769	0.001***	4.824	0.504**	0.629
96	Philippines	0.878	0.005***	-0.011	0.120***	0.657**	0.063***
97	Poland	-0.552	1.518	-0.001	-8.263	1.477**	-4.098
98	Portugal	0.432*	-0.237***	0.030	1.076***	-0.115***	0.837***
99	Romania	1.175	0.590	-0.001***	-3.149	1.005	-1.187
100	Rwanda	0.316**	-0.080***	-0.008	0.660***	0.094***	0.129***
101	Saudi Arabia	-0.085***	3.159	0.008***	-1.631	-1.133***	-1.059
102	Senegal	0.047***	-0.370***	0.001	2.827***	0.802**	-0.538***
103	Seychelles	0.534	0.179***	0.006	-0.896***	-0.488*	0.336
104	Sierra Leone	0.576	0.272	-0.004	-2.112	0.166***	-0.493
105	Singapore	-0.557***	0.547**	0.018***	-2.728**	0.496***	-0.898
106	Spain	0.306***	-1.125	-0.105	5.592	-1.199**	-1.198
107	Sri Lanka	1.174	2.019	0.098	-1.271	4.091	1.649
108	South Africa	-0.311	-0.551***	-0.017**	3.095***	-2.773*	-0.081***
109	Sudan	0.922	-0.021***	-0.001***	-0.018***	0.902	-0.084***
110	Suriname	0.620	-0.151***	-0.014	0.846***	-0.792	0.395
111	Sweden	0.072	-2.994	0.027	1.419	-8.598	-3.498
112	Switzerland	-0.129***	0.654***	-0.005***	-2.996***	0.593***	0.357***
113	Tanzania	-1.194***	2.193	-0.018	-15.660	-0.254	4.230
114	Thailand	0.514**	-0.136***	-0.044	0.988***	-0.161***	-0.365***
115	Togo	-0.327	1.101	0.008**	-9.123	0.054***	0.190***
116	Trinidad & Tobago	-0.174***	0.108**	-0.009***	-0.563***	0.326***	-0.050***
117	Tunisia	0.566	-0.171***	-0.067***	1.109***	-0.512***	0.044***
118	Turkey	0.621*	0.509**	-0.004**	-2.751***	-0.304***	0.420***
119	Uganda	0.235	1.068	0.004	-8.944	0.705	0.581***
120	United Kingdom	-0.145***	2.566**	-0.017***	-12.241**	2.218*	0.644***
121	United States	-0.282***	-0.310***	0.010***	1.536***	0.124***	0.531***
122	Uruguay	0.224	-0.847	-0.010	4.442	2.149	-1.407
123	Venezuela	0.275	-0.399*	-0.005	2.220*	0.214***	0.479
124	Vietnam	-0.547	-0.256	-0.003	0.806***	2.799	-0.444**
125	Zimbabwe	-0.319	1.392	0.002	-9.760	-0.766	1.272

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