

## Does Country Legal Origin Influence Impact of Public Debt on Economic Growth of Developing Countries?

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### ABSTRACT

The recent global financial crisis has led to an increase in public debt across developing countries, and concerns are arising about its economic impact. This paper investigates the effects of public debt on the long-term economic growth of common law versus civil law countries in developing economies. The paper applies the Pooled Mean Group estimator that accounts for heterogeneity across countries by allowing the short-term coefficients to differ across countries but constrain the long-term coefficient to be identical. Our results reveal that public debt lowers the long-run economic growth of common law countries, but it has insignificant effects on the long-run economic growth of civil law countries. Conversely, public debt has insignificant effects on the short-run economic growth of common law countries, but it lowers the short-run economic growth of civil law countries. Our results suggest that institutional factors such as legal origin explain the different impacts of public debt on the economic growth of developing countries.

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## INTRODUCTION

The recent global financial crisis, partly caused by the unwinding US subprime mortgage market, led to economic recession in many countries. Responding to this recession, governments in some countries adopted an expansionary fiscal policy as a measure to reduce the effects of the economic recession. However, such expansionary fiscal policy contributed to the rising public debt-to-GDP ratio in these countries and generated concerns about its economic impact.

The theory on public debt-growth relationship states that public debt affects the economy in the short and long run (Woo & Kumar, 2015). Specifically, the traditional theorist asserts that public debt increases aggregate demand and output in the short run but crowds out capital and reduces output in the long run (Elmendorf & Mankiw, 1999). Most researchers agree that common law appears to minimize the inefficient use of public debt than civil law in developing countries, but the impact of a country's legal origin (common law versus civil law) on public debt-growth relationship is overlooked in the literature. Developing countries' legal systems offer less protection of investors' legal and property rights, in contrast to developed countries. Moreover, there is concern about the impact of fiscal and debt sustainability on the economic growth of developing countries. According to the World International Debt Statistics Report (2015), public debt has been rising in developing countries since 2000. The total external debt for developing countries was 1964 billion USD in 2000 but increased to 5506.4 billion USD in 2013, which demonstrates an increase of 180%. Moreover, public debt increased steadily throughout the period of 2000 to 2013. Rising public debt in developing countries raises some concerns and the need to investigate the impact of public debt on economic growth. The results of these findings serve as an early warning signal to avoid accumulating excessive debt and its many consequent problems.

On the issue of public debt, Blanchard *et al.* (2013) highlighted the danger of increasing public debt and the need to rethink the ways macroeconomic policy is formulated. Prior studies (e.g. Schclarek, 2004) report the negative effects of public external debt on the growth of industrial and developing countries. Similarly, Reinhart and Rogoff (2010) examine the effects of public external debt on growth, but they focus on only the correlations between debt and growth. Correlation tells us the strength of the relationship between two variables but lacks the power to establish a causal relationship, and it does not control for other determinants of growth. Other researchers (e.g. Eberhardt & Presbitero, 2013; Pescatori *et al.*, 2014) find that the negative effects of public debt on growth are not robust in a non-linear framework.

This paper focuses on the effect of public debt on the economic growth of developing countries within the Elmendorf and Mankiw (1999) theoretical framework. Specifically, this paper investigates the effects of public debt on the long-run economic growth of common law versus civil law countries in developing economies, classified as emerging economies.

Unlike some prior studies that mainly focus on developed countries when investigating the public debt-growth relationship; this paper focuses on the effects of the country legal origin on the relationship between public debt and long-term economic growth in developing countries, classified as emerging economies. The countries are divided into common law and civil law countries to gauge the effects of legal origin on long-run economic growth. Secondly, our paper

applies the Pooled Mean Group (hereafter PMG) estimator that accounts for heterogeneity across countries, which is typically overlooked by prior studies when investigating public debt and the growth relationship. Third, the paper integrates insight from law theory using the Elmendorf and Mankiw (1999) theory to explain the effects of country legal origin on the relationship between public and economic growth. As the common law legal system protects investors' rights and enforces contracts better than the civil law legal system (La Porta *et al.*, 2008), all things being equal, better investors' protection rights and contract enforcement (indications of institutional quality) should reduce inefficient utilization of the public debt needed to finance profitable investment and infrastructure projects to support productivity and stimulate growth in common law countries as opposed to civil law countries.

The rest of the paper is organized as follows: Section 2 reviews the relevant literature, Section 3 describes data and methods, Section 4 discusses the results, and Section 5 concludes the paper.

## LITERATURE REVIEW

### Theoretical Framework

Common law and civil law operate in different ways. Common law relies on broader legal principles, while civil law relies on legal codes (Glaeser & Shleifer, 2002). Common law legal origin is linked to better protection of investors and creditors rights, less government regulation, more judicial independence, and less formalistic and more creative court, while civil law countries are linked to the opposite (La Porta *et al.*, 2008; La Porta *et al.*, 1998). Law theory argues that, in countries where the legal system enforces private property rights, enforces private contractual agreements, and protects legal rights, investors are more encouraged to invest (Beck & Levine, 2005). Likewise, many researchers accept that effective protection of investors and creditors' rights minimize the inefficient utilization of financial resources (e.g. public debt) and increases government access to the financing needed to fund profitable investment that stimulates growth (La Porta *et al.*, 2008). Good laws that protect property rights and enforce contracts encourage investment, which is crucial for economic growth.

The superior characteristics of the common law allow easy access to the public debt needed to finance profitable investment and stimulate growth. The common law appears to minimize the inefficient use of financial resources (such as public debt) than the civil law in developing countries. Therefore, this paper draws insights from law theory and integrates it with the theory by Elmendorf and Mankiw (1999). Although there are several channels through which public debt affects economic growth, the Elmendorf and Mankiw (1999) theory clearly states that public debt stimulates economic growth in the short run but crowds out capital and lower economic growth in the long run. The long-run and short-run predictions of this theory are integrated with the law theory. Specifically, this paper argues that common law protects investors' rights and provides better contract-enforcement mechanism than civil law does. These investors' protection rights and contract enforcement encourage investors to provide the debt capital needed to finance profitable investment. All things being equal, better

investors' protection rights and contract enforcement (indication of institutional quality) should reduce inefficient utilization of the public debt needed to finance profitable investment and infrastructure projects to support productivity and stimulate growth in common law countries as opposed to civil law countries. Therefore, this paper hypothesized that, at least in the short run, public debt should have a positive relationship with economic growth in common law countries but a negative relationship in both long- and short-term economic growth in civil law countries.

## Empirical Review

Turning to recent empirical studies in the literature, Woo and Kumar (2015), motivated by concern over the rising public debt across the world due to the recent global financial crisis, examine the impact of high public debt on long run economic growth. Applying OLS and System-GMM estimators, they find a negative relationship between initial public debt and subsequent economic growth after controlling for other growth determinants. Precisely, a 10 percent increase in initial public debt is associated with a slowdown in economic growth of about 0.2 percent. The authors conclude that their results are similar to other researchers' results reported in prior studies. Moreover, they document non-linearity in the public debt-growth relationship, with only high debt (above 90%) having a negative effect on growth. Unlike Woo and Kumar (2015), who mainly build on determinants of long-run growth, our paper focuses on the impact of public debt on economic growth in common law versus civil law countries in developing countries, which is rarely investigated. Moreover, our paper includes public debt square in our model specification to capture the non-linear effects of public debt on growth.

In order to thoroughly capture the non-linear effects of public debt on growth, Egert (2015) applies the panel threshold to investigate whether public debt has a negative nonlinear effect on growth if public debt exceeds 90%. He finds that the negative nonlinear relationship between public debt and growth is sensitive to modeling choices and data coverage. Moreover, in rare cases in which non-linearity is detected, the negative non-linear relationship appears at lower level of public debt (between 20% and 60% of GDP). Egert (2015) argues that his results contradict Reinhart and Rogoff (2010), who use descriptive statistics to show that public debt may have a negative effect on growth, especially when it exceeds 90%. Egert (2015) concludes that 90% is not a magic number, the threshold value can be lower, and the non-linear relationship may change depending on sample size and model specification. He concludes that the non-linear relationship between public debt and growth appears complex and difficult to model. He suggests that further research is needed to understand the relationship between public debt and growth. Our paper integrates law theory with the Elmendorf and Mankiw (1999) theory to explain the effects of country legal origin on the relationship between public and economic growth. Moreover, we include public debt square in our model specification to control for the non-linear effects of public debt on the economic growth documented in the literature.

Although this paper focuses on the impact of public debt on the economic growth of developing countries, classified as emerging economies, our paper is also related to studies (e.g. Daud *et al.*, 2013) focusing on the impact of external debt on economic growth. Daud *et*

*al.* (2013) analyze the contribution of external debt to economic growth in the long run using Autoregressive Distributed Lag (ARDL) and non-linear methods. They find that external debt increases economic growth up to an optimal level and that an additional increase in debt beyond the optimal level reduces economic growth.

## DATA AND METHODOLOGY

This paper investigates the effect of public debt on economic growth of developing countries, classified as emerging economies, for the period ranging from 1979 to 2013. This data is annual observation for each country and it is unbalanced panel data. Data were obtained from World Bank's World Development Indicators and Penn World Table (PWT) 7.0. The sample countries are only for the developing countries classified as emerging economies, as in Woo and Kumar (2015) article. Consequently, we exclude other developing countries that are not classified as emerging economies. Moreover, the availability of data on public debt and other variables included in the model determine the sample time period. The main analysis splits the sample into common law (5) countries and civil law (13) countries. The paper splits the sample data into common and civil law countries to investigate how country legal origin affects the relationship between public debt and economic growth. Additional analysis uses the total samples (5 common law plus 13 civil law countries) of 18 developing countries, classified as emerging economies. Table 1 summarises the variables, source, and definition.

**Table 1** Definition and source of variables

Variable Name	Source	Definition
GDP per capita growth rate (GDPPGR)	World Development Indicators World Bank	Real GDP per capita growth rate (annual %)
Public Debt (Debt)	IMF World Economic Outlook	The central government debt, total (% of GDP)
Population Growth (POP)	Penn World Table (PWT) 7.0	Population growth (annual %)
Government Final Consumption Expenditure (GOVCON)	World Development Indicators, World Bank	General government final consumption expenditure (% of GDP)
Real Effective Exchange Rate (REER)	World Development Indicators, World Bank	Real effective exchange rate index
Real Interest Rate (RIR)	World Development Indicators, World Bank	Real interest rate (annual %)
Investments (INV)	World Development Indicators, World Bank	Gross Investments (% of GDP)
Trade Openness (TO)	World Development Indicators, World Bank	Trade (% of GDP)

The paper follows Woo and Kumar (2015) and proxy public debt as ratio of total government debt to gross domestic product (in percentage). Economic growth is proxied by real per capita GDP growth rate (in percentage) as in Woo and Kumar (2015) and Duasa (2014).

The paper controls for other determinants of economic growth such as investments, real interest rate, trade openness, real effective exchange rate, government final consumption expenditure, and population growth, in the panel regression model. The control variables included in the empirical model are the core set of explanatory variables that are related to economic growth. Finally, our focal variable is country legal origin. This paper does not include country legal origin dummy variable directly into the model, but we split the sample countries into Common law or British law legal origins based on La Porta *et al.* (2008) classification. As our strategy split the sample based on country legal origin, it is not necessary to include country legal origin dummy variable directly into the model. The 18 developing countries chosen are those classified as emerging countries as in Woo and Kumar (2015).

In order to estimate the regression model, the paper applies the PMG because the Hausman test supports it over the Mean Group estimation technique. PMG is proposed by Pesaran, Shin and Smith (1999) and it is considered suitable for the analysis of dynamic panels. This is because PMG accommodates the long run equilibrium and the heterogeneous dynamic adjustment process. PMG estimation solves heterogeneity bias common in traditional panel fixed and random effects estimations. All traditional panel models have a basic assumption that at least some of the parameters are the same across the panel. For large time periods, Pesaran *et al.* (1999) show that the traditional panel technique including panel generalized method of moment can produce inconsistent results, and a misleading estimate of the average values of the parameters in dynamic panel data model, except if the slope coefficients are truly identical.

The PMG allows the intercepts, short-run coefficients and error variances to differ across countries, but it constraints the long-run coefficients to be similar across countries (Das, 2011; Mahyideen *et al.*, 2012). PMG is developed for a dynamic panel data model where the time period is greater than the cross-sectional units, and it estimates the model as a system based on a combination of pooling and averaging of the variable coefficients (Asteriou, 2009). The paper extends aspect of Woo and Kumar (2015) paper by focusing on the effects of legal origin on public debt-growth relationship using the PMG Model. Following Pesaran *et al.* (1999) and Law and Bany-Arifin (2008) approach with modification, the autoregressive distributed lag model's unrestricted specification for the dependent variable  $y$  is

$$\Delta y_{it} = \varphi_i y_{i,t-1} + \beta' X_{i,t-1} + \sum_{j=1}^{p-1} \lambda_j \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \gamma'_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_t \quad (1)$$

$i = 1, 2, \dots, N; t = 1, 2, \dots, T.$

where  $y_{it}$  (real per capital GDP growth rate) is a scalar dependent variable,  $X_{it}$  is the  $k \times 1$  vector of regressors (investments, real interest rate, trade openness, real effective exchange rate, government final consumption expenditure, and population growth) for the group  $i$ ,  $\mu_i$  represent the fixed effects,  $\varphi_i$  is a scalar coefficient on the lagged dependent variable,  $\beta_i$ 's is the  $k \times 1$  vector of coefficients on explanatory variables,  $\lambda_{ij}$ 's are scalar coefficients on lagged first differences of dependent variables, and  $\gamma_{ij}$ 's are  $k \times 1$  coefficient vectors on first-difference of explanatory variables and their lagged values. This paper assumes that the error terms  $\varepsilon_{it}$ 's are

independently distributed across  $i$  and  $t$ , with zero means and variances  $\sigma_i^2 > 0$ . In addition, assuming that  $\varphi_i < 0$  for all  $i$ , therefore there exists a long-run relationship between  $y_{it}$  and  $X_{it}$ :

$$\gamma_{it} = \theta'_i X_{it} + \eta_{it} \tag{2}$$

$i = 1, 2, \dots, N$ ;  $t = 1, 2, \dots, T$ .

Where,  $\theta'_i = \beta'_i / \varphi_i$  is the  $k \times 1$  vector of the long-run coefficients, and  $\eta_{it}$ 's are stationary with possibly non-zero means (this includes fixed effects). Eq. (1) can be rewritten as:

$$\Delta y_{it} = \varphi_i \eta_{i,t-1} + \sum_{j=1}^{p-1} \lambda_j \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \gamma'_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_i \tag{3}$$

where  $\eta_{i,t-1}$ , is the error correction term given by (2), hence  $\varphi_i$  is the error correction coefficient which measures the speed of adjustment towards the long-run equilibrium. The PMG estimator proposed by Pesaran *et al.* (1999) restricts the long-run coefficients to be the same over the cross-section, but allows the short-run coefficients and error variances to be different across groups; that is,  $\theta_i = \theta$  for all  $i$ . The hypothesis of homogeneity of the long-run policy parameters cannot be assumed a priori and we tested it empirically in all specifications using Hausman-type test (Hausman, 1978). The pooled maximum likelihood estimation is used in computing the group-specific short-run coefficients and the common long-run coefficients. Adopting from Law and Bany-Arifin (2008), the estimators are represented as:

$$\begin{aligned} \varphi_{PMG} &= \sum_{i=1}^N \varphi_i / N, & \beta_{PMG} &= \sum_{i=1}^N \beta_i / N, \\ \beta \lambda_{j PMG} &= \sum_{i=1}^N \beta \lambda_{ij} / N, j = 1, \dots, p - 1 \\ \gamma_{j PMG} &= \sum_{i=1}^N \gamma_{ij} / N, j = 0, \dots, q - 1, & \theta_{PMG} &= \theta \end{aligned} \tag{4}$$

The PMG is applied because the time period ( $T$ ) is larger than the number of countries ( $N$ ) in the panel data for this study. Moreover, the traditional theory of public debt-growth relationship asserts that public debt stimulate economic growth in the short-run but crowds out capital and reduce economic growth in the long-run. Thus, PMG estimation technique is appropriate for this study because it provides the long-run and short-run effects of public debt on economic growth. PMG allows the intercepts, short-run coefficients and error correction mechanism to differ across the countries, but restricts the long-run to be the same across countries (Mahyideen *et al.*, 2012; Das, 2011). These characteristics make PMG approach less restrictive than dynamic fixed effect models which assume common short-run and long-run coefficients as well as common speed of error correction across panels.

## RESULTS AND DISCUSSIONS

Tables 2A and 2B show the descriptive statistics. The mean of the public debt is slightly larger in common law than civil law countries. However, the mean of real GDP per capital growth is greater in civil law than in common law countries. Moreover, the standard deviation reveals that real GDP per capital growth rate is more volatile in civil law than common law countries. Thus, based on the descriptive statistics, it appears that the growth rate of civil law countries may not be sustainable. Before estimating equation 1, it is necessary to determine the order of integration of the variables used in the analysis by using some panel unit root tests (Suleiman *et al.*, 2013). The paper employs some widely used first-generation panel unit root tests. In order to test for the presence of unit roots in the panel data series, the paper uses the panel unit root test recently proposed by Levine *et al.* (2002), Im *et al.* (2003), and Maddala and Wu (1999). In these three studies, the null hypothesis is non-stationary. However, Levine *et al.* (2002) propose the null hypothesis that each individual time series has a unit root, which challenges the restrictive alternative hypothesis that each individual time-series is stationary. Conversely, Im *et al.* (2003) allow heterogeneity, and their null hypothesis states that each series in the panel contains a unit root, but the null hypothesis maintains that some but not all individual series have a unit root. The Maddala and Wu (1999) test has the added advantage, because it is valid for the individual Augmented Dickey-fuller Test (ADF) with different lag lengths.

**Table 2A** Descriptive statistics for common law countries

	GDPPGR	DEBT	TO	REER	RIR	POP	GOVCON	INV
Mean	2.544	49.365	103.158	109.445	3.262	1.931	13.426	22.610
Maximum	8.844	104.400	458.332	168.638	13.073	2.940	21.783	43.586
Minimum	-9.635	26.900	19.313	69.464	-12.340	-0.197	7.781	12.521
Std. Dev.	3.109	16.925	108.881	20.379	4.213	0.605	3.658	6.420

**Table 2B** Descriptive statistics for civil law countries

	GDPPGR	DEBT	TO	REER	RIR	POP	GOVCON	INV
Mean	3.487	41.362	59.394	95.398	9.259	1.161	13.516	24.071
Maximum	13.675	128.400	181.369	228.555	78.790	2.744	25.347	47.302
Minimum	-14.385	26.025	14.545	46.838	-24.600	-1.044	5.694	13.780
Std. Dev.	13.675	16.925	29.478	23.165	14.937	0.786	4.124	6.880

Notes: \*GDPPGR is Real GDP per capital growth rate (annual %). Public debt is the central government debt, total (% of GDP). INV is gross investments (% of GDP). POP is population growth (annual %). GOVCON is the general government final consumption expenditure (% of GDP). REER is real effective exchange rate index. RIR is the real interest rate (annual %), and TO is the trade (% of GDP).

Tables 3A and 3B report outcomes of the panel unit root test (in levels) and they show that the null hypothesis of a unit root cannot be rejected at levels, except real interest rates and government final consumption expenditure (GOVCON). However, this hypothesis is rejected when all the series are in first differences (see Tables 4A and 4B). These results clearly indicate that most of the variables in levels are non-stationary while all the variables are stationary in first differences. In other words, all the variables are integrated of order one. Therefore, the paper proceeds to the pooled mean growth estimation



**Table 3A** Panel unit root tests (Levels) for common law countries

Series	LLC	IPS	Maddala-Wu
Real GDP per capital growth rate (GDPPGR)	-1.977 (0.080)	-1.992 (0.079)	15.282 (0.010)
Public Debt (DEBT)	-1.530 (0.163)	-0.959 (0.169)	24.446 (0.256)
Trade Openness (TO)	-1.355 (0.088)	-0.421 (0.337)	10.483 (0.399)
Investments (INV)	0.847 (0.802)	1.251 (0.895)	3.911 (0.951)
Real Effective Exchange Rate (REER)	-1.233 (0.109)	-0.670 (0.252)	13.379 (0.203)
Real Interest Rate (RIR)	-3.477 (0.000)***	-4.154 (0.000)***	37.999 (0.000)***
Population Growth Rate (POP)	1.948 (0.974)	-0.838 (0.201)	15.341 (0.120)
Government Consumption (GOVCON)	-1.364 (0.086)	0.253 (0.600)	7.835 (0.645)

Notes:  $p$ -values are reported in parentheses. \*\*\* indicates the rejection of the null hypothesis of a unit root at 1% level of significance.

**Table 3B** Panel unit root tests (Levels) for civil law countries

Series	LLC	IPS	Maddala-Wu
Real GDP per capital growth rate (GDPPGR)	-1.096 (0.120)	-1.787 (0.090)	16.149 (0.110)
Public Debt (DEBT)	-0.069 (0.473)	-1.172 (0.130)	21.023 (0.121)
Trade Openness (TO)	-1.223 (0.103)	-0.854 (0.197)	29.738 (0.194)
Investments (INV)	-4.060 (0.000)***	-2.918 (0.002)***	49.633 (0.000)***
Real Effective Exchange Rate (REER)	-1.542 (0.100)	-1.561 (0.059)	24.846 (0.171)
Real Interest Rate (RIR)	-4.369 (0.000)***	-7.287 (0.000)***	95.948 (0.000)***
Population Growth Rate (POP)	0.474 (0.682)	-1.336 (0.091)	23.029 (0.120)
Government Consumption (GOVCON)	-2.890 (0.002)***	-2.397 (0.008)***	42.672 (0.011)***

Notes:  $p$ -values are reported in parentheses. \*\*\* indicates the rejection of the null hypothesis of a unit root at 1% level of significance.

**Table 4A** Panel unit root tests (First difference) for common law countries

Series	LLC	IPS	Maddala-Wu
$\Delta$ Real GDP per capital growth rate ( $\Delta$ GDPPGR)	-10.239(0.000)***	-6.959 (0.000)***	85.931 (0.000)***
$\Delta$ Public Debt ( $\Delta$ DEBT)	-3.989 (0.000)***	-3.161 (0.001)***	33.171 (0.000)***
$\Delta$ Trade Openness ( $\Delta$ TO)	-9.859 (0.000)***	-8.040 (0.000)***	70.582 (0.000)***
$\Delta$ Investmtns ( $\Delta$ INV)	-5.581 (0.000)***	-4.185 (0.000)***	37.947 (0.000)***
$\Delta$ Real Effective Exchange Rate ( $\Delta$ REER)	-6.775 (0.000)***	-5.458 (0.000)***	59.643 (0.000)***
$\Delta$ Real Interest Rate ( $\Delta$ RIR)	3.064 (0.000)***	-7.310 (0.000)***	78.340 (0.000)***
$\Delta$ Population Growth Rate ( $\Delta$ POP)	-2.281 (0.044)**	-4.412 (0.000)***	44.245 (0.000)***
$\Delta$ Government Consumption ( $\Delta$ GOVCON)	-6.328 (0.000)***	-4.583 (0.000)***	53.762 (0.000)***

Notes:  $p$ -values are reported in parentheses. \*\*\* & \*\* indicate the rejection of the null hypothesis of a unit root at 1% and 5% levels of significance, respectively.

**Table 4B** Panel unit root tests (First difference) for civil law countries

Series	LLC	IPS	Maddala-Wu
$\Delta$ Real GDP per capital growth rate ( $\Delta$ GDPPGR)	-10.965(0.000)***	-13.978 (0.000)***	106.653 (0.000)***
$\Delta$ Public Debt ( $\Delta$ DEBT)	-5.851 (0.000)***	-9.732 (0.000)***	38.174 (0.000)***
$\Delta$ Trade Openness ( $\Delta$ TO)	-10.116 (0.000)***	-8.631 (0.000)***	110.535 (0.000)***
$\Delta$ Investmnts ( $\Delta$ INV)	-8.369 (0.000)***	-5.736 (0.000)***	77.596 (0.000)***
$\Delta$ Real Effective Exchange Rate ( $\Delta$ REER)	-10.179 (0.000)***	-8.834 (0.000)***	118.250 (0.000)***
$\Delta$ Real Interest Rate ( $\Delta$ RIR)	5.940 (0.000)***	-11.230 (0.000)***	156.692 (0.000)***
$\Delta$ Population Growth Rate ( $\Delta$ POP)	-3.576 (0.000)***	-6.068 (0.000)***	105.576 (0.000)***
$\Delta$ Government Consumption ( $\Delta$ GOVCON)	-11.362 (0.000)***	-10.684 (0.000)***	130.678 (0.000)***

Notes:  $p$ -values are reported in parentheses. \*\*\* indicates the rejection of the null hypothesis of a unit root at 1% level of significance.

Tables 5A and 5B report estimates of the long-run coefficients, the adjustment coefficient, and the joint Hausman test statistics. The lag order is first chosen in each country on the unrestricted model with lag one for the independent variable. The adjustment coefficient (-0.815) for the common law countries' model has the expected sign and it is significant at the one percent level. Similarly, the adjustment coefficient (-0.967) for the civil law countries model carries the expected sign and it is significant at the one percent level. These results show that there is an adjustment dynamics from short-run to long-run in growth equation across the developing countries, classified as emerging economies. Moreover, in accordance with Bangake and Eggoh (2012), this paper compares the speed of adjustment to long-run equilibrium in absolute value terms. In absolute value terms, the speed of adjustment to the long-run equilibrium is slightly faster in civil law countries (-0.967) than common law countries (-0.815). The joint Hausman test statistics fail to reject the null hypothesis, which indicates that the data do not reject the restriction of common long-run coefficients across the sampled developing countries, classified as emerging economies. Therefore, the pooled mean group (PMG) estimation is appropriate to investigate the link between public debt and economic growth in this study. Moreover, Breusch-Pagan Heteroskedasticity and Wooldridge Serial Correlation Tests indicate that there is no evidence of heteroskedasticity and serial correlation problems. The  $p$ -values are greater than 5 percent, and the null hypotheses that there is heteroskedasticity and serial correlation problems are rejected, respectively.

**Table 5A** Pooled Mean Group (PMG) estimation for common law countries

Model 1		
	Long-run Coefficients	
Public Debt (Debt)	-0.277***	(-2.72)
Public Debt <sup>2</sup> (Debt <sup>2</sup> )	0.004***	(3.63)
Population Growth Rate (POP)	-0.078***	(-3.52)
Government Consumption (GOVCON)	-0.378***	(-3.07)
Real Effective Exchange Rate (REER)	-0.017	(-0.59)
Real Interest Rate (RIR)	-0.021	(-0.42)
Trade Openness (TO)	0.017**	(2.07)
Investment (INV)	0.025***	(2.49)
Hausman-test for long-run Homogeneity	3.02	(0.510)
Breusch-Pagan Heteroskedasticity Test	0.66	(0.418)
Wooldridge Serial Correlation Test	0.21	(0.560)
	Short-run Coefficients	
Error correction adjustment	-0.815***	(-6.90)
$\Delta$ Public Debt ( $\Delta$ Debt)	0.261	(0.99)
$\Delta$ Public Debt <sup>2</sup> ( $\Delta$ Debt <sup>2</sup> )	-0.057	(-1.02)
$\Delta$ Population Growth Rate ( $\Delta$ POP)	0.015	(1.21)
$\Delta$ Government Consumption ( $\Delta$ GOVCON)	-0.298	(-1.08)
$\Delta$ Real Effective Exchange Rate ( $\Delta$ REER)	0.097**	(2.83)
$\Delta$ Real Interest Rate ( $\Delta$ RIR)	0.029	(0.68)
$\Delta$ Trade Openness ( $\Delta$ TO)	0.002**	(2.09)
$\Delta$ Investment ( $\Delta$ INV)	0.124	(0.71)

Notes: : The dependent variable is real GDP per capita growth rate. Figures in parentheses are test statistics except for Hausman Test, Breusch-Pagan Heteroskedasticity Test, and Wooldridge Serial Correlation Test, which are p-values. \*\*\* and \*\* indicate that the coefficients are significant at 1% and 5% levels, respectively. Prior to running the PMG results for all the developing countries, classified as emerging economies, we conduct panel unit roots tests but the results are not reported to save space.

**Table 5B** Pooled Mean Group (PMG) estimation for civil law countries

Model 2		
	Long-run Coefficients	
Public Debt (Debt)	0.647	(1.58)
Public Debt <sup>2</sup> (Debt <sup>2</sup> )	-0.001	(-1.08)
Population Growth Rate (POP)	-0.785	(-1.59)
Government Consumption (GOVCON)	-0.333***	(-4.07)
Real Effective Exchange Rate (REER)	0.005	(0.75)
Real Interest Rate (RIR)	-0.043***	(-2.99)
Trade Openness (TO)	-0.042***	(-6.64)
Investment (INV)	0.017**	(2.87)
Hausman-test for long-run Homogeneity	2.99	(0.935)
Breusch-Pagan Heteroskedasticity Test	0.33	(0.316)
Wooldridge Serial Correlation Test	0.26	(0.405)
	Short-run Coefficients	
Error correction adjustment	-0.967***	(-9.62)
$\Delta$ Public Debt ( $\Delta$ Debt)	-0.517**	(-2.46)
$\Delta$ Public Debt2 ( $\Delta$ Debt2)	0.004	(1.73)
$\Delta$ Population Growth Rate ( $\Delta$ POP)	0.468	(1.31)
$\Delta$ Government Consumption ( $\Delta$ GOVCON)	-0.892***	(-2.82)
$\Delta$ Real Effective Exchange Rate ( $\Delta$ REER)	0.088	(1.68)
$\Delta$ Real Interest Rate ( $\Delta$ RIR)	0.023	(0.43)
$\Delta$ Trade Openness ( $\Delta$ TO)	0.086**	(2.21)
$\Delta$ Investment ( $\Delta$ INV)	0.090**	(2.01)

Notes: The dependent variable is real GDP per capita growth rate. Figures in parentheses are test statistics except for Hausman Test, Breusch-Pagan Heteroskedasticity Test, and Wooldridge Serial Correlation Test, which are p-values. \*\*\* and \*\* indicate that the coefficients are significant at 1% and 5% levels, respectively. Prior to running the PMG results for all the developing countries, classified as emerging economies, we conduct panel unit roots tests but the results are not reported to save space.

Although the mean group (MG) approach is less restrictive than the pooled mean group (PMG), PMG estimator is consistent and more efficient when the assumption of common long-run coefficient is valid. The Hausman test confirms that the assumption of common long-run coefficient is valid.

The Pooled Mean Group (PMG) results reveal that public debt lowers long-run economic growth of common law countries, but public debt has insignificant effects on long-run economic growth of civil law countries, in developing countries. Conversely, public debt has insignificant effects on short-run economic growth of common law countries, but public debt lowers short-run economic growth of civil law countries. Our results suggest that institutional factor such as legal origin explain different impact of public debt on economic growth of developing countries, classified as emerging economies (see Tables 5A and 5B).

The results for the civil law samples are consistent with our predictions that public debt is negatively related to short-run economic growth of civil law countries, in developing countries. However, the results are inconsistent with our predictions that public debt lowers long run economic growth of civil law countries, in developing countries. Moreover, the results for the common law samples are inconsistent with our prediction that public debt, at least, stimulates economic growth of common law countries in developing countries, in the short-run. Furthermore, this paper does not find evidence that public debt stimulates long-run economic growth of common law countries in developing economies, classified as emerging economies.

The results for the common law countries support the Elmendorf and Mankiw (1999) and the traditional view that public debt crowds out capital and lower economic growth in the long-run. But, there is no evidence that public debt stimulate economic growth of common law countries in developing economies, in the short-run, which contradict the Elmendorf and Mankiw (1999), and the traditional theory. The results for the civil law countries contradict Elmendorf and Mankiw (1999) and the traditional theory or view that public debt stimulates economic growth in the short-run but crowds out capital and lower economic growth in the long-run. Moreover, as a robustness tests, the results for all the developing countries, classified as emerging economies, reveal that public debt stimulates long-run economic growth, but public debt has no effect on short-run economic growth which contradict the Elmendorf and Mankiw (1999) and the traditional view that public debt crowds out capital and lower economic growth in the long-run (See Table 6 results). Additional robustness tests (see Tables 7A and 7B) that exclude China (as a potential outlier) give similar results, except that the coefficients of some explanatory variables change slightly.

It appears that the common law legal system is not necessarily efficient and effective than the civil law legal system in using public debt to stimulate economic growth. Thus, the La Porta *et al.* (2008) argument that common law legal system is superior to the civil law legal system is not supported. The reason for these inconsistent results could be that the common law legal system passed-on to some developing countries has undergone tremendous changes, over time. As a result, the laws have become less efficient and effective to stimulate long-run economic growth of developing countries, classified as emerging economies.

The empirical results for the common law countries also support Woo and Kumar (2015) who examine the impact of high public debt on long run economic growth. They find a negative relationship between initial public debt and subsequent economic growth, after controlling for other growth determinants. Likewise, the results are consistent with Schclarek (2004) who reports negative effects of public external debt on growth of industrial and developing countries using generalized method of moments. He concludes that this negative relationship is driven by the incidence of public external debt, and not by private external debt.

Additionally, our empirical results reveal absence of non-linearity in the public debt-growth relationship. Our results are consistent with Egert (2015) results that in rare cases when non-linearity is detected, the negative non-linear relationship appears at lower level of public debt (between 20% and 60% of GDP). Moreover, Egert (2015) results reveal that a negative nonlinear relationship between public debt and growth is sensitive to modeling choices and

data coverage, using data for 29 OECD countries. Likewise, our results are consistent with Schlarek (2004) who do not find any support for non-linear relationship between public debt and economic growth. Conversely, the results are inconsistent with Reinhart and Rogoff (2010) who use descriptive statistics to show that public debt may have a negative effect on growth, especially when it exceeds 90%.

**Table 6** Pooled Mean Group (PMG) estimation for all the developing countries, classified as emerging economies (Robustness Tests 1)

Model 3		
	Long-run Coefficients	
Public Debt (Debt)	0.059***	(2.49)
Public Debt <sup>2</sup> (Debt <sup>2</sup> )	-0.003	(-0.18)
Population Growth Rate (POP)	-0.102***	(-2.74)
Government Consumption (GOVCON)	-0.177***	(-2.60)
Real Effective Exchange Rate (REER)	-0.002	(-0.34)
Real Interest Rate (RIR)	-0.025**	(-2.16)
Trade Openness (TO)	-0.026**	(-4.22)
Investment (INV)	0.026**	(2.86)
Hausman-test for long-run Homogeneity	4.82	(0.777)
Breusch-Pagan Heteroskedasticity Test	0.49	(0.502)
Wooldridge Serial Correlation Test	0.26	(0.403)
	Short-run Coefficients	
Error correction adjustment	-0.922***	(-13.53)
$\Delta$ Public Debt ( $\Delta$ Debt)	0.199	(0.32)
$\Delta$ Public Debt <sup>2</sup> ( $\Delta$ Debt <sup>2</sup> )	-0.006	(-0.64)
$\Delta$ Population Growth Rate ( $\Delta$ POP)	0.111	(0.34)
$\Delta$ Government Consumption ( $\Delta$ GOVCON)	-0.887***	(-3.33)
$\Delta$ Real Effective Exchange Rate ( $\Delta$ REER)	0.100**	(2.63)
$\Delta$ Real Interest Rate ( $\Delta$ RIR)	-0.004	(-0.09)
$\Delta$ Trade Openness ( $\Delta$ TO)	0.063	(1.08)
$\Delta$ Investment ( $\Delta$ INV)	0.065***	(4.68)

Notes: <sup>a</sup> See Table 2 for exact definition of variables. <sup>b</sup> The dependent variable is real GDP per capita growth rate. <sup>c</sup> Figures in parentheses are test statistics except for Hausman Test, Breusch-Pagan Heteroskedasticity Test, and Wooldridge Serial Correlation Test, which are p-values. <sup>d</sup> \*\*\* and \*\* indicate that the coefficients are significant at 1% and 5%, respectively. <sup>e</sup> Prior to running the PMG results for all the developing countries, classified as emerging economies, we conduct panel unit roots tests but the results are not reported to save space. Observation = 432.

**Table 7A** Pooled Mean Group (PMG) estimation for civil law countries [Excluding China]  
(Robustness Tests 2)

Model 4		
	Long-run Coefficients	
Public Debt (Debt)	0.052	(1.66)
Public Debt <sup>2</sup> (Debt <sup>2</sup> )	-0.002	(-1.16)
Population Growth Rate (POP)	-0.837*	(-1.67)
Government Consumption (GOVCON)	-0.348***	(-4.24)
Real Effective Exchange Rate (REER)	0.004	(0.60)
Real Interest Rate (RIR)	-0.044***	(-3.07)
Trade Openness (TO)	-0.043***	(-6.73)
Investment (INV)	0.023**	(2.31)
Hausman-test for long-run Homogeneity	2.87	(0.896)
Breusch-Pagan Heteroskedasticity Test	0.31	(0.302)
Wooldridge Serial Correlation Test	0.24	(0.401)
	Short-run Coefficients	
Error correction adjustment	-0.917***	(-10.68)
$\Delta$ Public Debt ( $\Delta$ Debt)	-0.585**	(-2.69)
$\Delta$ Public Debt <sup>2</sup> ( $\Delta$ Debt <sup>2</sup> )	0.005*	(1.97)
$\Delta$ Population Growth Rate ( $\Delta$ POP)	0.836*	(1.90)
$\Delta$ Government Consumption ( $\Delta$ GOVCON)	-0.891**	(-2.57)
$\Delta$ Real Effective Exchange Rate ( $\Delta$ REER)	0.101*	(1.79)
$\Delta$ Real Interest Rate ( $\Delta$ RIR)	0.042	(0.75)
$\Delta$ Trade Openness ( $\Delta$ TO)	0.087**	(2.13)
$\Delta$ Investment ( $\Delta$ INV)	0.090**	(2.01)

Notes: a See Table 2 for exact definition of variables. b The dependent variable is real GDP per capita growth rate. c Figures in parentheses are test statistics except for Hausman Test, Breusch-Pagan Heteroskedasticity Test, and Wooldridge Serial Correlation Test, which are p-values. d \*\*\*, \*\* and \* indicate that the coefficients are significant at 1%, 5% and 10%, respectively. e Prior to running the PMG results for all the developing countries, classified as emerging economies, we conduct panel unit roots tests but the results are not reported to save space. Observation = 269.

**Table 7B** Pooled Mean Group (PMG) estimation for all the developing countries, classified as emerging economies [Excluding China] (Robustness Tests 3)

Model 5		
	Long-run Coefficients	
Public Debt (Debt)	0.026**	(2.20)
Public Debt <sup>2</sup> (Debt <sup>2</sup> )	-0.002	(-0.35)
Population Growth Rate (POP)	-0.113***	(-2.78)
Government Consumption (GOVCON)	-0.187***	(-2.75)
Real Effective Exchange Rate (REER)	-0.004	(-0.58)
Real Interest Rate (RIR)	-0.026*	(-1.84)
Trade Openness (TO)	-0.027**	(-4.25)
Investment (INV)	0.029**	(2.92)
Hausman-test for long-run Homogeneity	4.82	(0.952)
Breusch-Pagan Heteroskedasticity Test	0.47	(0.490)
Wooldridge Serial Correlation Test	0.22	(0.397)
	Short-run Coefficients	
Error correction adjustment	-0.922***	(-14.63)
ΔPublic Debt (ΔDebt)	0.209	(0.32)
ΔPublic Debt <sup>2</sup> (ΔDebt <sup>2</sup> )	-0.006	(-0.63)
ΔPopulation Growth Rate (ΔPOP)	0.116	(0.63)
ΔGovernment Consumption (ΔGOVCON)	-0.881***	(-3.09)
ΔReal Effective Exchange Rate (ΔREER)	0.109**	(2.77)
ΔReal Interest Rate (ΔRIR)	-0.008	(-0.17)
ΔTrade Openness (ΔTO)	0.064	(1.04)
ΔInvestment (ΔINV)	0.062***	(4.54)

Notes: <sup>a</sup> See Table 2 for exact definition of variables. <sup>b</sup> The dependent variable is real GDP per capita growth rate. <sup>c</sup> Figures in parentheses are test statistics except for Hausman Test, Breusch-Pagan Heteroskedasticity Test, and Wooldridge Serial Correlation Test, which are p-values. <sup>d</sup> \*\*\*, \*\* and \* indicate that the coefficients are significant at 1%, 5% and 10%, respectively. <sup>e</sup> Prior to running the PMG results for all the developing countries, classified as emerging economies, we conduct panel unit roots tests but the results are not reported to save space. Observation = 384.



## CONCLUSION

Although earlier studies have investigated the public debt-growth relationship for countries with developed economies, there is a dearth of studies on the effects of public debt on long-run economic growth of common law versus civil law countries in developing economies, classified as emerging economies. Our paper fills this gap in the literature. The PMG estimator that accounts for heterogeneity across countries reveals that public debt lowers the long-run economic growth of common law countries but has insignificant effects on the long-run economic growth of civil law countries. Conversely, public debt has insignificant effects on short-run economic growth of common law countries but lowers the short-run economic growth of civil law countries. The results regarding common law countries support the traditional theory that public debt crowds out capital and lower long-run economic growth. Conversely, the civil law countries results contradict the traditional theory that public debt stimulates economic growth in the short run but crowds out capital and lowers long-run economic growth. Moreover, in the short run, there is no evidence that public debt stimulates economic growth of common law countries in developing economies, classified as emerging economies.

From a policy perspective, the results have important policy implications. Firstly, the results imply that institutional factors such as legal origin explains the different impact of public debt on economic growth in developing countries, classified as emerging economies. Therefore, the aspect of the World Bank Millennium Developmental goal focusing on improving the quality of institutions in developing countries is a step in the right direction. Improving the quality of institutions would reduce inefficient and ineffective utilization of financial resources, such as public debt, and foster the long-run economic growth that developing countries desire. Secondly, the results re-inform policymakers (i.e. the government) to be cautious of large public debt to finance public expenditure. Large public debt affects the economy negatively in both the short and long run. A country with large public debt may experience difficulty in financing ongoing deficit through additional borrowing and may be tempted to use alternative sources that are costly, such as seigniorage (seigniorage usually leads to hyperinflation) to raise revenue. Third, large or moderate public debt may reduce the fiscal flexibility of the government. Although moderate levels of public debt have small negative effects on economic growth, large public debt is generally costly. Thus, even a government using moderate public debt would face some constraints to respond to calls for more spending or lower taxes.

Our paper focuses on the effects of public debt on the long-run economic growth of common law versus civil law countries in developing countries, classified as emerging economies. Future research may investigate the effects of public debt on long-run economic growth of common law versus civil law countries using data for all developing countries. Moreover, our study assumes cross-sectional independence, but future study may test for cross-sectional dependency effects and accounts for it in the model estimation.

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## APPENDIX

Lists of Developing Countries, Classified as Emerging Economies

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<b>Common Law Countries</b>	<b>Civil Law Countries</b>
Hong Kong	Brazil
India	Chile
Malaysia	China
Pakistan	Egypt
South Africa	Indonesia
	Mexico
	Peru
	Philippines
	Poland
	Russian Federation
	Slovak Republic
	Korea
	Turkey

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