Journal of Economic Cooperation and Development, **43**, 1 (2022), 103-132

Empirical analysis of country-level institutional quality and public debt: Perspective of South Asian countries

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ABSTRACT

Present study inspects the effect of country-level institutional quality on public debt in the South Asian nations of Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. Present study focuses on the South Asian region's public debt from the angle of country-level institutional quality data from 2002 to 2018. It employs a dynamic heterogeneous panel approach, known as panel autoregressive distributed lag (panel ARDL) model entailing "dynamic fixed effect (DFE), mean group (MG), and pooled mean group (PMG)". Findings of the study suggest that governance indicators, namely political stability and control of corruption are negatively significant to explain public debt. While government effectiveness and rule of law have significant and positive effect on public debt. The long-run estimates seem to be homogenous for all the reviewed countries. However, the short-run estimates and the adjustment speeds to the long-run equilibrium are heterogeneous, which could be attributed to volatile governance in each of the cross-section countries. Policymakers can benefit tremendously from the study's findings, especially for countries experiencing significant fiscal and external imbalances caused by major war and terrorism implications, low oil prices, and poor trade. There is an urgent need to focus on public debt management issues that are typically caused by policymakers' inattentiveness to proper governance and macroeconomic management. Regulators can reduce public debt via image building for both the country and

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the region, specifically by establishing a stable economic and political landscape as well as retaining macroeconomic stability through improvements in country-level institutional quality indicators.

ملخص

تستكشف هذه الدراسة تأثير الجودة المؤسسية على مستوى الدولة على الدين العام في دول جنوب آسيا مثل بنغلاديش وبوتان والهند ونيبال وباكستان وسريلانكا.وتركز على الدين العام لمنطقة جنوب آسيا من زاوية بيانات الجودة المؤسسية على مستوى الدولة ما بين 2002 و 2018. وهي تستخدم نهج اللوحة غير المتجانسة الديناميكية، والمعروف باسم نموذج لوحة الانحدار الذاتي للإبطاء الموزع (ARDL) الذي يستلزم "التأثير الديناميكي الثابت (DFE)، والمجموعة المتوسطة (MG)، والمجموعة المتوسطة المجمعة (PMG)". وتشير نتائج الدراسة إلى أن مؤشرات الحوكمة، وتحديداً الاستقرار السياسي والحد من الفساد، لها أهمية سلبية في تفسير الدين العام، في حين أن فعالية الحكومة وسيادة القانون لهما تأثير كبير وإيجابي على الدين العام. ويبدو أن التقديرات طويلة المدى متجانسة لجميع البلدان التي خضعت للمراجعة. ومع ذلك، فإن التقديرات قصيرة المدى ووتيرة عمليات التعديل على التوازن طويل المدى غير متجانسة، وهو ما يمكن أن يُعزى إلى تقلب الحوكمة في كل من البلدان الممثلة للعينة. ومن شأن صناع السياسات الاستفادة بشكل كبير من نتائج الدراسة، خاصة بالنسبة للبلدان التي تعاني من اختلالات مالية وخارجية كبيرة ناجمة عن تداعيات الحرب والإرهاب الرئيسية، وانخفاض أسعار النفط وضعف على مستوى التجارة.وإن هناك حاجة ملحة للتركيز على قضايا إدارة الدين العام التي تنتج عادة عن عدم اهتمام صناع السياسات بالحوكمة السليمة وإدارة الاقتصاد الكلي. ويمكن للجهات التنظيمية خفض الدين العام من خلال بناء صورة لكل من الدولة والمنطقة، وتحديدا من خلال إنشاء مشهد اقتصادي وسياسي مستقر بالإضافة إلى الحفاظ على استقرار الاقتصاد الكلي من خلال تحسين مؤشرات الجودة المؤسسية على مستوى الدولة.

ABSTRAITE

La présente étude examine l'effet de la qualité institutionnelle au niveau national sur la dette publique dans les pays d'Asie du Sud suivants : Bangladesh, Bhoutan, Inde, Népal, Pakistan et Sri Lanka. La présente étude se concentre sur la dette publique de la région de l'Asie du Sud sous l'angle des données de qualité institutionnelle au niveau des pays de 2002 à 2018. Elle utilise une approche de panel hétérogène dynamique, connue sous le nom de modèle de panel autorégressif à décalage distribué (panel ARDL), comprenant "un effet fixe dynamique (DFE), un groupe moyen (MG) et un groupe moyen combiné

(PMG)". Les résultats de l'étude suggèrent que les indicateurs de gouvernance, à savoir la stabilité politique et le contrôle de la corruption, sont négativement significatifs pour expliquer la dette publique. Alors que l'efficacité du gouvernement et la règle de droit ont un effet significatif et positif sur la dette publique. Les estimations à long terme semblent être homogènes pour tous les pays examinés. Cependant, les estimations à court terme et les vitesses d'ajustement à l'équilibre à long terme sont hétérogènes, ce qui pourrait être attribué à une gouvernance volatile dans chacun des pays de l'échantillon. Les décideurs politiques peuvent tirer un grand profit des conclusions de l'étude, en particulier pour les pays qui connaissent d'importants déséquilibres budgétaires et extérieurs causés par les conséquences de guerres majeures et du terrorisme, la faiblesse des prix du pétrole et la faiblesse des échanges commerciaux. Il est urgent de se concentrer sur les problèmes de gestion de la dette publique qui sont généralement causés par l'inattention des décideurs politiques à la bonne gouvernance et à la gestion macroéconomique. Les régulateurs peuvent réduire la dette publique en renforçant l'image du pays et de la région, notamment en créant un paysage économique et politique stable et en préservant la stabilité macroéconomique grâce à l'amélioration des indicateurs de qualité institutionnelle au niveau national.

Keywords: country-level institutional quality, public debt, South Asian countries, pool mean group analysis.

JEL Classification: N25, O17, H63.

1. Introduction

Public debt is deemed as a key player of the economic growth of developing nations. Public debt entails the sum of external and domestic debts. It also refers to the sum that a public system owes to external lenders, including individuals, businesses, governments, and international financial organisations. Many countries borrow from domestic and foreign markets to cover insufficient funds for their national activities.

Public debt is often utilised to finance the construction of new infrastructures or transportation systems, enhance education and healthcare services, or explore new energy sources (Mendonca & Tiberto, 2014). With efficient usage, it is a key financial source for improving domestic business landscapes, attracting foreign investments, and developing domestic business sectors (Jayaraman & Lau, 2009). Public debt can also help promote socio-economic activities; hence, increases in

budget revenues (e.g., tax revenues) enable governments to repay their debts and achieve new levels of economic growth. There are also indications that public debt has only mild effect on economic growth (Bua et al., 2014).

However, high levels of debt have complicated the economies of many countries. Increased public debt means increased pressure to repay the debt in subsequent periods. Such mounting pressure will lead governments to impose higher tax revenues and incur lower expenditures (similar to a contractionary fiscal policy), leading to lower national output and ultimately resulting in macroeconomic imbalances (Correia & Martins, 2019). Consequently, rising cases of unemployment and poverty will cause business enterprises to experience lower market demands, with some going into bankruptcy, thereby ultimately prolonging economic recessions (Akram, 2016; Arawatari & Ono, 2017; Kumar & Woo, 2010a). Additionally, mounting and rapid pressure for debt repayment will cause a quick decrease in national savings, domestic investments, and economic growth (Furceri & Zdzienicka, 2012; Ncanywa & Masoga, 2018). A high public debt rate per gross domestic product (GDP) will reduce the attractiveness of the domestic investment landscape, thus discouraging foreign investment inflows. Several cases of severe public debt and financial crises have created economic instability, leading to reduced economic output growth (Furceri & Zdzienicka, 2012). Nevertheless, developing countries have derived immense benefits from public debt sustainability and experienced rapid economic growth due to lower interest rates from the mid-1990s to 2010 (Ferrarini & Ramayandi, 2016). Given the high demand for socio-economic development financing, public debt also scores high on many policymakers' preference list because it is unlikely to turn into bad debt.

Economic theory states that public debt can facilitate a country's economic growth. However, this is not the case with South Asian countries. Although public debt has been proven beneficial for countries with superior institutional quality (Jalles, 2011; Kim et al., 2017), South Asian countries have been accumulating public debt and performing poorly economically (Akram, 2011; Tung, 2020). Numerous debt management strategies have been implemented, including debt rescheduling, structural adjustment programmes, and debt relief initiatives; however, the region continues to experience increasing public debt and poor economic performance (Akram, 2016). Thus, there is a dire

need to address this problem to avoid the recurrence of another debt crisis like the ones that hit the region from the 1980s to 2000s.

The past decades had witnessed considerable rises in government debt, motivating numerous scholars to scrutinize the impacts of public debt on economic development. A majority of them observed that external debt poses a non-linear effect on economic growth, with clearly damaging effects after a certain debt-to-GDP ratio is reached (Kumar & Woo, 2010b; Panizza & Presbitero, 2014; Reinhart & Rogoff, 2009, 2010). After thoroughly examining the data of public debt alongside its impact on the economic growth of Asian countries from 1970 to 2015, Gunarsa et al. (2020) confirmed the reduction in economic growth by public debt. However, they found very weak evidence to support this statement; for instance, 10% increase in debt can only reduce the economic growth up to 0.2% to 0.4%. Meanwhile, several studies witnessing developing countries revealed that the effect of public debt on economic growth depends on the size of debt adopted policies and institutional quality of those countries. Cordella et al. (2010) added that countries with weak institutional quality has lower debt ratios compared to their counterparts, depending on the debt size. Likewise, Asiedu (2003) indicated the importance of institutional quality in attracting investments, stimulating growth, and benefitting from debt relief policies. Thus, it is widely agreed that good governance can facilitate effective public debt management via the reduction of borrowing costs, mitigation of financial risks, and development of domestic debt markets. Good governance can also help maintain financial stability and boost domestic financial systems.

Additionally, some other researchers have emphasised the vital role of institutional quality in explaining growth variances among countries (Acemoglu et al., 2001; Butkiewicz & Yanikkaya, 2006). Finance has a more prominent effect on economic growth when the country possesses good institutional qualities (Law et al., 2013; Law & Habibullah, 2006). Hence, there is a need to further investigate the effect of institutional quality on the link between debt and growth, especially in the South Asian context where the topic has been largely disregarded. In general, countries with good institutions have an efficient public debt management system in place (Daud & Podivinsky, 2014); in contrast, countries with bad institutions make bad borrowing decisions, channel the borrowings to

fund insignificant projects (Jalles, 2011), default on repayments, and demonstrate poor economic growth (Ciocchini et al., 2003).

Despite the availability of a large body of literature on the adverse effects of poor governance on growth (Depken & Lafountain, 2006; Tanzi & Davoodi, 2012), however the effect of institutional quality on public debt accretion recently attracted attention of researchers. Based on the notion that the poor growth of South Asian countries is caused by poor institutional quality (Tarek & Ahmed, 2017b) and massive debts (Akram, 2016), present study inspects the effect of institutional quality on public debt in the context of South Asian countries. Thereby resolving region's prominent matter, which is poor institutional quality, manifested in the forms of high corruption levels, weak rules of law, mounting social conflicts, recurrent political volatilities, and armed conflicts. Due to all these reasons, fiscal and external inequities continue to rise owing to the mounting effects of war and public debt demands.

Based on the review of relevant literature on public debt, it was found that only a handful of studies have investigated regional country-level institutional quality variances with even fewer focusing on the South Asian region. Hence, this study intends to enrich the existing body of knowledge by examining this often-overlooked region. Additionally, studies on the relationship between institutional quality and public debt have mostly concentrated on the corruption index and neglected other governance indicators. Therefore, present study also intends to investigate the effect of institutional quality on public debt via six governance indicators.

This study focuses on the effect of governance on public debt, specifically the hypothesis proposing that poor governance causes greater public debt in the context of South Asian countries. South Asian countries have faced several policy-related challenges in recent years, such as civil wars, oil price drops, decreased fiscal revenues and currency shortages, refugee crises, terrorist attacks, regional conflicts, and political shifts due to the Arab Spring. Such challenges, particularly the implications of war, oil price drops, and trade decline have caused major fiscal and external imbalances in these countries, forcing their governments to raise public debt for economic improvement and development financing. This solution exposes these countries to national and international financial shocks, with smaller countries and

emerging markets being the most vulnerable due to their less diversified economies, smaller domestic financial savings base, less efficient financial systems, and susceptibility to financial problems brought by capital flows. The 2016 Global Risks Report by the World Economic Forum ranked "failure of national government (e.g., failure of rule of law, corruption, political deadlock, etc.)" as the sixth most prospective global risk (International Monetary Fund [IMF], 2016). The current study's findings could offer governments valuable insights about the consensus concerning the soundest public debt management practices.

This paper will continue with Segment 2, which presents the literature review on governance and public debt, followed by Segment 3 on the study's methodology. Next, Segment 4 presents the empirical findings with the accompanying explanations, and finally, Segment 5 determines the study and presents the relevant implications.

2. Literature review

Keynesian and neoclassical economists have been debating the topic of public debt and its impacts since the 1930s. The neoclassical perspective deems public debt a lingering burden on subsequent generations and an impediment to national economic growth. Krugman (1988) supported this argument, stating that high public debt can discourage investments, thus stunting economic growth. When the level of public debt is higher than the level of domestic revenue generation, a country is likely to go into a debt default, which can discourage investors.

Several theories and empirical studies in the area of political economy indicate that up to a certain level, public debt can boost a country's economic performance by easing fluctuations (Barro, 1979) and re-distributing wealth (Debortoli & Nunes, 2008). Nevertheless, retaining the positive effects of public debt requires good governance. According to Kraay et al. (2010), governance entails the "traditions and institutions by which the authority in a country is exercised". Present study proposed six global governance indicators, with the ranking percentile ranging from 0 (the lowest) to 100 (the highest). A higher score indicates greater institutional quality or governance. Based on the above definition, governance involves three aspects: (a) government selection, monitoring, and replacement processes; (b) governmental capacity to develop and implement sound policies effectively; and (c) respect towards the

governing institutions that oversee the economic and social relations between the citizens and the state. Each area has two governance measures, resulting in six dimensions for determining institutional quality:

- **Voice and Accountability**: Determines the degree of citizenry participation in government selection and in the freedoms of expression, media and association.

- **Political Stability and Absence of Violence**: Identifies the possibility that a government will be ousted via unlawful means, such as politically driven violence and terrorism.

- **Government Effectiveness:** It measures the governmental capacity to formulate and execute the sound policies and deliver public goods. This measure includes public service quality indicators as well as civil service quality and its political independence.

- **Regulatory Quality:** Measures the governmental capacity to formulate and execute the sound policies and procedures to allow and encourage private sector growth. This measure gauges opinions concerning those policies.

- **Rule of Law:** Gauges opinions about the degree of agents of tolerance towards society. For instance, contract enforcement quality, property rights, the police and courts, and the possibility of crime and violence.

- **Control of Corruption**: Gauges opinions about corruption, i.e., the application of public power to gain private benefits. Private benefits entail minor and major corruption and state hold by the elites and private interests.

To answer the question of how the six components of governance influence public debt, the present study must examine the factors driving government debt in terms of quantity and composition, specifically the political and institutional reasons leading to public debt . Alesina and Tabellini (1990) and Persson and Svensson (1989) introduced the positive debt theory which proposes that increase in

public debts are solely driven by non-agreements among the politicians in office. The studies of Roubini and Sachs (1989), De Haan and Sturm (1997), and Woo (2003) also supported this notion by demonstrating the significant role of governance in public debt.

Contemporary studies find that developing countries' poor economic performance and high indebtedness are not solely caused by weak institutional quality. Inline, Jalles (2011) examined the effects of democratic accountability and corruption control on the link between debt and growth for 72 developing countries throughout 1970–2005. The author found that countries with effective debt utilisation had lower corruption levels. Kim et al. (2017) found a statistically significant effect of corruption on the link between debt and growth. Likewise, the study linking corruption, shadow economy, and government debt for the 1996–2012 period by Cooray et al. (2017) indicate that a shadow economy can aggravate the effect of corruption on public debt and that the variables are complementary of each other. The same study further proves that a shadow economy reduces tax revenue generation, leading to higher debts. Meanwhile, Daud and Podivinsky (2014) studied the linkage between economic growth, economic freedom and public debt in Malaysian context using the threshold approach and discovered that institutional quality poses contingency effects on the debt and growth relationship. Tarek and Ahmed (2017a) conducted a study on the Middle East and North Africa (MENA) region and tested the notion that poor institutional quality leads to public debt. Their findings confirm that debt is significantly driven by political stability, the absence of violence, regulatory quality, and the rule of law. The same study also proves that weak institutional quality significantly and indirectly causes poor GDP growth. Fan (2008) studied the effect of policy and institutional quality on the debt–growth link using 114 developing countries as a sample and found that the link was largely affected by both factors. Asiedu (2003) inspected the debt relief and institutional quality relationship in the context of highly indebted nations using 12 institutional measures and found that a majority of the heavily indebted countries had weaker institutions as compared to the countries with lower debts. Therefore, in order to get benefited from debt relief, it is crucial to have a certain level of institutional quality.

Even though the weak economic growth of a majority of developing countries is said to be caused by high public debts, the medium that allows such effect to take place is economic mismanagement due to weak institutional quality. Further research is needed in this often-disregarded area by concentrating on the impact of institutional quality on the linkage between debt and growth, especially in the South Asian region which has been long burdened by public debt crises. Thus, the purpose of this paper is to initiate research in this area.

3. Research methodology

3.1. Data, sources, and definitions

This study obtained its data from the databases of the "World Bank (World Databank), IMF (International Financial Statistics), and Worldwide Governance Indicators (WGI)". Data on six South Asian countries were compiled for further analysis from January 2002 to December 2018. These South Asian countries are Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. In this study, the dependent variable is the public debt to GDP ratio. Public debt entails the central public debt (accounting for over 90% of the governments' total debt). Six institutional quality measures are used in this study based on the WGI indicators, namely: 1) voice and accountability, 2) political stability and absence of violence, 3) government effectiveness, 4) regulatory quality, 5) rule of law, and 6) control of corruption. A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance (see. Table 1).

Table 1: Variable operationalization

Dependent variable		
Public debt to GDP ratio	The dependent variable is the public debt to GDP ratio, and this is defined as the central public debt, which accounts for over 90% of the government's total debt.	(Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021; Shittu, Ismail, Latiff, & Musibau, 2020)
Independent variable		
Country level institutional quality		
• Voice and accountability	A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance	(Ogunniyi, Mavrotas, Olagunju, Fadare, & Adedoyin, 2020); Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021); (Mehmood, Mohd-Rashid, & Tajuddin, 2021)
• Political stability and absence of violence	A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance	(Ogunniyi, Mavrotas, Olagunju, Fadare, & Adedoyin, 2020); Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021); (Mehmood, Mohd-Rashid, & Tajuddin, 2021)
• Government effectiveness	A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance	(Ogunniyi, Mavrotas, Olagunju, Fadare, & Adedoyin, 2020); Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021); (Mehmood, Mohd-Rashid, & Tajuddin, 2021)
• Regulatory quality	A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance	(Ogunniyi, Mavrotas, Olagunju, Fadare, & Adedoyin, 2020); Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021); (Mehmood, Mohd-Rashid, & Tajuddin, 2021)

• Rule of law	A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance	(Ogunniyi, Mavrotas, Olagunju, Fadare, & Adedoyin, 2020); Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021); (Mehmood, Mohd-Rashid, & Tajuddin, 2021)
• Control of corruption	A measurement scale from 0 (the lowest) to 100 (the highest) is used, with higher values denoting superior governance	(Ogunniyi, Mavrotas, Olagunju, Fadare, & Adedoyin, 2020); Mehmood, Mohd-Rashid, Aman-Ullah, & Zi Ong, 2021); (Mehmood, Mohd-Rashid, & Tajuddin, 2021)

This study also employs panel data analysis involving several tests, namely panel unit root, panel cointegration, and dynamic heterogeneous panel estimations, i.e., fixed effect (DFE), mean group (MG), and pooled mean group (PMG).

The model specification is as follows:

$$ln\,PD_{i,t,c} = \beta_0 + \beta_1\, lnVA_{i,t,c} + \beta_2\, lnPS_{i,t,c} + \beta_3 lnGE_{i,t,c} + \beta_4 lnRQ_{i,t,c} + \beta_5 lnRL_{i,t,c} + \beta_6 lnCC_{i,t,c} + \varepsilon$$

In the above equation, *lnPD*, refers to natural log of public debt to GDP ratio. Whereas, *lnVA* is the natural log of voice and accountability; *lnPS* is the natural log of political stability and no violence; *lnGE* refers to the natural log of government effectiveness; *lnRQ* is the natural log of regulatory quality; *lnRL* is the natural log of rule of law and lastly *lnCC* refers to the natural log of control of corruption.

3.2. Panel unit root tests

All the variables undergo panel unit root tests to ensure that spurious regression does not occur when the panel data is used. These tests are conducted mainly to solve the low power issue following the application of the Augmented Dickey-Fuller (ADF) test. According to Campbell and Perron (1991) and Ramirez (2007), estimation could be unreliable due to a low powered unit root test, i.e. when the number of time series observations is below 50. This issue can be overcome by conducting the panel unit root test, which has more power and a standard asymptotic

distribution, leading to more reliable estimations. Two methods are adopted in this study, i.e. the Levin, Lin, and Chu (LLC) method as suggested by Levin et al. (2002) and the Im, Pesaran, and Shin (IPS) method, introduced by Im et al. (2003). This study also follows the suggestions of Maddala and Wu (1999) and Choi (2001) to use a more direct and non-parametric unit root test as well as the Fisher-ADF and Fisher-PP statistics.

3.3. Panel cointegration test

Since heterogeneity exists in the panel's dynamics and error variances, following (Pedroni, 1999, 2004) the heterogeneous panel cointegration test can be used that enables cross-section inter-dependence with multiple effects is used, as shown below:

$$Y_{it} = \alpha_{it} + \delta_i t + \gamma_{1i} E_{it} + \gamma_{3i} K_{it} + \varepsilon_{it}$$

where i = 1,…, *N* refers to each country in the panel and *t* = 1,…,*T* refers to the time period. The parameters α_{it} and δ_i allow for the likelihood of country-specific fixed effects and deterministic trends, respectively. ε_{it} denotes estimated residuals, representing deviations from the long-run relationships. Since all the variables are denoted in natural logarithms, the model's γ^s parameters are referred to as elasticities.

The null hypothesis proposing no cointegration, $\rho_i = 1$ is tested by carrying out the following unit root test on the residuals:

$$\varepsilon_{it} = \rho_{i\varepsilon it-1} + w_{it}$$

There are two sets of cointegration tests, as proposed by Pedroni (1999, 2004). The first set, which is based on the within dimensional approach, consists of four panel cointegration test statistics, i.e., "panel v-statistic, panel ρ-statistic, panel PP-statistic, and panel ADF-statistic". These statistics group the autoregressive coefficients from multiple countries, for the unit root tests on the estimated residuals. The statistics incorporate the cross-country common time factors and heterogeneity. The second set of panels cointegration test is based on the between dimensional approach, which entails three panel cointegration test statistics, i.e. group ρ-statistic, group PP-statistic, and group ADF-statistic. These statistics are derived from the averages of each autoregressive coefficient linked to the

residuals' unit root tests for each panel country. The seven tests undergo asymptotic distribution as standard normal.

The proposed test by Kao (1999) is also used in this study, along with those of Pedroni's (1999, 2004). Unlike Pedroni's cointegration tests, Kao's (1999) cointegration test is calculated by pooling all the cross-section residuals in the panel. The test presumes that all the cointegrating vectors in every cross-section are identical. Kao's (1999) test is included in this study to check for robustness in addition to Pedroni's (1999, 2004) tests.

3.4. Panel estimation

The PMG estimator may produce short-run estimations entailing the intercept, the adjustment speed, and heterogeneous error variances. The long-run slope coefficient is homogenous. This method has higher efficiency and consistency in capturing the prevalence of long-run relationships. However, the error correction term's coefficient must be below 2 and negative. Additionally, the estimations must be consistent so that no serial correlations will occur in the residual of the error correction model, leading to exogenous explanatory variables. These requirements can be met by incorporating the lags (p, q) for both the dependent (p) and independent (q) variables. To use this method, the T and N sizes must be large, with T being larger than N. Pesaran et al. (1999) suggested using approximately 20–30 countries for the number of N. Next is the MG estimator as proposed by Pesaran and Smith (1995) which enables single regressions for each country and coefficient. Unlike PMG, this method is not constrained to the procedures for estimators. It can generate various long-run and short-run heterogenous coefficients for each country. Next is the dynamic fixed effect (DFE) estimator, which is very similar to PMG. It renders the vector cointegration coefficient to be similar among all the long-run panels. Besides, it confines the adjustment speed, rendering the short-run coefficient to be the same and permitting the given panel coefficient.

Below is the long-run relationship for the MG model:

$$\ln PD_{it} = \theta_i + \delta_{0i}\, lnPD_{t-1} + \delta_{1i}\, lnVA_{i,t} + \delta_{2i}\, lnPS_{i,t} + \delta_{3i} lnGE_{i,t} + \delta_{4i} lnRQ_{i,t} + \delta_{5i} lnRL_{i,t} + \delta_{6i} lnCC_{i,t} + \varepsilon_{i,t}$$

The long-run relationship for PMG and DFE models is as follows:

$$\ln PD_{it} = \mu_i + \sum_{j=1}^{p} \lambda_{ij}\, lnPD_{t-1} + \sum_{j=1}^{q} \delta_{ij}\, lnVA_{i,t-j} + \sum_{j=1}^{q} \delta_{ij}\, lnPS_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnGE_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnRQ_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnRL_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnCC_{i,t-j} + \varepsilon_{it}$$

where the number of countries is $i = 1, 2, \ldots, 6$; the number of periods is $t = \text{January } 2002 - \text{ December } 2018$; j is the optimal time lag; and μ_i is the fixed effect.

Equations 2 and 3 can be reparametrized into an error correction model, which is written as follows:

$$\Delta\ln PD_{it} = \mu_i + \varphi_i(\, lnPD_{t-1} + \lambda_1\, lnVA_{i,t} + \lambda_2\, lnPS_{i,t} + \lambda_3 lnGE_{i,t} + \lambda_4 lnRQ_{i,t} + \lambda_5 lnRL_{i,t} + \lambda_6 lnCC_{i,t}) + \sum_{j=1}^{p} \lambda_{ij}\, lnPD_{t-1} + \sum_{j=1}^{q} \delta_{ij}\, lnVA_{i,t-j} + \sum_{j=1}^{q} \delta_{ij}\, lnPS_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnGE_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnRQ_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnRL_{i,t-j} + \sum_{j=1}^{q} \delta_{ij} lnCC_{i,t-j} + \mu_{it}$$

3.5. Hausman test

This test is vital for the selection between "PMG or MG and PMG or DFE". In case the null hypothesis for PMG and MG is accepted, PMG will be chosen over MG due to the former's greater efficiency. Otherwise, MG will be chosen over PMG. Further, if the null hypothesis for PMG and DFE is accepted, PMG will be chosen over DFE. Otherwise, DFE will be chosen over PMG.

4. Results and discussion

4.1. Panel root tests

Although the panel ARDL estimation allows a mixture of I(0) and I(1) series in the model, present study performs "panel unit root tests" to ensure that none of the time series is I(2). LLC and IPS unit root tests are carried out to determine the prevalence of data stationarity for the variables of lnVA, lnPS, lnGE, lnRQ, lnRL, lnCC, and lnPD. Hence, the variables' integration order must be determined in this study. Table 2 presents the test results, which show that lnPD is stationary at level for LLC whilst the rest of the variables (lnVA, lnPS, lnGE, lnRQ, lnRL, lnCC, and lnPD) are non-stationary at level for LLC and IPS. Despite that, all the variables are stationary at first difference for both LLC and IPS, indicating a mixed integration order of (I (I) and I (0)). The panel ARDL is applicable based on the aforementioned findings.

Table 2: Unit root tests

	Levin, Lin & Chu (2002)		**Im, Pesaran & Shin (2003)**	
Level	**Constant**	**Constant & Trend**	**Constant**	**Constant & Trend**
lnPD	-1.8193**	-2.2007**	0.2127	0.3145
lnVA	-2.8128***	-1.6435*	-1.1906	0.4853
lnPS	-1.6957**	-4.0170***	-1.2725	-2.0484**
lnGE	-3.6116***	-3.4424***	-3.3432***	-2.2590**
lnRQ	-3.2083***	-0.7722	-1.7907**	1.2459
lnRL	-2.5213***	-3.8600***	-2.3866***	-2.2379**
lnCC	-3.2897***	-4.4976***	-3.1088***	-2.2869**
1st Difference				
lnPD	-7.2557***	-7.6619***	-6.0684***	-5.5633***
lnVA	-7.9516***	-9.6335***	-6.7158***	-7.0211***
lnPS	-8.1128***	-7.4244***	-6.7812***	-5.3855***
lnGE	-8.8795***	-7.3703***	-7.0078***	-4.8475***
lnRQ	-10.6749***	-14.0451***	-8.2466***	-10.7080***
lnRL	-9.4750***	-8.4720***	-8.0644***	-6.6532***
lnCC	-10.1841***	-8.1487***	-7.8512***	-6.3397***

Notes: Standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0$ .1.

4.2. Panel cointegration tests

Table 3 indicates the "panel cointegration test" estimations for Pedroni (1999, 2004) and Kao (1999). Based on Pedroni's (1999, 2004) tests, from seven panel cointegration tests, four tests rejected the null hypothesis showing no cointegration at the 5% and 10% significance levels. On the other hand, the null hypothesis of no cointegration was also strongly rejected by Kao's (1999) residual-based cointegration test, at the 1% significance level. This study, therefore, offers strong proof of cointegration among the series. Therefore, it can be projected that the variables of "voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption", and have long-run relationships with public debt. Ultimately, these results indicate that the country-level institutional quality indicators and public debt have a steady-state relationship.

Table 3: Panel cointegration tests

Pedroni (1999, 2004)				Kao (1999)	
Within dimension		Between dimension			
Test statistics:		Test statistics:		Test statistics:	
Panel v-statistic	-0.8914	Group rho-statistic	2.9789	ADF	-3.2754***
Panel rho-statistic	1.8622	Group PP-statistic	-1.5142*		
Panel PP-statistic	-1.6377*	Group ADF-statistic	-1.5774*		
Panel ADF-statistic	-1.7036**				

Notes: Standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

4.3. Panel ARDL estimations

This study uses DFE, MG, and PMG estimators to determine the relationships between public debt and country-level institutional quality indicators i.e., (voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption).

After estimating the three panel models, this study utilises the Hausman test to determine the best model that suits the nature of the data. Between PMG and DFE, the Hausman test fails to reject the null hypothesis, indicating the preference for the PMG model over the DFE model. Similarly, the Hausman test result for PMG against MG fails to reject the null hypothesis, thereby implying the preference for PMG over MG. Thus, the study proceeds to interpret the result from the PMG estimation.

Table 4 presents the Hausman test results for the DFE, MG, and PMG estimators, which suggest that political stability pose negative long-run effects on public debt. This negative correlation indicates that any percentile rank increase in political stability can lessen long-run public debt, which contradicts the results of Tarek and Ahmed (2017b).

Meanwhile, government effectiveness and the rule of law have long-term and significant positive effects on public debt. Several factors influence government effectiveness and the rule of law, including a lack of regulatory quality and policy implementation. While a lack of government effectiveness and the rule of law stifles investment efficiency, a lack of efficiency in government policies results in erroneous allocations of public resources. As a result, government effectiveness has the potential to strengthen the country through its strong borrowing power, because liberal governments are more likely to honour their debts. According to Schultz and Weingast (2003), countries that exercise their strength in government effectiveness get easy access to credit compared to their non-democratic rivals. The positive association between government effectiveness and public debt is similar to Tarek and Ahmed (2017b).

Government effectiveness and rule of law have positive correlations with the long-run public debt. This positive correlation indicates that any percentile rank increase in government effectiveness and the rule of law can increase the long-run public debt. Hence, the South Asian nations' weak economic performance can be mitigated by utilising public debt more effectively to minimise any unwanted implications on economic growth. Another takeaway from the findings is that sound institutional qualities can facilitate long-term economic growth by lowering debt levels in the South Asian region.

The absence of rule of law is one of the strong predictors of poor governance and a shadow economy. According to Schneider and Enste (2000), sometimes regulatory and bureaucratic protocols are unnecessarily complex and vague to the extent of curbing competition and operation in markets. At the same time, they also provide fertile ground for corrupt activities. In the absence of acceptable procedures, when businesses and individuals find their rights and incentives sinking with contracts violations, they start operating in the informal economy. Further, citizens will also feel defrauded in the face of widespread corruption. They start feeling that their tax money is going into the wrong hands and no accountability and rule of law exists. Friedman et al. (2000) said that once unofficial activities start growing in the market, tax revenues will decrease. It will be difficult to increase or even maintain the tax net when there is a lack of public trust in governance and the rule of law and companies are operating in a shadow economy. Johnson et al. (1997) concurred with this view, saying that "tax evasion by the shadow economy weakens a government's ability to provide public goods to the official sector". These public goods are "law and order, effective tax, regulatory institutions and public administration".

Further, control of corruption is negatively correlated to long-run public debt. This negative correlation indicates that any percentile rank increase in control of corruption can lessen long-run public debt, which contradicts the results of Tarek and Ahmed (2017b). According to Méon and Sekkat (2005), in the presence of political instability, inefficiency, and political conflict, it is difficult to control corruptions over investments, leading to higher debt in the economy. Similarly, Tanzi (1995) said that corruption supports illegitimate leaders who willingly instigate social polarization and organised crime that will damage the business environment. As the lack of control on corruption also negatively impact three fundamental pillars of a country, namely "legislative, executive, and judicial prevalence". However, it is a big challenge to measure efficiency and effectiveness in public spending due to multiple objectives and unsaleable outcomes in the market. The result states that improved country-level institutional quality can reduce the debt to GDP ratio, indicating that country-level institutional quality negatively affects public debt in South Asian nations.

In summary, the findings for political stability and control of corruption based on PMG are in line with those of DFE. The findings based on DFE

demonstrate that political stability and control of corruption are negatively significant variables. Meanwhile, the MG findings show no significant link between country-level institutional quality and long-run public debt. Finally, the findings based on PMG indicate that voice and accountability as well as regulatory quality have no significant effect on long-term public debt.

Table 4: Long-run and short-run estimation results

Variables	(1) DFE	(2) MG	(3) PMG
L.lnVA	0.1637	1.3120	0.1194
	(0.1580)	(0.9395)	(0.0979)
L.lnPS	-0.1446**	0.1205	-0.1849***
	(0.0610)	(0.2023)	(0.0441)
L.lnGE	0.3206	0.3399	0.6705***
	(0.2692)	(0.2862)	(0.1277)
L.lnRQ	0.0856	-0.1331	0.1020
	(0.1574)	(0.3175)	(0.1288)
L.lnRL	0.5261	0.6032	0.2944**
	(0.3493)	(0.6665)	(0.1274)
L.lnCC	-0.1974*	-0.1778	-0.2186***
	(0.1020)	(0.5495)	(0.0294)
Ect	-0.2829***	-0.9365***	-0.3813***
	(0.0698)	(0.1373)	(0.1295)
D.lnVA	0.0297	0.3395	0.1452
	(0.0882)	(0.4117)	(0.1642)
D.lnPS	-0.0364	0.1665	-0.0693*
	(0.0259)	(0.1149)	(0.0415)
D.lnGE	-0.0446	-0.1933	-0.0660
	(0.0912)	(0.3219)	(0.2130)
D.lnRQ	0.0756	0.0225	-0.0326
	(0.0495)	(0.1321)	(0.0697)
D.lnRL	0.1077	0.8700**	0.0858*
	(0.0875)	(0.3622)	(0.0462)
D.lnCC	-0.0373	-0.4439	-0.1755*
	(0.0449)	(0.4728)	(0.1024)
Constant		-2.4157	0.3592***
		(5.0772)	(0.1027)
Observations		96	96
Hausman test	5.6000		2.8900

Notes: Standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 4 also presents the results on the short-term effects based on DFE, MG, and PMG estimators. All three estimators show negatively significant error correction term (ECT) values, confirming the prevalence of short-run correlations. According to the findings based on DFE, country-level institutional quality has no effect on short-term public debt. Meanwhile, the findings based on MG show that voice and accountability, political stability, government effectiveness, regulatory quality, and control of corruption showed no impact on short-term public debt. On the other hand, the only rule of law has a positive significant effect on short-term public debt. Finally, the findings based on PMG show that political stability is significantly and negatively correlated to short-term public debt. In contrast, rule of law is positively related to short-term public debt, which contradicts the findings of Tarek and Ahmed (2017b). Further, the findings based on PMG show that control of corruption is significantly and negatively correlated to short-term public debt.

4.4. PMG cross-section short-run coefficients

Based on the Hausman test results, the PMG estimator is chosen over the others as it can measure the short-term impacts of country-level institutional quality indicators (i.e. voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption) on each of the sampled country's public debt. The results in Table 5 show that voice and accountability have a significant positive effect on short-term public debt for Bangladesh and Sri Lanka. However, the same indicator does not significantly affect the short-term public debt of Bhutan, India, Nepal, and Pakistan. The results also reveal the significance of political stability in reducing short-term public debt for Bangladesh and Sri Lanka, but the same variable has no significant effect for Bhutan, India, Nepal, and Pakistan. Next, government effectiveness has a significant and positive effect on the public debt of Bangladesh and Nepal but a significant and negative effect in the case of Bhutan. Regulatory quality is found to have a significant and positive effect on Bhutan's public debt but no effect for the other countries. Likewise, the rule of law has a significant and positive effect on Pakistan's public debt but no effect on the public debt of the other countries. Finally, control of corruption has a significant and negative effect on public debt in the case of Bangladesh and Sri Lanka.

Table 5: Short-run country-specific results for six South Asian countries

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
ect	-0.9203***	-0.3366**	-0.1189	-0.5903***	-0.1812**	-0.1404
	(0.2026)	(0.1452)	(0.0748)	(0.1959)	(0.0826)	(0.0967)
D.lnVA	0.8763***	-0.3122	0.0581	-0.0348	0.0301	0.2538*
	(0.2819)	(0.2584)	(0.3902)	(0.1520)	(0.1305)	(0.1372)
D.lnPS	-0.2650***	-0.0342	-0.0142	-0.0470	0.0233	-0.0789*
	(0.0500)	(0.1853)	(0.0344)	(0.0917)	(0.0197)	(0.0463)
D.lnGE	0.3899*	-1.0892***	0.0305	0.2054*	0.0788	-0.0115
	(0.2183)	(0.4042)	(0.1093)	(0.1058)	(0.1299)	(0.1258)
D.lnRQ	-0.2034	0.1730***	0.1367	-0.1733	-0.1735	0.0447
	(0.1382)	(0.0558)	(0.0980)	(0.1623)	(0.1306)	(0.1085)
D.lnRL	0.0918	0.2440	0.0459	0.0733	0.1539**	-0.0945
	(0.1211)	(0.7497)	(0.2569)	(0.0857)	(0.0771)	(0.2186)
D.lnCC	-0.1217**	-0.6289	0.0636	-0.0527	-0.0274	-0.2857***
	(0.0533)	(0.4860)	(0.1158)	(0.0817)	(0.0694)	(0.1046)
Constant	0.6741	0.5165*	0.0878	0.5570	0.1744	0.1454
	(0.6445)	(0.2872)	(0.1122)	(0.5158)	(0.1466)	(0.1480)
Observations	96	96	96	96	96	96

Notes: Standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

5. Conclusion

The global industrial revolution has brought public debt to the fore as a primary driver of industrial development for both developed and developing economies. However, countries burdened with high debts have been beset by recessions and significant losses, leading to research interest in the factors contributing to high public debt. The current study focused specifically on the factor of country-level institutional quality in the context of South Asian countries, i.e. Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka over the period from 2002 to 2018. Results of the ARDL panel analysis conducted in this study indicate that political

stability, government effectiveness, rule of law, and control of corruption affect long-run public debt in the selected South Asian countries. At the same time, political stability, rule of law, and control of corruption also affect short-term public debt in the same regional context. The majority of past research has provided evidence of the negative effect of poor governance on public debt. However, there is also evidence that poor governance has a positive effect on public debt in the context of ineffective institutions.

Based on the literature review of the institutional factors affecting public debt, it was found that only a few studies had investigated regional differences with even fewer focusing on the trends in the South Asian region. Hence, the present study's findings could be treated as complementary to the literature on the macroeconomic effects of governance and political factors on public debt. Countries in the South Asian region are burdened with massive fiscal and external imbalances caused by major policy challenges (e.g., civil wars, oil price drops, low fiscal revenues and currency shortages, refugee crises, terrorist attacks, regional conflicts, and political shifts due to the Arab Spring). Hence, governments of these countries must ensure the sustainability of their public debt growth rates through good governance. Researchers also need to conduct more empirical studies on regional government performance to facilitate the implementation of good public debt management practices in South Asia.

For the sake of policy implications, present study suggests for the continuous improvements to the governance indicators to ensure significant public debt reductions, particularly in the reviewed countries. Considering that financial stability and economic development go hand in hand with low public debt, good governance is crucial for establishing efficient regulatory frameworks, which in turn facilitate and solidify national economic growth. Towards this end, there is a crucial need to develop clear objectives, consistent policies, and long-run policy frameworks. Also, systematic assessments of the impacts and rules should be put in place to ensure that the objectives set are achieved given today's ever-changing socio-economic landscape. Such actions must be transparent and non-discriminatory.

The policy implications derived from the findings can help reinforce institutional reform agendas towards achieving sustainable growth,

particularly in emerging economies. This study's findings also trigger the need for a re-assessment of the notion that the use of financial resources alone is enough to resolve the issue of national economic underdevelopment. Additionally, the findings also serve as a wake-up call to international financial institutions that public debt has higher utility when paired with higher institutional quality.

This study offers policymakers valuable implications for the implementation of sustainable social developments. Governments that misuse public debt systems would impose the burden of accumulative debt repayments on future generations. Despite the importance of public debt in driving economic development, it is equally important to reduce overreliance on public debt due to its long-term detrimental impact on both individual livelihoods and business activities. Policymakers must be made aware that reducing public debt will also mean reducing poverty. High public debt hurts not only the disadvantaged groups but also all income groups in society. Finally, rather than borrowing, policymakers need to harness domestic financial capital to drive private economic sectors. Such a strategy will lead to long-term stability without incurring higher debts in the future.

This study is not free of limitations. It focused on the factors affecting public debt only and did not quantify the effects of public debt on macroeconomic variables such as wages, inflation, and exchange rate fluctuations. The shortcomings of this study open up avenues for further research in the future.

Acknowledgement

The authors are grateful to the anonymous referees of the journal for their extremely useful suggestions to improve the quality of the paper. The authors also would like to acknowledge their gratitude for funding from the Fundamental Research Grant Scheme FRGS/1/2018/SS01/UUM/02/7) (S/O Code: 14203) provided by the Ministry of Higher Education, Malaysia.

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