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The impact of the institutional absorptive capacity on public debt in aid-recipient MENA countries

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Abstract: Aid efficiency is contingent to the institutional framework of an economy, including governance structure and other contextual factors that affect the absorptive capacity for aid. The institutional absorptive capacity is thus a critical factor influencing fiscal imbalances and public debt levels in aid-recipient in developing economies. This paper examines the impact of the institutional absorptive capacity for aid on public debt in 12 aid-recipient MENA countries over the period 2012-2022. By integrating governance indicators with contextual non-macroeconomic elements, this paper defines the non-linear relationship between the institutional absorptive capacity and debt-to-GDP. It proposes a novel measurement for the institutional absorptive capacity, using the Principal Components Analysis method to compile the World Bank's worldwide governance indicators along with the human development index (HDI), government digitization, and access to electricity. It proposes using system one-step GMM estimation model which caters for all drawbacks of other estimation techniques. Findings show a strong negative impact of the institutional absorptive capacity for aid on public debt. The paper provides evidence-based intuition for policymakers in the MENA region, underscoring the importance of governance-driven reforms as a pathway to minimize continuous dependency on external borrowing and ensure sustainable public debt.

Keywords: *Donor aid, Government digitization, Institutional absorptive capacity for aid, Public debt, Quality of institutions.*

1. Introduction

The concept of institutional absorptive capacity has been gaining more focus as aid effectiveness is being challenged, with recipient countries entering a vicious circle of dependency on external funding to support unsustainable fiscal imbalances. The role of institutions is critical in transforming donor aid into long-term economic prosperity. This, however, is subject to many governance frameworks and contextual factors related to both donor and recipient (Rageth et al., 2021); thus, either mitigating or encouraging debt accumulation (Musa et al., 2023; Panizza & Presbitero, 2021). Public debt management demonstrates a notable challenge for aid-recipient MENA economies. Recognized for cyclical low levels of income and savings and weak financial conditions (Nelson, 1956 & Erikson, 2005; cited in Saidon & Zainal, 2019), the fiscal vulnerabilities and debt-related risks the MENA region are intensified by governance inefficiencies and constant reliance on aid. This paper analyses the interplay between public debt, donor aid, and institutional quality within the context of the absorptive capacity.

This paper is divided in 6 sections. Section (2) is the literature review. Section (3) is the methodology. Section (4) is the estimation results. Section (5) is the discussion of findings. Section (6) is the conclusion.

2. Literature Review

The institutional absorptive capacity is core player in the full employment of official donor aid and proper public finance management. The theory of absorptive capacity was developed by Cohen and Levinthal (1990) to explain the structural readiness and ability of firms to engage in new ideas and

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recognize the value of improvements and innovation (Cohen & Levinthal, 2019). It has been outstretched to adapt to non-corporate realms in the wider economic and public institutions context. This concept has been elaborated by other researchers, like (McGillivray & Feeny, 2008; Feeny & McGillivray, 2009), who study the government's ability of an aid-recipient country to optimize utilization of official donor aid in its public finance framework. The institutional absorptive capacity for aid is influenced by short-term and long-term constraints (Renzio 2005). Sound quality of institutions is as pre-condition for successful aid-backed economic policies that target growth, while aiming to reduce reliance on external funding. The theoretical framework about this interaction incorporates principles from institutional economics, political science, and development studies, highlighting how institutional quality is a vital factor in the effectiveness of aid. Foundational theories, chiefly based on the contributions of (North, 1990; Rodrik, 2007, Mosley et al., 2004; Acemoglu et al., 2005, 2012) and others assert that the quality of institutions influences the incentives and limitations governing the allocation, management, and utilization of aid. This notion is supported by the work of Abate (2022), Boateng et al. (2021), Ogbuabor et al. (2023), Udeagha & Ngepah (2022), Arvin et al. (2021), Lau & Yip (2023), Choi (2023).

Andrews et al. (2017) highlight the importance of understanding the nature, capabilities, and context-specificities of institutions to reflect on their ability to reform, which is a critical factor in strengthening institutional absorptive capacity. Zaib et al. (2023) asserts the analysis of (Rodrik et al., 2004), specifying that upon controlling for institutions, both geography and trade show weak significance on economic growth and fiscal discipline. On the other hand, Moss et al. (2008), investigating the "aid-institution paradox" contend that donor-driven initiatives must consider institutional absorptive capability to guarantee sustainability and mitigate the risks of resource mismanagement. The political economy perspective introduces a crucial aspect to the discussion, analyzing how power dynamics inside institutions affect the distribution and use of aid (Boone, 1996; Riddell, 2014). A study by (Shah et al., 2023) criticizes previous literature debating that selection bias and endogeneity may exaggerate and distort the impact of aid flows on economic growth.

Furthermore, a study by Gillani and Gillani (2023) proposes an adverse relationship between aid inflows and quality of institutions, showcasing that mismanaged aid leads to dependency by undermining the need for strengthening institutions. Studies by (Kongo, 2023; Dinca et al., 2021; Soh et al., 2021, Nguyen & Luong, 2021) show that weak institutions – manifested by lack of fiscal discipline, rent-seeking practices, lack of transparency, corruption etc. – lead to fiscal behaviours that cause an increase in public debt. This raises the question of the appetite of both debtors and creditors towards provision of foreign aid (Kranke, 2022; Gelpern et al., 2023; Dzhumashev & Hailemariam, 2021; Kim et al., 2022; Cui & Hu, 2022) and the challenges of repayment reputation particularly in countries with weak governance structures (Kranke, 2022; Cho & Rhee, 2023; Jiang & Li, 2023).

Building on this debate, there are contextual factors that affect the institutional absorptive capacity for aid, which include the human capital, access to infrastructure, and adoption of technological advancement. The Human Development Index (HDI) can be observed as proxy for the human capital, whereby the literature shows a positive impact of HDI on fiscal discipline. Access to electricity can be a proxy for infrastructural attainment, as conducive infrastructure improves institutional capacities to manage aid-funded projects (Acheampong et al., 2021; Pan et al., 2023). Government digitization, as a manifestation of adoption of technology, has a positive effect on donor aid absorption, in developing countries, as it leads to an improvement in performance of institutions and reduction in corruption (Setor et al., 2021; Surovičová et al., 2022). The absorptive capacity for donor aid is strengthened when government digitization is embedded within the institutional framework of the economy in developing countries (Dávid-Barrett & Fazekas, 2020; Adomako et al., 2021). In addition to institutional factors, persistent public debt accumulation, as shown by the works of (Bucher-Koenen, T. & Pettinicchi, 2021; Nambiar, 2021; Sahin & Sahin, 2020), is affected by other macroeconomic conditions influencing fiscal instability. These include GDP per capita, government expenditure, and military expenditure as a share of GDP. The interaction between institutional quality and contextual factors has synergistic effects that substantially affect public debt dynamics and mitigate public debt risks. Robust institutions enhance the beneficial effects of HDI, access to electricity, and government digitization, fostering a virtuous circle of enhanced governance, effective aid deployment, and sustainable debt management. Research by Aurangzaib & Fatima (2022) and Nguyen & Luong (2021) present evidence from developing economies indicating that expenditures in human capital and infrastructure have fortified institutional frameworks, hence diminishing budgetary vulnerabilities. Boateng et al. (2021) contend that the integration of these elements results in enhanced fiscal outcomes, allowing aid recipient nations to keep manageable debt levels.

Inadequate governance frameworks diminish the potential advantages of contextual factors, intensifying inefficiencies and fiscal strain. Huda (2022) and Strokan (2023) identify that insufficient institutional capacity in Central Asia hinders the efficacy of power and digitization projects, hence sustaining aid dependence and unsustainable debt patterns. Countries with poorly managed governance systems coupled with insufficient infrastructure experience elevated debt levels attributable to inefficiencies in aid absorption and fiscal management (Shittu, et al., 2020; Appiah-Kubi, et al., 2022). This necessitates correcting governance deficiencies to optimize the influence of contextual factors on public debt dynamics. Confronting these difficulties requires adopting a comprehensive strategy that encompasses investments in human capital, infrastructure, and digital technologies, in conjunction with governance reforms. Zhao et al. (2021) and Derici-Temel (2022) contend that strategic investments in institutional reforms are crucial for optimizing HDI advancements and infrastructure development in South Asia and Latin America.

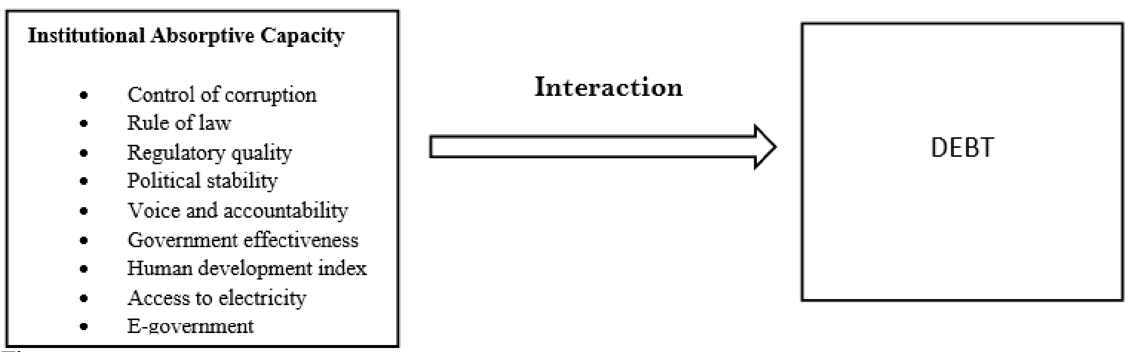

Figure 1.
Conceptual model.

Hypothesis H_1: Institutional absorptive capacity for aid positively influences the ratio of debt to GDP.

3. Methodology

This research uses a panel analysis from secondary data extracted from the World Bank (2024), International Monetary Fund (2024) and the United Nations E-Government Knowledgebase (2024), for a time span 2012 to 2022. The number of countries is N=12 and the number of years is T=11. This panel data is unbalanced, as $N \neq T$ (Zulfikar 2018). Countries covered are Algeria, Djibouti, Egypt, Iran, Iraq, Jordan, Lebanon, Mauritania, Morocco, Sudan, Tunisia and Turkey. To standardize the measurement, log transformation for each variable is used (Wooldridge 2010). It is based on the research done by (Nguyen and Luong 2021), which studied the dynamics of public debt using government expenditure and government revenue as independent variables and essential components of fiscal policy and the governance components, namely inflation and unemployment, as control variables.

In this study, the model used is indicated in the equation below:

$$LNDEBT_{it}=\beta_0+ \beta_1 LNDEBT_{it-1} + \beta_2 INTER_{it} + \beta_3 LNGDP_{it} + \beta_4 LNME_{it} + \beta_5 LNGOVEXP_{it} + \varepsilon_{it} \quad (1)$$

The dependent variable LNDEBT is the natural logarithm of debt-to-GDP. It is published yearly by the International Monetary Fund. The independent variable is INTER – the interaction term

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between an institutional absorptive capacity index (IACI) and net official donor aid (ODA) received share of GDP. The IACI is calculated as multiplying the quality of institutions index (QOI) with the vector of contextual non-macroeconomic elements affecting the absorptive capacity itself. The QOI is constructed by consolidating the six worldwide governance indicators (World Bank Worldwide Governance Indicators, 2024) using the Principal Component Analysis method. These indicators are: control of corruption, voice and accountability, rule of law, regulatory quality, Political Stability and No Violence, Government Effectiveness.

$$X = [HDI \quad Elect \quad GovDig] \tag{2}$$

$$IACI = QOI * X \tag{3}$$

$$INTER = IACI * ODA \tag{4}$$

The control variables include LN_LagDEBT which is the lag of the dependent variable and is considered as endogenous variable. It is used to capture the role of the historic trend of public debt on its status (Nguyen and Luong 2021); LNGDP which is the natural logarithm of gross domestic product per capita growth rate as annual percentage (Welde Geleta 2021); LNGOVEXP which is the natural logarithm of government expenditure (Nguyen and Luong 2021), and LNME which is the natural logarithm of military expense (Azam & Feng, 2017).

β_0 is the intercept.
β_1, β_2, β_3, β_4 and β_5 are the coefficients of each independent variable.
ε_{it} is the error term, (t) is the time and (i) is the country.

In terms of the estimation model used, it is crucial to use one-step system GMM to address the problem of unobserved heterogeneity, that is to control the endogeneity (Roodman 2009). The GMM model applies the first difference transformation and has an efficiency more than fixed and random effects estimation models. Furthermore, the GMM model is useful in unbalanced panel when the number of years (T) is small relative to the number of countries (N) (Baltagi, B. H., & Baltagi, B. H. 2008). In addition, owing to the nature of variable "Debt-to-GDP", as it has a dynamic relationship with the independent variables, it is important to use its lagged value as the independent variable. This option is allowed in the GMM model. In the MENA context, there is a lack of reliable and consistent data; therefore, we used a small sample that contains 12 countries over 11 recent years. This period marks a significant political transformation in the MENA region countries (Zaghdoudi, K., & Hakimi, A. 2017).

4. Estimation Results

According to Table 1, the descriptive statistics (Rajagopalan, 2023) show that all the variables have a mean value greater than the standard deviation.

Table 1.
Descriptive statistics.

Variables	Mean	Standard deviation	Minimum value	Maximum value
LNDEBT	3.871	0.995	0	4.875
LN_LagDEBT	3.891	0.950	0	4.875
INTER	0.181	2.247	-10.09	5.410
LNGDP	3.723	1.181	0	4.844
LNGOVEXP	3.276	0.378	2.211	3.876
LNME	3.468	1.417	0	4.787

According to Table (2), there is a positive, strong and significant correlation between the dependent variable and each of the independent variables lagged variable of debt (LN_LagDEBT), logarithm of government expenditure (LNGOVEXP). The other independent variables have an insignificant correlation with the dependent variable. There is a positive strong and significant correlation between the government expenditure and the interaction term. And there is a positive yet weak between military expenditure and government expenditure.

Table 2.
Correlation matrix.

	LNDEBT	LN_LagDEBT	INTER	LNGDP	LNGOVEXP	LNME
LNDEBT	1					
LN_Lag DEBT	0.7557*	1				
INTER	-0.0747	-0.0869	1			
LNGDP	0.0447	0.0412	-0.1177	1		
LNGOVEXP	0.5018*	0.4237*	0.6063*	0.0553	1	
LNME	0.1022	0.094	-0.0636	0.2557*	0.2210*	1

Note: (*) the significance level at 5%.

Table (3) shows that, given the nature of the model where number of years T is small and the number of countries N is large in a panel dataset, the Generalized Method of Moments (GMM) gives the best results (Arellano and Bond 1991), as the sample size is inefficient in the other dynamic panel models such as ARDL model. Also, the GMM is characterized by a lagged dependent variable and cross section-specific unobserved heterogeneity. It controls the endogeneity and addresses heteroskedasticity (Lu & Wooldridge, 2020). After catering for the pros and cons of other estimation techniques (Bond, 2001), the one-step system GMM was used, whereby most estimators showed a positive impact of the lagged value of debt on the current debt ratio. Likewise, the increase in military expenditures leads to an increase in debt ratio. Military expenditure (LNME) continues to show a positive and significant impact (p=0.031). In turn, the introduction of interaction term (INTER) led to a decrease in the debt ratio in the countries of MENA region, as it retained a negative and significant relationship with the debt-to-GDP ratio (p=0.002). This result exhibits that improving the quality of institutions improves aid effectiveness and reduces the debt burden through mitigating fiscal risks (Adomako et al., 2021).

Table 3.
Coefficient of estimation models - dependent variable logarithm of debt (LNDEBT).

Variables	**Pooled OLS**	**Fixed effect model**	**Difference GMM one-step**	**Difference GMM twostep**	**System GMM one-step**	**System GMM two-step**
LLNDEBT	1.026*** (0.000)	0.659*** (0.000)	0.669*** (0.000)	0.691 (0.282)	0.729** (0.001)	0.888* (0.029)
INTER	0.0024 (0.824)	-0.006** (0.008)	-0.007*** (0.000)	-0.278 (0.381)	-0.008** (0.002)	0.142 (0.510)
LNGDP	0.002 (0.752)	-0.004 (0.570)	-0.005 (0.454)	0.116 (0.246)	-0.002 (0.769)	0.029 (0.674)
LNGOVEXP	-0.026 (0835)	0.002 (0.982)	-0.030 (0.786)	2.214 (0.237)	-0.0004 (0.997)	0.574 (0.522)
LNME	0.421* (0.029)	0.1543* (0.034)	0.160*** (0.000)	-0.111 (0.828)	0.155* (0.031)	0.039 (0.826)
Constant	-0.181 (0.754)	0.946 (0.060)	0.993* (0.034)	-6.247 (0.155)		
Diagnostic tests						
Multicollinearity Variance inflation	1.96					

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factor (VIF)						
Serial correlation H_0: There is no serial correlation	(0.0830)				AR (1):0.176 AR(2): 0.249	AR(1):0.458 AR(2): 0.261
Heteroskedasticity H_0: Data is homoscedastic	(0.000)					
Sargan (P-value) H_0: Instruments used are valid			0.2189	1	0.203	0.203
P-value of F statistic	(0.0000)	(0.0000)	(0.0000)	(0.0830)	(0.0000)	
R squared	0.9563	0.8229				

Note: *, **, *** are the significance level at 5%, 1% and 0.1% respectively. *Values in parentheses are the p-values. *One-step GMM estimator with robust standard error.

The results of the different estimation methodologies used present arguments for three economic aspects which align with existing literature. First is the cyclical nature of public debt in the MENA region, whereby breaking the persistence of public debt requires prudent fiscal reforms aiming at achieving budget surpluses. Second, institutional governance reforms are instrumental in the reduction of fiscal vulnerabilities and public debt burden as a strong institutional absorptive capacity for aid allows for the alignment between national development goals and donor aid inflows. Third, the trade-off between military expenditure and public debt in MENA countries is a critical factor in public finance management aiming at ensuring the necessary fiscal space for developmental public expenditure.

5. Discussion of Findings

The findings of this research prove that the public debt in the MENA region is shaped by previous debt dynamics, institutional quality, and choices of fiscal policy. Governance reforms and prudent fiscal strategies are crucial in addressing persistence of debt and aid effectiveness optimization. The synergic relationship between current and previous levels of public debt aligns with the debt overhand theory of fiscal policy, as proposed by (Krugman 1988); whereby persistent high levels of public debt crowd-out investment in growth-prone public expenditure and economic activity. This leads to highlighting the crucial role of fiscal policy reform to maintain surpluses whereby government revenues surpassing government expenditure, to reverse the escalating dynamics of public debt (Panizza & Presbitero, 2021). However, this research navigates further into public finance theories by examining the impact of institutional governance and foreign aid inflows on the fiscal dynamics within the context of the MENA region, thus presenting new understanding of regional economic discipline.

This research finds out that military expenditure significantly shapes the public debt profile in the MENA region. Military expenditure, particularly that funded by external borrowing, is considered an unproductive kind of expenditure which creates more strain on public finance. This finding aligns with recent research showing the inverse relationship between military spending and development while amplifying the debt burden (Harutyunyan, 2023). Military expenditure crowds out productive investments, which in turn support economic growth and reduce debt dependency, ceteris paribus, as shown in previous studies by (Gönül-Sezer & Demirel, 2023; (Xu et al., 2021), confirming the necessity of prioritizing debt sustainability over unproductive military spending. The findings of this research also posit that while military expenditure, being a component of government expenditure, thus contributes to GDP growth rate in the MENA region; however, this advantage paradoxically does not sufficiently counterbalance the straining pressure it puts on the national fiscal balance.

This research also highlights a synergetic relationship between quality of institutions and donor aid in diminishing the public debt burden in MENA countries. More specifically it shows a strong inverse impact of the interaction term between the quality of institutions and donor aid on public debt, by enhancing aid efficiency. Better institutional absorptive capacity for aid reduces public debt levels, as the institutional good governance acts as a catalyst for fiscal soundness. The interaction stresses on the ability of good governance to foster the capacity to manage donor aid effectively. Recent studies affirm this finding (Oppong et al., 2023; Maruta et al., 2020). However, there is no universal consent on this notion. Recent research highlights contexts where high performing institutions paradoxically increase their debt exposure, by encouraging governments to increase their borrowing based on their repayment reliability (Panizza & Presbitero, 2021; Ma & Qamruzzaman, 2022). This divergence in practices puts forward the need to balance the credibility of institutions with fiscal prudence, as uncontrolled dependence on observed exposes public finance sustainability to high risks of vulnerability. Along the same lines, findings of this research shed light on the impact of institutional absorptive capcity for aid on public debt in aid-recipient MENA countries. The inverse connection between public debt and institutional absorptive capacity suggests that investing in strengthening institutions and reducing the constraints of absorptive capacity leads to better fiscal discipline. These findings support the literature (Lee et al., 2023; Oppong et al., 2023). The findings give evidence-based insights for policymakers to impose robust institutional reforms and good governance practices to reduce the debt burden. These results affirm the findings of (Kaufmann et al., 2009; Kharas & Dooley, 2021; Nikonov et al., 2023; Luu et al., 2023; Elbadawi & Makdisi, 2010).

Moreover, there is a positive, weak and significant correlation between the logarithm of GDP per capita (LNGDP) and the logarithm of military expenditure (LNME). The positive relationship can be explained by the assumption that military expenditure is generally part of government expenditure, which in turn contributes to the structure of the gross domestic product. Hence, a change in military expenditure is associated with a change in GDP per capita, moving in the same direction. The weakness of this relationship can be attributed to contextual factors affecting the nature of funding for military expenditure. Conversely, a positive strong and significant association occurs between the government expenditure and the interaction term. This finding can be inferred as having a strong institutional capacity allows for effective official donor aid management, enabling efficient and effective utilization of aid resources through focused government expenditure.

6. Conclusion

This research contributes to the literature by examining an understudied yet important topic in the MENA region, which is the role of institutional absorptive capacity in managing public debt. By integrating governance indicators with the contextual non-macroeconomic elements, this study provides a nuanced perspective that reflects the region's unique context. The findings complement and expand upon existing research in other contexts (Alshammary et al., 2020; Aurangzaib & Fatima, 2022; Nguyen & Luong, 2021), offering a model that can be adapted for comparative studies across different regions.

It contributed significantly to the literature by constructing a novel index to measure the institutional absorptive capacity for aid. This research addressed the gap in the literature by constructing a novel measurement for the institutional absorptive capacity, consolidating governance indicators with contextual non-macroeconomic factors, using Principal Component Analysis to reduce the dimensions of observation. Unlike previous research which analyses the quality of institutions using isolated governance indicators (Nguyen and Luong 2021), this approach brings a comprehensive framework to navigating into the intricate relationship among public debt management, donor aid, and institutional quality. It thus confirms the findings of previous studies showcasing the critical role of institutional robustness in decreasing public debt (Oppong et al., 2023; Aurangzaib & Fatima, 2022).

This research provides a strong argument to policymakers in aid-recipient MENA countries on the importance of strategizing and implementing structural reforms. Holistic strategies prioritizing institutional reform are needed to improve the institutional absorptive capacity for aid, thus enhance aid utilization efficacy; allowing governments to align aid inflows with national developmental priorities.

This approach strengthens fiscal discipline, which is a critical factor in debt management in fragile economies.

In conclusion, this research enhances the validity of public debt theories by emphasizing the critical role of institutional absorptive capacity in public debt management in the MENA region. It also identifies domains of divergence from mainstream economic theories, with supporting evidence based on distinct political economy contexts. It paves the way for future research to further examine the dynamic interplay of institutional reforms, aid inflows, and macroeconomic conditions. Country-specific analysis is proposed to uncover patterns related to the challenges associated with the varying institutional capacities on public finance management in the MENA region. Also, in-depth research is recommended to explore situations where institutional credibility is associated with an increase in borrowing.

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