

## The Impact of Corruption on Military Spending in the Asia-Pacific Region

Jason C. PATALINGHUG

<https://orcid.org/0000-0002-1965-4843>

Department of Economics

Southern Connecticut State University<sup>1</sup>, USA

[patalinghuj1@southernct.edu](mailto:patalinghuj1@southernct.edu)

### Article's history:

Received 5<sup>th</sup> of April, 2025; Received in revised form 29<sup>th</sup> of April, 2025; Accepted 12<sup>th</sup> of May, 2025; Available online: 22<sup>nd</sup> of June, 2025. Published as article in the Volume XX, Summer, Issue 2(88), 2025.

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### Suggested citation:

Patalinghug, J. C. (2025). The impact of corruption on military spending in the Asia-Pacific region. *Journal of Applied Economic Sciences*, Volume XX, Summer, 2(88), 232 – 243. [https://doi.org/10.57017/jaes.v20.2\(88\).05](https://doi.org/10.57017/jaes.v20.2(88).05)

### Abstract

This study examines the relationship between corruption and military spending in the Asia-Pacific region. Using key governance indicators from the World Bank - specifically control of corruption, political stability, and rule of law - it assesses governance quality across nations. Employing econometric techniques, the research explores whether countries with stronger governance tend to spend more or less on their military. Additionally, it analyses how corruption, as a critical governance factor, influences defence expenditures in the region. The findings of this research contribute to a deeper understanding of the factors influencing military spending decisions in the Asia-Pacific context, seeking to understand the economic and political dynamics shaping defence expenditure patterns in the region. This study contributes to the broader discourse on the intersection of governance quality, corruption, and national security.

**Keywords:** military spending, corruption, panel data, fixed effects, Asia-Pacific.

**JEL Classification:** H10; H50; H56.

### Introduction

The Asia-Pacific region has witnessed important economic growth in recent decades, accompanied by a notable increase in military spending among major nations. This growth in defence expenditures has raised concerns about an arms race in the region. Concurrently, research has increasingly emphasized the crucial role of good governance in fostering economic development. Several studies have highlighted the negative impact of corruption on economic performance, demonstrating how it can undermine institutions, distort resource allocation, and hinder economic growth.

This study examines the impact of corruption on military spending in the Asia-Pacific region. It builds on the model developed by Gupta et al. (2001) but adapts its framework to focus specifically on corruption within this regional context. Unlike Gupta et al. (2001), which takes a broader approach, this paper narrows its analysis to the unique governance and economic dynamics of the Asia-Pacific.

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<sup>1</sup> 501 Crescent St. New Haven, CT 06515, USA

This paper expands upon this research by investigating the specific relationship between corruption and military spending within the Asia-Pacific context. By utilizing governance indicators developed by the World Bank, including control of corruption, political stability, and rule of law, this research aims to empirically examine whether higher levels of corruption are associated with increased or decreased military expenditure in the region. The analysis will explore potential mechanisms through which corruption might influence defence spending, such as rent-seeking behaviour, opaque procurement processes, and the diversion of funds intended for development. Furthermore, the study will consider the potential moderating effects of other factors, such as geopolitical tensions, economic growth, and regional security dynamics, on the relationship between corruption and military spending.

The paper is structured as follows. Section 1 provides a review of related literature. Section 2 explains the empirical model of this paper. Section 3 provides an explanation of the data and variables used in this study as well as where the data for this study comes from. Section 4 shows the estimation results of the paper and last Section provides the conclusion to this study.

### 1. Review of Related Literature

The literature on corruption can be divided into two main areas. The first deals with what are the determinants of corruption. The second deals with the consequences of corruption. Bardhan (1997) defines corruption as the use of public office for private gains. Klitgaard (1988) defines corruption as when someone illegally does something to benefit himself at the expense of the interests of the ideals and people he is sworn to serve while Schleifer & Vishny's (1993) definition of corruption is government property being put to sale by government officials for their own personal gain. Dreher et al. (2007) utilized a corruption model that tackles both the indicators and causes corruption simultaneously within a framework that is unified.

Kimenyi & Mbaku (1996) found a negative relationship between the amount of democracy in developing countries and transfers to the military. They state that development programs of international agencies are bound to have limited success as long as the military elites control power. Tanzi & Davoodi (1998) posted about 15% of total expenditures on arms purchases could be attributed to bribes while Hines (1995) wrote that military aircraft purchases are prone to corruption. Mauro (1995) stated that corruption lowers investment growth which thus slows down economic growth. Akçay (2006) found empirical evidence that more corrupt countries have lower levels of human development.

Gupta et al. (2001) wrote that corruption is affected by both supply-side and demand-side considerations. The supply side considerations mentioned are bribery by foreign suppliers and the increased competition for arms sales after the end of the Cold War. The demand-side considerations are: (1) the government is the sole provider of defence services thus there is limited competition which promotes rent seeking, (2) the secrecy surrounding military purchases promotes corruption, (3) the amount of defence assets (e.g., land) is huge and this creates more opportunity for corruption and (4) military projects usually use up a lot of capital which thus make it likelier for firms to give bribes to officials.

Gupta et al. (2001) showed that corruption is associated with higher military spending as a share of gross domestic product (GDP) and total government expenditures, and with larger budget outlays in relation to both GDP and government spending. Aizenman & Glick (2006) found that corruption has a negative effect on economic growth and that there is a nonlinear relationship between military spending, corruption and growth. A paper by D'Agostino et al. (2012) confirms the findings of Aizenman & Glick. Their paper uses a model of endogenous growth that enables corruption to work on economic growth through the interactions between civilian spending and the military sector. They then estimated this model on a panel dataset of African nations over the years 2003 to 2007. Their results confirm the forecasts of the endogenous growth model that while government investment spending boosts economic growth, huge military burdens, increased levels of government expenditures and a high level of corruption can diminish it.

Pieroni & d'Agostino (2008) showed that there exists a strong relationship between the military and corruption for nations with a higher share of military expenditure to gross domestic product. Their paper introduced an interaction variable between each country's military burden and the corruption index which enabled them to estimate gross and indirect elasticities of the military and corruption with respect to economic growth. Their findings support their premise that, regardless of the influence of corruption, a decrease in the share of military spending to gross domestic product could significantly boost the economic performance of a country.

Pieroni (2009) investigated the relationship between military expenditure and economic growth. He does this by creating an economic growth model with endogenous technology that includes the impacts of the shares of civilian and military components of government expenditure. His results confirm the negative effect that military spending has on economic growth which is found throughout the literature.

Delavallade (2006) used a three stage least squares model to estimate a system of simultaneous equations. She showed that corruption reduces social expenditures like education, health care, and social protection programs and increases spending on defence, fuel and energy and law enforcement.

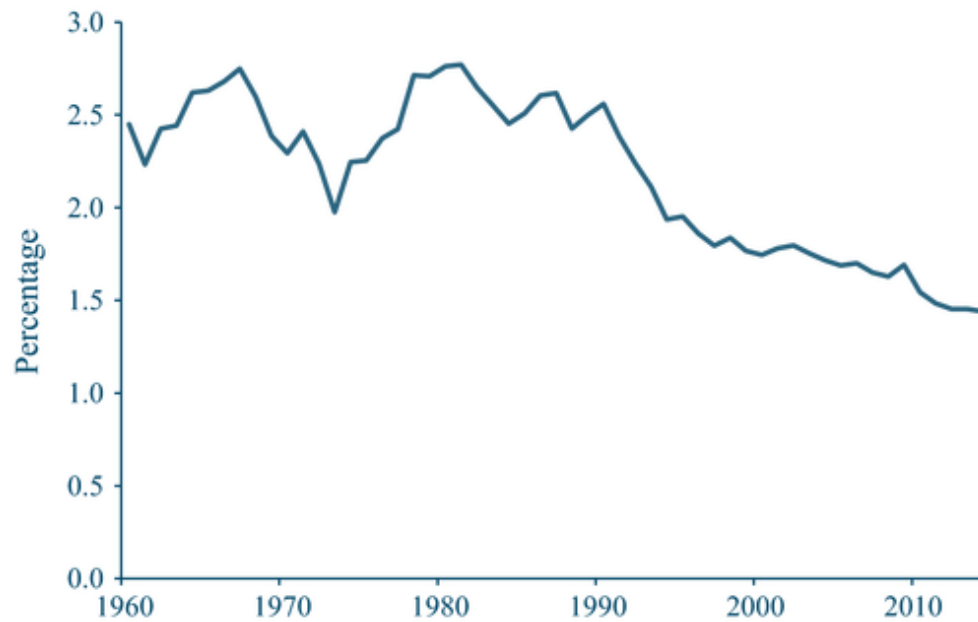
Dunne et al. (2005) goes over some of the issues that go with growth models that have military spending as a variable. They stated that the literature on economic growth did not find military spending to be a significant factor when it comes to growth. However, the literature on defence economics did find that military spending has a significant effect on growth. They argue that the reason for this discrepancy is the Feder-Ram model which is widely used in defence economics but not by the mainstream literature.

D'Agostino et al. (2016) look at how government spending and corruption affect economic growth. Using data from 22 African countries for the period 1996-2007 and a GMM model, they found the interaction between military burden and corruption has a strong influence on economic growth while the interaction of corruption and government investment expenditure has a weaker influence on economic growth.

Sandler & George (2016) conducted a comprehensive analysis of military expenditure trends from 1960 to 2014, aiming to identify key shifts in global defence spending before and after the Cold War. Their study examined the influence of major geopolitical and economic events, including the Cold War, the September 11 attacks, and the 2008 financial crisis, on military budgets across different regions. Their findings revealed that global military spending, as a share of GDP, experienced a significant decline after the Cold War ended in 1990. This reduction was particularly evident among NATO countries and other Western nations, where defence budgets were scaled back due to reduced geopolitical tensions and shifting economic priorities. However, the study also highlighted contrasting trends in other regions. Military expenditures in the Asia-Pacific and Middle East and North Africa (MENA) regions steadily increased, reflecting rising security concerns, regional conflicts, and economic growth that allowed for greater investment in defence.

Figure 1 illustrates the median share of GDP allocated to defence spending over time. The data indicate a noticeable decrease in military expenditure following the end of the Cold War. However, this trend is not universal. Major global powers, including the United States, China, and Russia, have continued to maintain or even increase their military spending due to strategic interests, geopolitical rivalries, and security commitments. Additionally, countries experiencing ongoing regional tensions, such as Greece and Turkey, have also sustained high levels of defence expenditure relative to their GDP, largely driven by mutual security concerns and historical conflicts.

Figure 1: Median share of GDP devoted to defence, 1960–2014



Source: Sandler & George (2016)

Yakovlev (2007) used Arellano–Bond GMM estimators, random effects and fixed effects to investigate the effects of military expenditures, arms sales, and the interaction between them in a balanced panel dataset of 28 countries during the period 1965–2000. His findings showed that an increase in military expenditures or an increase in net arms exports would then lead a decrease in economic growth, but an increase in military expenditures is not as damaging to growth when a nation is a net exporter of arms.

Arif et al. (2019) studied the how corruption affects military expenditures. They divided their dataset of 97 countries using the period 1997 to 2015 into three income groups (low-income, middle income and high income). Using a system generalized method of moments (SGMM) model, they found that corruption helps increase the defence budget of developed countries, but it contributes to decreasing the defence budgets of developing countries.

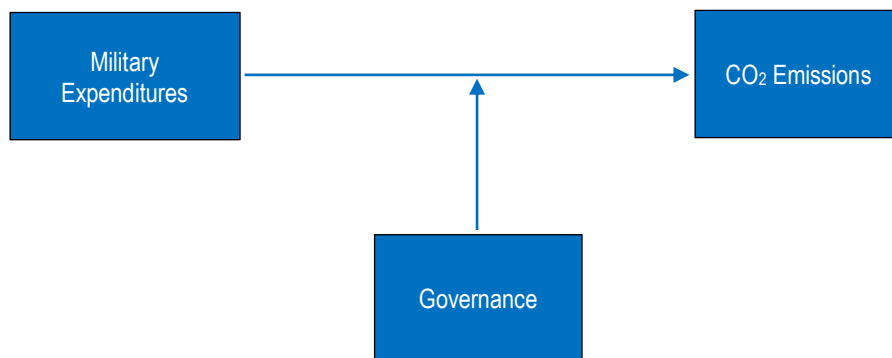
Dramane (2021) examined how the size of government spending affects the corruption level in countries in Sub-Saharan Africa. He used annual panel data on 39 African nations during the years 2000 to 2017, as well as a fixed effects model and instrumental variables, and he found that public health expenditure and government final consumption expenditure have a negative relationship with the corruption level while military spending has a positive relationship with the corruption level.

Goel & Saunoris (2016) studied the effect of military build-ups on corruption. Using a cross-national data set of 130 countries over the period 1990-2011 and a two-step GMM model, they found that higher military build-ups result in an increase in corruption across all specifications in their study.

Tran Pham (2024) used a GMM model and a dataset of 30 Asian countries during the period 1995-2017 to investigate the effect of military spending and corruption on the informal economy. He found that there is a negative relationship between military spending and the informal economy and that a greater degree of corruption helps mitigate those negative effects.

Increased military spending can also have environmental consequences. Asongu & Ndour (2023) studied the effects of military spending and the quality of governance on carbon dioxide (CO<sub>2</sub>) emissions in Africa. Using a GMM model and panel data that covers 40 African countries during the period of 2010-2020, they found that military expenditures have a positive and significant effect on CO<sub>2</sub> emissions while good governance decreases the positive effects that military expenditures have on CO<sub>2</sub> emissions. A lower quality of governance caused by corruption thus will exacerbate the negative environmental effects of military spending. The relationship between CO<sub>2</sub> emissions, military spending and the quality of governance is shown in Figure 2.

Figure 2: Interrelationships between military expenditure, governance, and CO<sub>2</sub> emissions

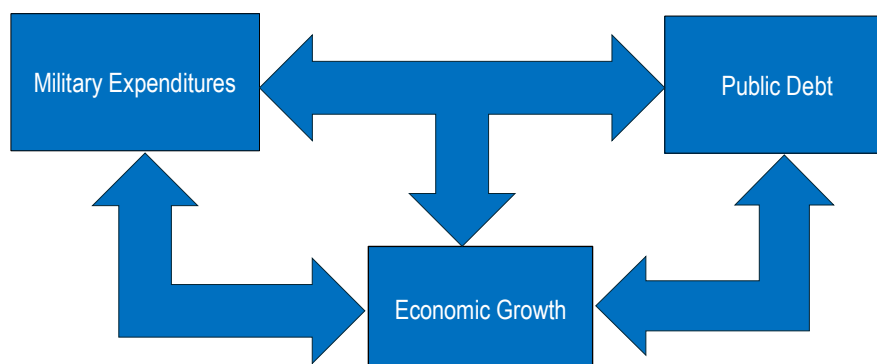


Source: Asongu & Ndour (2023)

Kengdo (2023) examines the effect of military spending and public debt on economic growth in Cameroon during the period 1980-2021. Using an autoregressive distributed lag (ARDL) model and time series data, he found that both military spending and public debt hurt economic growth in both the short run and the long run. Figure 2 shows the interrelationships between military spending, public debt, and economic growth and is based on the work of Kengdo (2023), Dudzevičiūtė et al. (2021) and Karagol (2005).

Figure 3 illustrates that there are two ways that military spending can affect public debt. First, military spending can put pressure on government revenues which thus lead to more borrowing. Second, military spending can have an effect on public debt if a country is a net importer of arms and needs other resources to pay for these imports. The two ways in which military spending affect public debt thus in turn have an effect on economic growth. Similarly, Bazie et al. (2024) found that corruption leads to higher military spending in sub-Saharan African countries.

Figure 3: Interrelationships between military spending, public debt, and economic growth



Source: Kengdo (2023)

## 2. Empirical Model

Gupta et al. (2001) proposed that national income (Y) is composed of consumption (C) and government expenditures (G). They assumed no private investment so that  $Y = C + G$ . Government expenditures are then classified as either military (M) or non-military (N) expenditures so that  $G = M + N$ . They used the following empirical model in estimating the effects of corruption on military spending which is seen in equation (1) below:

$$\left(\frac{M}{Y}\right)_i(t) = \theta_0 + \theta_1 R_i(t) + \theta_2 C_i(t) + \varepsilon_i(t) \quad (1)$$

where:  $t$  is a time index and  $i$  represents a country,  $M/Y_i(t)$  is the ratio of military spending (M) to GDP (Y),  $R_i(t)$  is a corruption indicator,  $C_i(t)$  is a vector of controls and  $\varepsilon_i$  is an error term.

The empirical model that will be used in this paper is modified from the study of Gupta et al. (2001). It is specified as follows:

$$M/Y = \beta_0 + \beta_1 GDPPC + \beta_2 URBAN + \beta_3 GOVGDP + \beta_4 CORRUPT + \beta_5 AGE + \mu_t \quad (2)$$

where:  $M/Y$  = Dependent variable that measures the ratio of military expenditures to government spending or gross domestic product (GDP);  $GDPPC$  = Real per capital GDP in purchasing power parity (PPP) terms;  $URBAN$  = Urban population as a percentage of a country's total population;  $GOVGDP$  = Government expenditures as a percentage of GDP;  $CORRUPT$  = Control of corruption percentile rank;  $AGE$  = Ratio of dependents (those who are 15 and under or 64 and older) to the working age (ages 15-64) population;  $\mu_t$  = error term.

Both the dependent and independent variables in equation (2) are expressed in logarithms.  $GDPPC$ ,  $URBAN$  and  $AGE$  are our control variables. According to Gupta et al. (2001),  $GDPPC$  is a scale variable,  $URBAN$  and  $AGE$  represent the demand for public goods and services and  $GOVGDP$  is a variable that is usually included in studies on military expenditure. We have four variables representing the dependent variable  $M/Y$ . The first is  $MILGOV$  which is the ratio of military expenditures to government expenditures. The second is  $MILGDP$  which is the ratio of military expenditures to GDP. The third is  $ARMS1$  which is the ratio of arms imports to gross domestic product. Lastly, we have  $ARMS2$  which is the ratio of arms imports to government expenditures. There will be two specifications for each of the four dependent variables. The first specification will use pooled ordinary least squares (OLS) while the second will use a fixed effects estimator. The corruption indicator used in this paper is the control for corruption measure which is one of the six governance indicators formulated by the World Bank.

## 3. Data and Variables Used

The data used in this study comes from the World Development Indicators (WDI) published by the World Bank. The corruption variable used in this study is the control for corruption percentile rank which comes from the World Bank World Governance Indicators (WGI) website. This study will be using annual panel data for 35 countries in the Asia-Pacific region for the period 2019-2023. This region encompasses countries from East Asia, Southeast Asia, South Asia, Central Asia, West Asia and Oceania. There are therefore 175 observations. The control for corruption indicator rates countries on a scale of -2.5 to 2.5 where 2.5 means least corrupt and -2.5 means most corrupt. For this study we shall use the percentile ranks instead of the raw scores. The data gathered includes military expenditures as a percentage of GDP, military expenditures as a percentage of total government spending, arms imports, real GDP, total government expenditures, urban population as a percent of total population of a country, age dependency ratio, general government final consumption expenditure as a percentage of GDP, and GDP per capita (PPP, in constant 2021 international dollars).

Arms imports are defined as Stockholm International Peace Research Institute (SIPRI) Trend Indicator Values (TIV) expressed in millions of US Dollars. ARMS1 is derived by dividing arms imports by the real GDP (in constant 2015 USD) of each country. ARMS2 is derived by dividing arms imports by the general government final consumption expenditures (in constant 2015 USD) of each country. The AGE variable is the age dependency ratio which represents the ratio of dependents (people younger than 15 or older than 64) to the working-age population (people aged 15-64). This data is presented as the proportion of dependents per 100 working-age population. Table 1 provides the list of countries used in this study; Table 2 provides definitions of the variables used in this study and Table 3 provides descriptive statistics of the variables in this paper.

Table 1: List of countries in the dataset

Afghanistan	Israel	New Zealand
Australia	Japan	Oman
Bahrain	Jordan	Pakistan
Bangladesh	Kazakhstan	Papua New Guinea
Brunei	Korea, Rep.	Philippines
Cambodia	Kuwait	Saudi Arabia
China	Kyrgyzstan	Singapore
Fiji	Lebanon	Sri Lanka
India	Malaysia	Tajikistan
Indonesia	Mongolia	Thailand
Iran	Myanmar	Timor-Leste
Iraq	Nepal	

Table 2: Variable definitions

Variable	Description
ARMS1	Ratio of Arms Imports to GDP
ARMS2	Ratio of Arms Imports to Government Expenditures
MILGOV	Military Expenditures as a Percentage of Government Expenditures
MILGDP	Military Expenditures as a Percentage of GDP
GDPPC	Real per capita GDP in PPP Terms
URBAN	Urban Population as a Percentage of Total Population
GOVGDP	Ratio of Government Expenditure to GDP
CORRUPT	Control of Corruption (Percentile Rank)
AGE	Age Dependency Ratio (% of Working Population)

Table 3: Descriptive statistics

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Count
ARMS1	0.0031	0.0005	0.0077	0	0.0551	174
ARMS2	0.0226	0.0045	0.0522	0	0.2803	138
MILGOV	8.6136	7.8750	5.6100	1.41	24.0400	172
MILGDP	2.4730	1.9100	1.8098	0.31	8.9100	173
GDPPC	26,580.8634	14,356.6450	26,529.2626	1981.71	132,468.9300	174
URBAN	60.9406	62.5100	26.8237	13.25	100.0000	175
GOVGDP	16.1157	15.6800	7.5903	2.36	52.9200	154
CORRUPT	45.7182	43.3300	28.0032	4.76	100.0000	175
AGE	52.8487	53.6100	12.8822	27.48	88.5100	175

#### 4. Results

Aizenman & Glick (2006) stated that corruption may be considered as taxation on fiscal spending. The main hypothesis of this paper is that an increase in corruption leads to an increase in military spending which is similar to Gupta et al.'s (2001) findings. Therefore, we expect a negative relationship between military expenditures and the corruption indicator since a higher value of the variable on corruption implies that a nation has a lower level of corruption. A significant value for the corruption indicator means that corruption plays a role in determining government expenditures in the region. As indicated earlier, four dependent variables will be tested: (1) the ratio of military expenditures to government spending (MILGOV), (2) the ratio of military expenditures to GDP (MILGDP), (3) the ratio of arms imports to GDP (ARMS1) and (4) the ratio of arms imports to government expenditures (ARMS2). Each of these four dependent variables will have two specifications, one which uses pooled OLS and another which has country fixed effects.

Table 4 shows the results with MILGOV and MILGDP as the dependent variables. Specifications 1 and 3 use pooled OLS while specification 2 and 4 use fixed effects. We see that corruption (CORRUPT) has a negative and significant effect (at the 0.01 level) on ratio of military expenditures to GDP (MILGDP) for both the pooled OLS and fixed effects models (specifications 1 and 2). We therefore get the expected sign for these two equations. The ratio of government spending to GDP (GOVGDP) is positive and significant at the 0.01 level for both specifications 1 and 2. This implies that a rise in the share of government spending in GDP will result in the rise in the share of military spending in GDP. Meanwhile, the age dependency ratio (AGE) is negative and significant at the 0.01 level in specification 1.

Corruption is negative and significant at the 0.01 level in specification 3 which is a pooled OLS equation. This means that corruption has a negative and significant effect on the ratio of military expenditures to government spending (MILGOV). However, corruption is not significant in specification 4 which uses MILGOV as its dependent variable and a fixed effects model. AGE is also negative and significant at the 0.01 level for specification 3 but is insignificant in specification 4.

Table 5 shows the results with ARMS1 and ARMS2 as the dependent variable. Specifications 5 and 7 use pooled OLS while specification 6 and 8 use fixed effects. None of the independent variables in specification 5 are significant while URBAN is the only significant variable in specification 6. AGE is positive and significant at the 0.05 level in specification 7 while corruption is negative and significant at the 0.10 level in specification 8.

To test the relationship of military spending with corruption we first do a regression without any control variables. Regressing military expenditures with only the corruption indicator we find the corruption indicator significant at the 5% level for both specifications (see Table 1 and Table 2). The F-values for both regressions are also significant at the 5% level. However, they both suffer from low R<sup>2</sup> values. The White and Breusch-Pagan (BP) tests show no heteroscedasticity. The coefficients for corruption are also positive which is different from what was expected of them. It suggests positive relationship between the corruption indicator and military spending which implies a negative relationship between corruption and military spending since the higher the value of the corruption indicator, the less corrupt the country is.

Table 4. Panel regression results. Dependent variable: MILGDP and MILGOV

Coefficients Standard Errors in ( )	Dependent Variable: MILGDP		Dependent Variable: MILGOV	
	(1)	(2)	(3)	(4)
Constant	2.4097 (1.4804)	8.4050* (5.0601)	6.1276*** (1.4933)	9.8054* (5.3726)
GDPPC	0.0933 (0.1179)	-0.1652 (0.2163)	0.0882 (0.1189)	0.0450 (0.2296)
URBAN	0.1758 (0.1682)	-1.3595 (0.9983)	.19455 (0.1697)	-1.3424 (1.0599)
GOVGDP	0.4331*** (0.1141401)	0.2593*** (0.0805)	-0.0258 (0.1151)	0.0722 (0.0854)
CORRUPT	-0.2995*** (0.1006)	-0.4193*** (0.1392)	-0.3539*** (0.1015)	-0.1164 (0.1478)
AGE	-0.8734*** (0.2517)	0.0545 (0.5826)	-1.1412*** (0.2539)	-0.6752 (0.6186)
No. of obs.	152	152	152	152
Model	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
F-stat	9.85	5.12	9.69	0.73

Note: \*Significant at the 10% level; \*\*Significant at the 5% level; \*\*\*Significant at the 1% level; All variables are defined in logarithms.

Table 5: Panel regression results. Dependent variable: ARMS1 and ARMS2

Coefficients Standard Errors in ( )	Dependent Variable: ARMS1		Dependent Variable: ARMS2	
	(5)	(6)	(7)	(8)
Constant	-11.0012** (5.4565)	-152.5958** (73.2620)	-13.5869** (5.9613)	-28.1398 (84.9160)
GDPPC	-0.5915 (0.4135)	-1.2793 (3.5194)	-0.3759 (0.4794)	-6.9371 (4.2914)
URBAN	0.7595 (0.5889)	32.34230** (15.2237)	0.7718 (0.6835)	19.4603 (17.4079)
GOVGDP	0.2104 (0.4002)	-1.3533 (1.1798)	0.2023 (0.4760)	-0.7829 (1.6046)
CORRUPT	0.2413 (0.3722)	-1.5187 (1.9781)	0.1761 (0.4303)	-3.6735* (2.1612)
AGE	1.3086 (0.9204)	9.2107 (8.7011)	1.9706** (0.9898)	7.0400 (10.8379)
No. of obs.	125	125	101	101
Model	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
F-stat	2.08	1.64	1.83	1.11

Note: \*Significant at the 10% level; \*\*Significant at the 5% level; \*\*\*Significant at the 1% level; All variables are defined in logarithms.

Regressing military expenditures on corruption and all the available control variables resulted in some of the corruption coefficients being insignificant. This could be because the corruption indicator of the World Bank might not be as effective compared to the corruption indicators used in other studies. Gupta et al. (2001) used indicators from the Transparency International (TI) index and the International Country Risk Guide (ICRG) index. Another reason might be that the number of observations might not be enough. We have several indicators that we could have used as additional control variables for this study such as secondary school enrolment but some of these variables had incomplete data.

The results also show that the corruption indicator and military expenditures have a negative relationship between them which implies that the higher the percentile rank (which means less corruption) the lower the military spending and vice versa which is similar to Gupta et al.'s (2001) findings. Although there are instances where some countries (Qatar and Saudi Arabia for example) have high military spending and relatively low corruption while at the same time there are countries (Papua New Guinea and Laos) which have high corruption but low military expenditures. Gupta et al. (2001) used the entire world as his sample for their study. The Asia-Pacific region may have certain peculiarities such that may explain why we obtained the results that we got.

In addition, there might have been some control variables that were not selected that could have done a better job in estimating the model. Indicators such as religion or the legal system of a given country might be more effective in our model.

### Conclusion

The findings of this study align with results reported by Gupta et al. (2001), indicating that increased levels of corruption are associated with higher military spending. Conversely, reduced corruption allows governments to allocate more resources to essential sectors such as healthcare, education, and social services. This is because fewer funds are diverted to rent-seeking activities, which waste taxpayer money and enrich bureaucrats and politicians. Therefore, policies aimed at curbing corruption can lead to governments investing more in productive areas. This research contributes to the growing body of literature suggesting that the military expenditure-to-GDP ratio can serve as an indicator of governance quality, due to its correlation with corruption levels. Future research in this field could explore more refined measures of corruption and identify additional control variables to enhance the model's robustness.

### Credit Authorship Contribution Statement

Jason C. Patalinghug is the sole author of this paper. He conceived the research idea, secured grant funding and resources, conducted the literature review, collected and analysed the data, designed the methodology and model, and drafted and revised the manuscript.

### Acknowledgments/Funding

This research is supported by a grant from the Connecticut State Universities – American Association of University Professors (CSU-AAUP) and a grant from the Accelerated MBA Incentive Fund of the Southern Connecticut State University (SCSU) School of Business. The author gratefully acknowledges both CSU-AAUP and the SCSU School of Business for their financial support and for providing research reassigned time essential for completing this project. The paper was presented at the 2025 Eastern Economic Association Conference in New York City. The author acknowledges the valuable feedback and insights provided by the session attendees, which have contributed to the improvement of the manuscript."

### Conflict of Interest Statement

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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