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ZÖSS-Discussion Papers
ISSN 1868-4947/130
Discussion Papers
Hamburg 2026

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Discussion Paper

ISSN 1868-4947/130

Zentrum für Ökonomische und Soziologische Studien

Universität Hamburg

August 2026

Impressum:

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Abstract

This study examines the impact of military spending on developmental outcomes associated with the social contract in Middle Eastern countries over the period 1995-2023. The Human Development Index (HDI) is used as an indicator of developmental outcomes associated with the social contract. It also serves as a proxy for the state's ability to transform public economic resources into developmental gains in health, education, and standards of living. The study relies on panel data covering 17 countries and employs an econometric framework that combines static models with a dynamic System GMM model to address temporal persistence, endogeneity, and unobserved heterogeneity.

The results indicate a negative and statistically significant effect of military spending on the Human Development Index, an effect that persists after controlling for key macroeconomic factors and after incorporating the dynamic dimension. The findings also reveal a high degree of persistence in HDI, reflecting its cumulative nature over time. Regarding the institutional context, the results do not provide strong evidence of an effective moderating role for the Polity index, as its impact appears limited and statistically weak. Overall, the findings suggest that military spending constitutes a persistent distributive pressure that affects developmental outcomes associated with the social contract within the limits allowed by the data and the adopted methodology.

Key words: Military spending, social contract, human development, Middle East, political institutions.

1. Introduction

Global military spending has exhibited an upward trend in recent decades, driven by the intensification of geopolitical conflicts and changes in the nature and type of security threats. This trend has revived the classical debate in political economy regarding the trade-off between security and development, particularly in relation to how limited public economic resources are allocated between military and social sectors. In this context, growing questions have emerged regarding the social and economic costs of military spending, and the extent to which it affects the state's ability to achieve sustainable developmental outcomes.

The Middle East is among the regions with the highest levels of military spending globally (Tian et al., 2024, p. 11). The region is characterized by multiple sources of security threats, the overlap of internal conflicts with regional tensions, and the continued fragility of political arrangements in several countries. This pattern of militarization is accompanied by clear divergences in developmental trajectories across these states, leading to varying social and economic outcomes over the long term. This variation raises fundamental questions about the actual cost of military spending, particularly with regard to the state's ability to maintain a stable social contract.

This issue acquires heightened importance in the context of the Middle East, which is characterized by several overlapping structural factors, including the relative dependence on rent-based resources in a number of countries, weak channels of institutional accountability, and the continued reliance on coercive apparatuses as a foundation for political stability. Together, these factors complicate the relationship between public spending priorities and development outcomes, and consequently social stability, such that a simple linear relationship between resources and outcomes cannot be assumed.

This study proceeds from the premise that the Human Development Index (HDI) captures an important developmental dimension of social contract outcomes. Rather than measuring the social contract directly, HDI reflects the state's capacity to transform public resources into improvements in health, education, and living standards. Within this framework, changes in public spending priorities, particularly sustained increases in military expenditure, may affect these developmental outcomes by altering the allocation of resources available for social investment.

When analyzing the relationship between military spending and human development outcomes, it is essential to take into account the differing trajectories across countries and over time. The political economy of military spending is shaped within institutional and political frameworks that vary in their capacity to regulate the allocation of public resources, enforce accountability, and limit rent-seeking or clientelist uses of military expenditure. Accordingly, the nature of the political regime and the quality of institutions may play a role in reshaping this effect or mitigating its intensity, without necessarily implying the ability to reverse or eliminate it.

The importance of this study stems from the need to move beyond conventional approaches that treat military spending in isolation from its social outcomes, or that assume a uniform

linear relationship between militarization and development. The study also seeks to fill a gap in the Middle East literature by systematically linking military spending to social contract outcomes within a dynamic framework that accounts for temporal persistence, unobserved heterogeneity, and potential endogeneity. It is important to note that the study treats the Human Development Index as a measurable developmental outcome linked to the state's fulfillment of its core social obligations, rather than as a direct measure of the social contract itself.

Despite the breadth of literature addressing both military spending and development outcomes separately, their integration within a social contract framework remains limited, particularly in contexts characterized by the interaction of political and institutional factors with economic decision-making. Moreover, many studies implicitly assume a direct or linear relationship between military spending and development, without considering the adaptive role of political institutions in reshaping this effect.

The study aims to analyze the impact of military spending on developmental outcomes associated with the social contract, as captured by the Human Development Index (HDI), across 17 Middle Eastern countries over the period 1995-2023. The main contribution of this study is structured around three interrelated dimensions. First, it provides an analytical framework that integrates the literature on military spending with that on the social contract within a resource allocation perspective. Second, it employs a combination of static panel data models and a dynamic System GMM model, allowing for the treatment of the dynamic nature of HDI and potential endogeneity in military spending, thereby going beyond the limitations of conventional static models. Third, it explicitly tests the conditional role of the institutional and political context, as captured by the Polity index, in reshaping the impact of military spending on development outcomes.

Accordingly, the study offers a structured analytical framework that links military spending to social contract outcomes in the Middle East within a disciplined dynamic approach. It avoids strong, non-testable assumptions and maintains a clear distinction between conditional association and strict causality. In doing so, the study provides a more precise assessment of the cost of militarization on social stability and highlights that military spending, even in the presence of relative improvements in institutional structures, remains a persistent pressure on the state's ability to transform public resources into sustainable developmental gains. It also contributes new empirical evidence from the Middle East, a region that remains underrepresented in the empirical literature on the political economy of military spending.

In light of this theoretical and analytical framework, the study seeks to answer the following main research question:

To what extent does military spending affect developmental outcomes associated with the social contract, as measured by HDI?

This main question gives rise to several sub-questions:

1. What is the nature of the relationship between military spending and developmental outcomes associated with the social contract in the region when controlling for key macroeconomic factors?
2. Does military spending retain its negative effect after accounting for the temporal persistence of the Human Development Index?
3. To what extent does the political context, as represented by the degree of political openness, mitigate the intensity of this effect without altering its direction?
4. Does addressing issues of high inflation and extreme shocks lead to a substantial change in the estimated relationship?

The remainder of the study is organized as follows: the next section presents the literature review and hypothesis development, followed by a description of the data and sources in Section Three. Section Four outlines the methodology and econometric models used, while Section Five presents and discusses the empirical results. The study concludes with Section Six, which provides the main findings and policy implications.

2. Literature Review and Hypothesis Development:

Recent literature conceptualizes the social contract as a political process through which society, either explicitly or implicitly, consents to the authority of the state. In doing so, individuals relinquish certain political rights in exchange for obligations fulfilled by the state, such as the provision of security and adequate public goods and services. This agreement requires individuals to comply with the laws, rules, and practices of the state in pursuit of broader collective goals (UNDP, 2016, p. 9).

The social contract is considered credible when it adequately reflects citizens' expectations and the state's capacity to meet those expectations. This, in turn, requires a willingness on the part of elites to allow the allocation of state resources and capacities in ways that align with these expectations. Such a political settlement represents a compromise between different actors typically elite groups or specific social strata within the Middle Eastern context regarding how political authority is organized, that is, the "rules of the game". It also determines how power and institutions are structured on behalf of society. Ultimately, when the political settlement is able to fulfill the expectations embedded in the social contract, states exercise their authority within this framework (UNDP, 2012, p. 18).

Some strands of political literature define the social contract as the set of explicit or implicit agreements among all relevant societal actors and the sovereign authority (i. e., the government or any other ruling entity), specifying their respective rights and obligations. Accordingly, social contracts are seen as creating balances in the relationships between the state and society, as well as within society itself; that is, they promote social cohesion, which constitutes their primary purpose and the key variable through which their effectiveness can be assessed (Loewe, Zintl and Houdret, 2021, p. 3).

Thus, the literature can be understood as treating the social contract as an implicit distributive arrangement (rather than a formal legal contract or an abstract normative condition) that

determines what the state provides in exchange for compliance and stability. Within this approach, the social contract can be defined in terms of its observable outcomes. From this perspective, the state's capacity to provide basic services and economic protection is viewed as a central element in sustaining the social contract, particularly in countries that lack strong institutional channels of political accountability, as is the case in the Middle East (Loewe, Zintl and Houdret, 2021, p. 3; Loewe, El-Haddad and Zintl, 2024, pp. 2–3). Because the social contract is a multidimensional concept encompassing legitimacy, trust, accountability, and service provision, no single indicator can fully capture it. Accordingly, this study focuses on one observable dimension of social contract outcomes: developmental performance. HDI is therefore employed as a proxy for developmental outcomes associated with the social contract rather than as a direct measure of the social contract itself.

This operational definition is more suitable for contexts characterized by fragility and conflict, such as the Middle East, where the erosion of the social contract often occurs through a decline in the quality of public services (UNDP, 2012, pp. 49–52; Gasmi et al., 2023, pp. 2–3). Development and governance reports further emphasize that the relationship between the state and society in such contexts is effectively mediated through the outcomes of distributive policies, making the analysis of social contract outcomes a more realistic analytical entry point than attempting to measure its political legitimacy directly (UNDP, 2012, pp. 18, 49–52, 2016, p. 9, 2024a, pp. 1–3, 135; Cloutier, 2021, pp. 13–15).

This perspective can be applied to the Middle Eastern context, where prevailing governance patterns have historically albeit to varying degrees relied on the provision of benefits and services in exchange for political stability, whether in rentier or non-rentier states (Abid, 2025a). Accordingly, treating the social contract as a distributive arrangement allows for the analysis of its imbalances through shifts in public spending priorities, without assuming explicit transformations in constitutional structures or political regimes (UNDP, 2012, pp. 49–52; Loewe, Zintl and Houdret, 2021, p. 3).

In light of the foregoing distributive understanding of the social contract, the literature has increasingly turned to the use of composite indicators to capture the outcomes of state provision (Aleksynska and Wojcieszynski, 2022, p. 24). The Human Development Index is among the most widely used of these indicators, as it combines three dimensions that reflect the state's commitment to the social contract through the transformation of public resources into social gains in health, education, and standards of living. Accordingly, the index is employed as an expression of public policy outcomes that constitute the core of the reciprocal relationship between the state and society (UNDP, 2012, p. 18, 2016, p. 9, 2024b, pp. 1, 3). UNDP documentation further confirms that HDI was designed to capture development outcomes (UNDP, 2024b, p. 3) making it well suited for analyzing the results of public spending choices over time. Consequently, the composite nature of the index allows for the tracking of cumulative changes in the state's service performance, which is consistent with the dynamic conception of the social contract as an ongoing process.

The Human Development Index (HDI) has been widely used to explain developmental disparities among countries that are structurally similar in terms of resources or geographic location, but differ in their public policy priorities. Accordingly, differences in development outcomes reflect variations in how public resources are allocated, thereby reinforcing the

validity of using HDI as a proxy indicator for social contract outcomes in comparative analysis (UNDP, 2024a, pp. 29–33).

It is worth noting that some strands of the literature find a positive effect of military spending on economic growth while others identify a negative effect (Elbargathi & Al-Assaf, 2023; Saeed, 2023). The economic literature also treats military spending as a distributive pressure mechanism from an opportunity cost perspective (Elish et al., 2023; Han & Jeong, 2025), whereby resources allocated to military expenditure are diverted away from other sectors of the economy and contribute to increasing state burdens, such as public debt (Dunne et al., 2004). Comparative studies further show that higher military spending is often associated with a relative decline in expenditure on health and education (Reeves & Stuckler, 2013), which are key components of the “provision” dimension of the social contract.

The literature suggests that the displacement effect is not always immediate; rather, it may emerge over time through changes in social investment rates or a slowdown in the improvement of developmental indicators within the economy (Töngür and Elveren, 2012, pp. 4–5, 11; Abid, 2025a). This makes it difficult to capture the relationship using static approaches, given its cumulative nature, thereby reinforcing the need for an analysis that accounts for the temporal persistence of human development outcomes.

Military spending can thus be regarded as a persistent pressure on human development. In the Middle Eastern context, the prioritization of security translates into a continuous expansion of military expenditure, even in periods that do not involve direct conflicts or existential threats (Abid, 2025b, pp. 13–17). Accordingly, military spending functions as a structural constraint on the state’s capacity to enhance social contract outcomes, which justifies analyzing it as a sustained pressure on human development (Elish et al., 2023).

Despite the extensive literature examining military spending on the one hand and development outcomes on the other, several analytical gaps remain. First, the majority of studies focus on the impact of military spending on macroeconomic indicators, particularly economic growth, while its effect on social contract outcomes as manifestations of public resource allocation remains relatively underexplored. Second, the existing literature tends to treat the relationship between military spending and development as direct or linear, without considering that this effect may be conditional on the institutional and political context within which public resource allocation is determined. Third, although the importance of political institutions in explaining developmental disparities is widely acknowledged, their adaptive role in reshaping the impact of military spending has not been sufficiently tested within a rigorous econometric framework.

In addition, a large proportion of studies rely on static models that do not account for the dynamic nature of development indicators, nor do they adequately address issues of endogeneity and unobserved heterogeneity, which may lead to biased or unstable estimates. These limitations are particularly pronounced in the Middle Eastern context, where political and institutional factors interact closely with security and economic considerations, making it difficult to generalize findings from the existing literature without testing them within this specific context.

In light of the above, this study seeks to address these gaps by providing an analysis that links military spending to social contract outcomes within a dynamic framework that accounts for temporal persistence, while simultaneously testing the conditional role of the institutional and political context in reshaping this effect.

In light of the foregoing literature review and the identification of research gaps, and based on the analytical framework that views military spending as a distributive pressure affecting social contract outcomes within a varying institutional and political context, the following hypotheses are formulated:

Hypothesis 1: Military spending has a negative effect on developmental outcomes associated with the social contract in Middle Eastern countries.

Hypothesis 2: Improvements in the political context, as reflected in the nature of the regime, mitigate the negative effect of military spending on the social contract.

Hypothesis 3: The negative effect of military spending on the social contract persists after controlling for key macroeconomic factors, such as economic growth, unemployment, inflation, demographic structure, and oil rents.

3. Data

The study is based on panel data covering a group of Middle Eastern countries over the period 1995-2023. This period was selected due to the availability of consistent and comparable data across countries and variables, as well as its representation of a phase characterized by sustained security pressures and increasing military spending burdens in the region, alongside gradual transformations in economic and institutional structures.

The Middle Eastern countries included in the study were identified based on the classification previously adopted by the Central Intelligence Agency (Central Intelligence Agency (CIA), 2023). It is worth noting that the sample was defined according to the geopolitical classification of the CIA World Factbook in its earlier edition (Central Intelligence Agency (CIA), 2023), which included Armenia and Azerbaijan within the Middle East. Although the current edition has reclassified them under Europe/Central Asia, they were retained in the sample to preserve the consistency of the data and the temporal framework used in the analysis.

It should also be noted that Palestine (the West Bank and Gaza Strip) was excluded from the sample due to the lack of consistent and continuous quantitative data over the study period (1995-2023), which prevented its inclusion in the statistical analysis despite its political and regional significance. Accordingly, the final sample consists of seventeen countries in the region with varying political and economic structures, allowing for the testing of the study's hypotheses regarding military spending, the social contract, and the nature of political regimes.

The Human Development Index (HDI), published by the United Nations Development Programme, is used as the main dependent variable in the analysis (Abid, 2025a). The index is used to capture developmental outcomes associated with the social contract based on an implicit exchange between the state and society, whereby the state's performance in providing essential services is assessed as a source of legitimacy and social stability (UNDP,

2012, pp. 49–52, 2016, p. 9; Loewe, Zintl and Houdret, 2021, p. 3; Loewe, El-Haddad and Zintl, 2024, pp. 2–3). The Human Development Index reflects a significant and tangible dimension of state performance, closely linked to the outcomes of the social contract.

Military spending, measured as a percentage of GDP, constitutes the main explanatory variable and is obtained from SIPRI data. A set of control variables reflecting economic and demographic conditions is also included, namely: GDP growth rate, unemployment rate, inflation rate (after treating outliers), urban population share, the natural logarithm of total population (Kentor et al., 2022; Saeed, 2023), and oil rents as a percentage of GDP (Mowlaei & Golkhandan, 2015; Wang & Su, 2021). In addition, the Polity index is used to capture differences in the nature of political regimes and the degree of institutional openness across countries (Solarin, 2017).

Table 1. Variables and sources

Variable	Description	Source	Reference
HDI	Human Development Index (composite of education, health, and income)	UNDP Human Development Reports	(Abid, 2025a)
Military spending (% of GDP)	Military expenditure as % of GDP	SIPRI Military Expenditure Database	(Tian et al., 2023)
GDP growth	Annual GDP growth rate (%)	World Development Indicators (WDI)	(Becker and Dunne, 2021; Abid, 2025b)
Unemployment rate	Unemployment rate, total (% of labor force)	World Development Indicators (WDI)	(Anyanwu ' et al., 2011)
Inflation (winsorized)	Consumer price index, annual % change	World Development Indicators (WDI)	(Saeed, 2023)
Log population	Natural log of total population	World Development Indicators (WDI)	(Raifu & Aminu, 2023)
Urban population (%)			
Oil rents	Oil exporter dummy or oil rents (% of GDP	World Development Indicators (WDI) / BP	(Farzanegan, 2017; Wang and Su, 2021)
Polity score			(Solarin, 2017)

4. Methodology and Econometric Models

This study is based on a panel data framework, which allows for the exploitation of variation across countries and over time, while accounting for key econometric features of such data, including country-specific unobserved heterogeneity, the temporal persistence of developmental variables, and the potential endogeneity between some explanatory variables and the dependent variable. The analysis follows a stepwise strategy consistent with the standard methodological framework outlined in (Wooldridge, 2010, pp. 281–290), without assuming direct causality beyond what this framework permits.

In the first stage of the analysis, a set of static models is estimated, including Pooled OLS, Random Effects, Fixed Effects, and Two-way Fixed Effects. The purpose of these models is limited to describing the conditional relationship between military spending and the social contract, as represented by the HDI, and to examining the nature of unobserved variation across countries, without treating them as final estimates of the relationship under study. The Fixed Effects model is more consistent when unobserved country-specific characteristics are likely to be correlated with the explanatory variables, while the Two-way Fixed Effects model is used to control for common time shocks that may affect all countries during certain periods (Wooldridge, 2010, pp. 291–304).

The static model is based on the following general specification for country i in year t :

$$HDI_{it} = \beta_1 Mil_{GDP_{it}} + \beta_2 GDP_{it} + \beta_3 Unemployment_{it} + \beta_4 Inflation_{it} + \beta_5 Urban_{it} + \beta_6 \log(Pop_{it}) + \beta_7 Oil_{it} + \alpha_i + \lambda_t + \varepsilon_{it}.$$

where α_i represents country-specific fixed effects, λ_t denotes common time effects, and ε_{it} is the stochastic error term. This static framework does not aim to address the high temporal persistence of the HDI or the potential endogeneity, but is primarily used for comparison and diagnostic purposes regarding the structure of the data. However, this framework does not adequately capture the strong dependence of the dependent variable on its past values, nor does it address the potential endogeneity between some explanatory variables and the dependent variable. Accordingly, the study relies in its main stage on a dynamic model using the one-step System GMM approach, which allows for the inclusion of the lagged dependent variable and controls for unobserved heterogeneity (Roodman, 2009, pp. 86–87, 101–104, 117–118; Wooldridge, 2010, pp. 371–374).

The dynamic model includes the lagged dependent variable to capture the cumulative nature of the HDI over time. Military spending, measured as a percentage of GDP, is treated as an endogenous variable, with its lagged values used as internal instruments according to the implemented specification. The remaining economic variables are included as in the empirical analysis, without extending assumptions about their endogeneity beyond what is supported by the data structure and the applied procedures. The instrument matrix is reduced using the collapse option to avoid instrument proliferation, and robust standard errors with small-sample correction are employed.

The validity of the dynamic specification is assessed using the Arellano-Bond tests for autocorrelation in first differences, where first-order autocorrelation is expected and second-order autocorrelation should be absent, in addition to the Hansen test of overidentifying

restrictions to verify the validity of the instruments used. The study does not include any event study models, conflict timing variables, or alternative specifications that were not actually implemented in the reported econometric analysis.

5. Results and Discussion

5.1 Baseline Results

The descriptive statistics presented in Table 2 illustrate the economic structure of the countries under study. The average military spending as a percentage of GDP is relatively high compared to the global average (Tian et al., 2024, p. 11). However, the substantial variation between the minimum and maximum values indicates that some countries exhibit among the highest levels of military spending globally, reaching up to 19.864%. This reflects the intensity of conflicts and tensions, and also points to the phenomenon of security serving regime stability (Abid, 2025b, p. 13).

Consequently, increasing resources are allocated to military expenditure, which may lead to an imbalanced allocation of resources between economic and social sectors, including public services provided by the state as a key outcome of the social contract.

The high average inflation rate in the region (108.8%), along with extremely large outlier values, also indicates significant economic instability. This situation is likely associated with broader economic and social instability, given the adverse effects of inflation on the class structure within the studied societies. All of this is further linked to substantial variation in GDP growth across the countries, which may partly be explained by the presence of oil-rich economies that help mitigate the negative effects of weak economic performance.

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Obs.
HDI	0.7365	0.1100	0.389	0.937	493
Military spending (% of GDP)	5.0913	2.7306	0.616	19.864	493
GDP growth	4.0076	6.7910	-36.658	53.382	493
Unemployment rate	7.9305	4.9441	0.100	20.710	493
Inflation (winsorized)	108.8368	121.2960	0.941	1031.657	493
Urban population (%)	74.0995	18.0463	23.760	100.000	493
Log population	15.9259	1.2752	13.151	18.322	493
Oil rents	16.7431	16.4545	0.000	65.158	493
Polity score	0.7911	0.8258	0	3	493

Note: Author calculations. This table reports descriptive statistics for the balanced panel dataset covering 17 Middle Eastern countries over the study period. Military spending is measured as a percentage of GDP. Inflation is winsorized at the 1st and 99th percentiles. All variables are measured at the annual country level

To assess the potential presence of multicollinearity among the explanatory variables, the Variance Inflation Factor (VIF) test was conducted based on the baseline model specification. The results indicate that all VIF values fall below the conventional threshold of 10, with an average of 1.52, suggesting that multicollinearity is not a concern in the estimated models and allowing for reliable interpretation of the regression coefficients (Kim, 2019, p. 559)

Table 3 presents the pairwise correlation matrix among the main variables alongside the VIF test results. The findings show that the correlation coefficients generally fall within a moderate range and do not indicate any serious multicollinearity issue. Although some variables particularly urbanization and the Human Development Index exhibit relatively high correlations, these relationships are theoretically expected within the context of development dynamics and do not undermine the validity of the estimates, especially given the low VIF values. Overall, these results support the appropriateness of the model specification and the robustness of the econometric analysis used in the baseline estimation.

Table 3. Correlation matrix and VIF test results

Variable	HDI	Mil_GDP	GDP_g	Un-employment	Inflation	Urban	Log Pop	Oil	VIF
HDI	1.000	-0.076	0.085	-0.529***	0.170***	0.789***	-0.372***	-0.045	
Mil_GDP	-0.076	1.000	-	-0.097*	-	0.048	-0.032	0.095*	1.20
GDP_g	0.085	-	1.000	-0.162***	-	0.050	-0.136**	0.136***	1.22
Unemployment	-	-0.097*	-	1.000	0.081	-	0.501***	-	2.36
Inflation (w)	0.170***	-	-	0.081	1.000	0.117**	0.167***	-0.048	1.15
Urban	0.789***	0.048	0.050	-0.579***	0.117**	1.000	-	0.109**	1.70
Log Pop	-	-0.032	-0.136**	0.501***	0.167***	-	1.000	-0.005	1.56
Oil	-0.045	0.095*	0.136***	-0.446***	-0.048	0.109**	-0.005	1.000	1.41

Note: Authors' calculation. *** p < 0.01, ** p < 0.05, * p < 0.1.

The baseline results presented in Table 4 show that the Breusch-Pagan Lagrange Multiplier test strongly rejects the Pooled OLS model ($p = 0.000$), confirming the presence of country-specific unobserved heterogeneity and justifying the use of panel data models. The Hausman test results also reject the Random Effects hypothesis ($\chi^2(7) = 32.67$, $p = 0.000$), indicating systematic differences between the Fixed Effects and Random Effects estimators and suggesting that the unobserved effects are correlated with the explanatory variables. Accordingly, the Fixed Effects model is considered the most appropriate estimator within the static framework.

In addition, a Two-way Fixed Effects model is estimated to control for common time shocks that may affect all countries in the sample. Given the assumptions underlying the Hausman test, it is limited to comparisons between Fixed Effects and Random Effects models and does not extend to the Two-way Fixed Effects specification. Therefore, the latter is evaluated based

on its explanatory power, improvements in the Within R^2 , and the statistical significance of time effects.

The results from the static models indicate that the negative effect of military spending on developmental outcomes associated with the social contract, as measured by HDI, becomes more consistent after controlling for unobserved heterogeneity, suggesting that this effect is linked to structural differences across countries.

Despite the advantages of the Fixed Effects framework, it does not adequately address the high persistence of the Human Development Index, nor does it fully resolve the potential endogeneity of military spending, and it does not allow for a precise assessment of the dynamics of the relationship or the direction of causality. These limitations motivate the adoption of a dynamic System GMM framework in the subsequent analysis to account for temporal persistence and endogeneity.

Table 4. Comparison of Static Panel Data Models

Variable	Pooled OLS	Random Effects	Fixed Effects	Two-way FE
Military spending (% GDP)	- 0.0036*** (0.0011)	- 0.0024*** (0.0009)	- 0.0020** (0.0009)	- 0.0026*** (0.0007)
GDP growth	0.0004 (0.00045)	0.0000 (0.00026)	0.0001 (0.00026)	0.0005** (0.00021)
Unemployment	- 0.0063*** (0.00086)	- 0.0016** (0.00078)	- 0.0013* (0.00079)	- 0.0030*** (0.00063)
Inflation (wins.)	0.00008*** (0.00002)	0.00002 (0.00002)	0.00003* (0.00002)	- 0.00002 (0.00001)
Urbanization	0.0040*** (0.00020)	0.0061*** (0.00047)	0.0053*** (0.00068)	0.0011* (0.00057)
Log population	0.0037 (0.00272)	0.0447*** (0.00550)	0.0622*** (0.00705)	- 0.0215*** (0.00717)
Oil rents	- 0.0016*** (0.00020)	0.0003 (0.00024)	0.0006** (0.00024)	0.0001 (0.00022)
Country FE	No	No	Yes	Yes
Year FE	No	No	No	Yes
Observations	493	493	493	493
Within R^2	0.69 (overall)	0.48	0.49	0.72

Author calculations. Robust standard errors in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1. Breusch-Pagan LM test (RE vs Pooled): p = 0.000. Hausman test (FE vs RE): χ^2 (7) = 32.67, p = 0.000.

Table 5 presents the results of the dynamic estimation using the System GMM model, where the dynamic nature of the Human Development Index is taken into account through the inclusion of the lagged dependent variable $L.hdi$. The results indicate a high degree of persistence in HDI, as the coefficient of $L.hdi$ is positive, large, and statistically significant. This reflects the cumulative nature of human development over time and justifies the use of a dynamic framework rather than static models.

The results also indicate a negative and statistically significant effect of military spending on human development, even after controlling for temporal persistence and unobserved heterogeneity. This suggests that the effect operates both across countries and within

countries over time. This finding remains stable when applying an alternative treatment of inflation through winsorization, as well as when introducing additional control variables, thereby reinforcing the robustness of the main conclusion.

Regarding the control variables, the model results show that GDP growth is positively and significantly associated with the Human Development Index, while the unemployment rate exhibits a negative effect with weak statistical significance, consistent with its role as an indirect channel affecting human development in the short run. In contrast, inflation, after adjustment, does not show a statistically significant effect within the dynamic framework, suggesting that its short-term fluctuations do not directly translate into changes in human development indicators. Similarly, the results for urbanization, population size, and oil rents remain limited in statistical significance within this framework.

From a diagnostic perspective, the Arellano-Bond test results confirm the absence of second-order autocorrelation in first differences, supporting the validity of the dynamic model assumptions. The Hansen test and Difference-in-Hansen tests also indicate the validity of the instruments used and provide no evidence of instrument proliferation, thereby strengthening the reliability of the System GMM estimates in this context.

Overall, the results show that incorporating the dynamic dimension and addressing potential endogeneity in military spending reinforces the main finding: the negative effect of military spending on human development persists even after controlling for temporal persistence and the potential endogeneity of the explanatory variables.

Table 5. Baseline dynamic estimates (System GMM)

Variable	Coefficient	Std. Err.	95% Confidence Interval
HDI (t-1)	0.8553***	0.0556	[0.7374, 0.9732]
Military spending (% of GDP)	-0.00224***	0.00053	[-0.00336, -0.00111]
GDP growth	0.00044***	0.00010	[0.00022, 0.00066]
Unemployment	-0.00117*	0.00062	[-0.00248, 0.00014]
Inflation (winsorized)	-0.00001	0.00001	[-0.00003, 0.00000]
Urban population	0.00056*	0.00028	[-0.00004, 0.00116]
Log population	0.00149	0.00192	[-0.00258, 0.00557]
Oil rents	-0.00021	0.00013	[-0.00050, 0.00007]
Constant	0.06866*	0.03258	[-0.00040, 0.13772]

Notes: This table reports baseline dynamic panel estimates obtained using one-step System GMM. The dependent variable is the Human Development Index (HDI). The lagged dependent variable is included to capture persistence in human development. Military spending is treated as endogenous and instrumented using its own lagged values, while the remaining covariates are treated as exogenous. Robust standard errors are reported, and instrument proliferation is controlled through the collapse option. Diagnostic tests support the validity of the specification: AR(1) = -2.65 (p = 0.008), AR(2) = -1.15 (p = 0.250), and Hansen $\chi^2(6)$ = 8.18 (p = 0.225). The number of instruments (15) remains below the number of groups (17). *** p < 0.01, ** p < 0.05, * p < 0.1.

5.2 The Moderating Role of Political Institutions

Table 6 extends the baseline dynamic model by incorporating the Polity variable as an indicator of the nature of the political regime, along with an interaction term between military spending and Polity. This is intended to test whether the institutional characteristics of the political system condition the dynamic effect of military spending on human development. The model is estimated using System GMM while maintaining the same instrument specification and assumptions adopted in the baseline model.

The results across all dynamic specifications show that the negative and statistically significant effect of military spending on human development persists, confirming the robustness of the baseline finding and its insensitivity to the inclusion of additional institutional variables. The inclusion of the Polity index does not alter this conclusion, as it does not exhibit a direct and statistically significant effect within the dynamic framework.

The interaction between military spending and the Polity index is also weakly significant, and its magnitude suggests only a limited mitigation of the negative effect of military spending at higher levels of political openness. Overall, the results do not provide strong evidence that political institutions function as an effective dynamic conditioning mechanism in the short run within the System GMM specification used in this analysis.

Accordingly, the results indicate that institutional factors, despite their importance in the long run, do not operate as an effective dynamic conditioning mechanism in the short run within this framework, and that the negative effect of military spending on human development persists regardless of the nature of the political regime. The diagnostic test results, including the Arellano-Bond tests and the Hansen test, remain consistent with the model assumptions, further supporting the reliability of these estimates.

With Polity

Table 6. Regime type and military spending (System GMM)

Variable	Coefficient	Std. Err.	95% Confidence Interval
HDI (t-1)	0.8520***	0.0559	[0.7334, 0.9706]
Military spending (% of GDP)	-0.00339***	0.00102	[-0.00556, -0.00122]
Polity score	-0.00820	0.00643	[-0.02182, 0.00542]
Military spending × Polity	0.00174*	0.00097	[-0.00032, 0.00380]
GDP growth	0.00038***	0.00012	[0.00014, 0.00062]
Unemployment	-0.00124*	0.00066	[-0.00264, 0.00016]
Inflation (winsorized)	-0.00001	0.00001	[-0.00003, 0.00000]
Urban population	0.00053*	0.00028	[-0.00006, 0.00113]
Log population	0.00191	0.00240	[-0.00318, 0.00701]
Oil rents	-0.00021	0.00013	[-0.00050, 0.00008]
Constant	0.07343*	0.03838	[-0.00793, 0.15479]

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.

Based on the above, the results support the first hypothesis regarding the negative effect of military spending on the social contract. They provide limited evidence for the second hypothesis concerning the moderating role of the institutional context, while confirming the third hypothesis that the negative effect persists after controlling for key macroeconomic factors.

5.3 Discussion

The results indicate that military spending in Middle Eastern countries has negative and persistent effects on developmental outcomes, as measured by the Human Development Index. This can be interpreted in light of the distributive nature of public expenditure, whereby the allocation of resources toward military spending comes at the expense of social spending and essential services. This, in turn, limits the state's ability to transform public resources into developmental gains in health, education, and standards of living core pillars of the social contract in these contexts and may weaken its developmental foundation, particularly in environments where state legitimacy largely depends on the provision of economic and social benefits.

In contrast, the results do not provide strong evidence that the institutional context, as measured by the Polity index, functions as an effective mechanism for mitigating this effect in the short run. Although there is some indication of a limited moderating effect, the weak statistical significance of the interaction term suggests that the nature of the political regime does not substantially alter the relationship between military spending and social contract outcomes within the adopted dynamic framework. This reflects the limited capacity of institutional changes to redirect public spending priorities under the security pressures and political considerations that characterize the region.

These findings suggest that the adaptive role of institutions, despite its theoretical importance, may be constrained by deeper structural factors related to the nature of the state and the political economy of the region, where considerations of security and political stability continue to take precedence over the developmental dimensions of the social contract. Accordingly, the negative effect of military spending appears to extend beyond short-term institutional differences, reflecting a more stable pattern in the allocation of public economic resources.

This suggests that the sustainability of the social contract in Middle Eastern countries is closely linked to the state's ability to balance security and defense requirements on the one hand, and investment in human capital and public services on the other. When resources are increasingly allocated to military spending at the expense of social expenditure, this may weaken developmental outcomes that underpin the social contract, legitimacy based on the provision of public services and improved living conditions in exchange for loyalty and may reinforce patterns of political stability that rely more heavily on security-oriented state strategies.

6. Conclusion

This study examines the relationship between military spending and developmental outcomes in Middle Eastern countries over the period 1995-2023, using an analytical framework that combines static models with a dynamic System GMM approach. The developmental dimension of the social contract is operationalized through the Human Development Index (HDI) as a proxy for the state's ability to transform public resources into developmental gains in health, education, and standards of living.

The results indicate a negative and statistically significant effect of military spending on the Human Development Index, which persists after controlling for key macroeconomic factors, as well as after incorporating the dynamic dimension and addressing endogeneity and unobserved heterogeneity. The findings also reveal a high degree of persistence in HDI, reflecting its cumulative nature over time.

Beyond its empirical findings, the study contributes to the research literature by linking military spending to developmental outcomes through the lens of the "social contract," rather than focusing solely on economic growth. This perspective is particularly significant in the Middle East, where the sustainability of the state-society relationship is often tied to the state's ability to deliver tangible socio-economic results. At the same time, these findings should be interpreted in light of the selected indicators and the scope of countries included in the analysis.

7. Policy Implications

In light of the study's findings, several policy-relevant implications can be highlighted, within the limits allowed by the empirical results:

First, the findings point to the importance of maintaining a balance in the allocation of public resources between military and social spending, given the association between higher military expenditure and lower human development outcomes, reflecting direct distributive implications for the social contract.

Second, the persistence of the negative effect of military spending even after controlling for key macroeconomic factors suggests that this effect is linked not only to short-term economic conditions but also reflects a more stable pattern in resource allocation priorities. This underscores the need to consider the long-term implications of public spending policies.

Third, the limited moderating role of the institutional context indicates that improvements in the nature of the political system, as captured by the Polity index, may not be sufficient on their own to alter the effect of military spending on development outcomes in the short run. This highlights the need for a deeper understanding of the underlying factors that govern the allocation of public resources in such contexts.

In conclusion, the results suggest that the sustainability of social contract outcomes in Middle Eastern countries is closely tied to how the trade-off between security and defense requirements, on the one hand, and investment in human capital and essential services, on

the other, is managed within a framework that takes into account existing economic and institutional constraints.

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