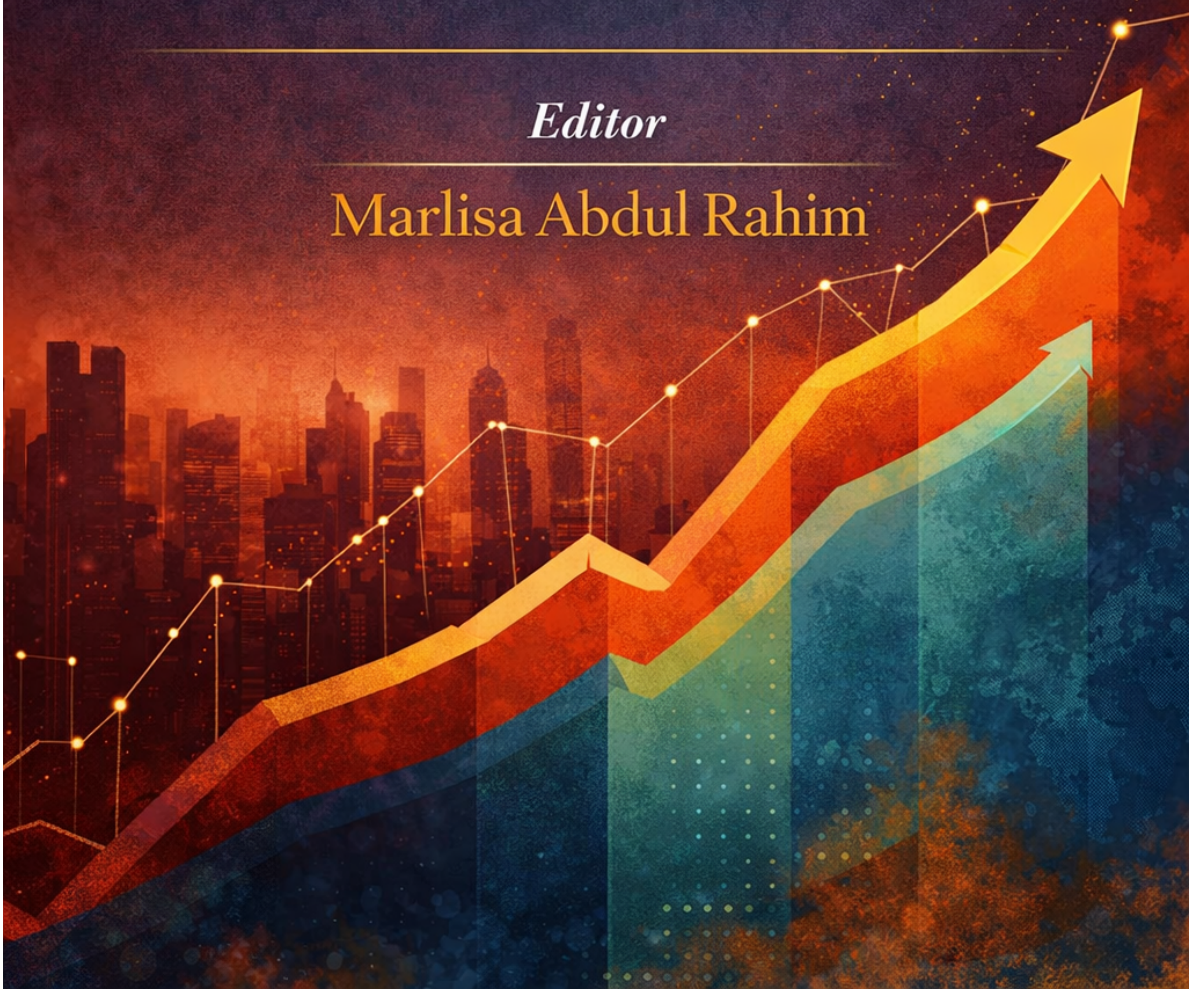
GOVERNANCE, FISCAL POLICY AND DEVELOPMENT TRAJECTORIES

Editor

Marlisa Abdul Rahim



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PREFACE

This volume brings together a collection of scholarly contributions that explore key issues at the intersection of public policy, economic management, and social development. In an increasingly complex global environment, challenges related to governance, resource allocation, and security continue to shape both institutional performance and broader development outcomes.

The chapters in this book address diverse yet interconnected themes. The analysis of municipal borrowing under information constraints highlights the importance of transparency and data-driven decision-making in public finance. The examination of salary policies within the public education system underscores the role of management strategies in enhancing motivation and institutional effectiveness. In addition, the discussion on security challenges and economic development provides critical insights into how stability and governance directly influence economic growth and societal well-being.

By adopting a multidisciplinary perspective, this volume integrates insights from economics, public administration, and development studies. It not only contributes to academic discourse but also offers practical implications for policymakers and practitioners dealing with contemporary governance and development challenges.

It is hoped that this book will serve as a valuable resource for researchers, students, and professionals interested in public policy, economic development, and institutional dynamics, while encouraging further research on the complex relationships between governance, security, and economic progress.

Editorial Team
March 2026, Türkiye

CHAPTER 1
STATISTICAL MODELLING OF MUNICIPAL BORROWING ESCALATION UNDER INFORMATION CONSTRAINTS

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INTRODUCTION

Standard statistical modelling techniques such as linear regressions can overcome the difficulty of analysing unanticipated escalations in municipal debt in the absence of precise information on the sources and drivers of such escalations (Dos Santos & Fábio, 2023). This chapter describes how to expose the concealed influences behind such escalations, even when these influences are invisible to an outsider.

To demonstrate the applicability of the proposed modelling approach, the chapter uses data from the 308 Portuguese local authorities. In Portugal, as in many other countries (Gordon & Guerron-Quintana, 2024; Vasvári & Pocsai, 2025), local authorities are subject to statutory borrowing limits. This limit in Portugal is operationalized through a 'Borrowing Ratio', calculated as the quotient of a local authority's 'Total Borrowing' divided by its 'Borrowing Limit'. The Borrowing Limit is defined as 1.5 times the average net cash receipts over the previous three years. To ensure fiscal sustainability, this Borrowing Ratio must be maintained at or below 1.0.

Economic actors seeking to establish relationships with municipalities should not overlook this limitation, as non-compliance may compromise the effectiveness of municipal actions. However, when external stakeholders attempt to analyse the data disclosed on local authority borrowing, they frequently encounter significant limitations, as the complete information required for a thorough assessment is often inaccessible. Indeed, although the two components of the Borrowing Ratio are made available to the public, the specific data that is used to determine Total Borrowing is not revealed. Total Borrowing includes liabilities originating from affiliated entities that are not legally required to disclose their financial statements. Moreover, its calculation involves the application of regulatory clauses that refer to financial operations whose reconstruction is methodologically complex and often opaque. Consequently, information on Total Borrowing is virtually non-existent for external analysts. This chapter addresses the problem by identifying municipal characteristics that may contribute to abrupt fluctuations in Total Borrowing even when such characteristics are not directly observable.

It does so by detecting local authorities that exhibit a heightened risk of over-borrowing or display the most inconsistent patterns of debt variation relative to figures reported in official financial statements. Additionally, the chapter facilitates the construction of Z-scores to assess the likelihood of non-compliance with borrowing regulations.

As with other local authorities, Portuguese municipalities exhibit a wide range of sizes and characteristics. Some have a population of almost one million, while others have only a few hundred. Some are isolated islands, while others are cosmopolitan cities. Total borrowing, as well as the figures disclosed in the financial accounts of local authorities, reflect substantial heterogeneity. As such, the data exhibit highly asymmetric distributions and contain a substantial number of extreme values, which manifest as prominent outliers when conventional statistical techniques are applied. This heterogeneity poses a significant obstacle to the application of conventional econometric modelling techniques, such as regression analysis, for identifying the determinants of total local government borrowing and its abrupt fluctuations.

While the use of less conventional, robust, or non-parametric techniques can address the issues arising from large size disparities, such methods may obscure unanticipated escalations in Total Borrowing, namely those that constitute outliers relative to expected behaviour rather than to scale. Trimming (Leone et al., 2019; Adams et al., 2019), or other ad hoc solutions, would lead to similar issues by excluding potentially informative data points, thereby limiting the explanatory power and practical usefulness of the models. The modelling approach suggested in this chapter addresses these issues by allowing the use of standard modelling techniques and controlling for size-related outliers, while avoiding the need to exclude cases and retaining model-related outliers that contain relevant information.

1. THEORETICAL BACKGROUND

To promote financial resilience, manage the cost of external funding, and prevent economic distress, central authorities oversee municipal borrowing (AREB, 2014) and encourage viable financial planning (Letelier, 2011; Balaguer-Coll et al., 2016; Kotia and Lledó, 2016; László, 2019; Vasvári & Pocsai, 2025).

Policymakers have long focused on disincentives and other measures to enforce limits on local borrowing. The pressure to monitor municipal borrowing more closely has led to recommendations for improved overseeing based on accepted procedures (Navarro-Galera et al., 2016).

Regarding statistical modelling methodologies, Zafra-Gómez et al. (2009) and Cabaleiro et al. (2013) advocate the use of factor analysis as a tool to manage local government debt, employing financial ratios as the underlying variables. Furthermore, ratio-based systems for the supervision of municipal insolvency exposure are also proposed, enabling regulatory bodies and central authorities to react when rating thresholds are exceeded (Hájek, 2010; Zhao et al., 2022). Local authority Z-scores are constructed by Yakymova et al. (2019) and Kablan (2020). In contrast to the present study, much of the existing literature relying on statistical methodologies tends to overlook a foundational approach that systematically informs model construction and justifies the choice of financial ratios, resulting in frameworks that are often empirically driven but theoretically underdeveloped.

2. THE MODELLING APPROACH

Local authorities are often under an obligation to report periodically on their financial situation and the profits or losses incurred. Once published, these reports are used by external parties such as banks and other lenders, by the central government and regulators, and by financial analysts, to assess key economic features, particularly solvency. Econometric and other statistical modelling techniques are also employed to support the aforementioned analyses. However, practitioners often encounter substantial difficulties due to the unfavourable statistical properties of the financial data reported by local authorities data that are atypical in distribution and resistant to conventional modelling approaches. The application of statistical models based on data disclosed in financial statements has attracted considerable interest, largely due to well-known cases in which models employing financial ratios as independent variables are believed to have successfully predicted significant events, such as economic or financial failure (Taffler, 1981), the anticipated decline in income (Ou, 1990), misstated financial statements (Dechow et al., 2011), and takeover targets (Barnes, 1990).

However, these stories are not only controversial but also lack statistical substantiation, which led Trigueiros (2019) to argue that the accuracy and generalisability of such seemingly successful models could be improved by accounting for the fundamental randomness inherent in financial data.

The values observed in continuous random variables are influenced by numerous small perturbations. These perturbations are termed ‘additive’ when their effects accumulate through summation, and ‘multiplicative’ when their influence combines through multiplication (Johnson et al., 1994). The sampled values can exhibit additive distributions, such as the normal distribution, or multiplicative distributions, such as the lognormal distribution, depending on whether the underlying probability law is additive or multiplicative (Johnson et al., 1994).

Most common economic accruals, such as individual wealth or business size, are in fact the result of aggregating many uncertain sums and therefore follow a multiplicative probability law (Lucas, 1978; Johnson et al., 1994; Luttmer, 2011). To the extent that the numbers reported in local authorities' financial statements exhibit random behaviour like economic accruals, their distributions will be multiplicative (McLeay, 1986; Watson, 1990).

A defining feature of multiplicative distributions is their inherently exponential nature. When sample values are ordered by magnitude, they tend to increase exponentially. As a result, the variance expands rapidly with increasing values, leading to a sharp decline in the concentration of observations. Consequently, such distributions typically exhibit a high density of cases clustered within a narrow range, accompanied by a small number of extreme values dispersed across a broader scale (Johnson et al., 1994; Wilcox, 2010). When this type of distribution is present in regressions, the estimated parameters are biased by high-impact outliers, while the exponential scatter of cases (heteroscedasticity) makes it impossible to analyse unanticipated cases, as shown in Figure 1, which compares a typical multiplicative scatter (left-hand side) with the equivalent additive scatter (right-hand side). Figure 1 demonstrates the futility of constructing regressions directly on multiplicative data. It also demonstrates graphically that the exponential behaviour is an inherent property of the data, rather than an aberration that can be addressed through the application of a specific data-messaging recipe.

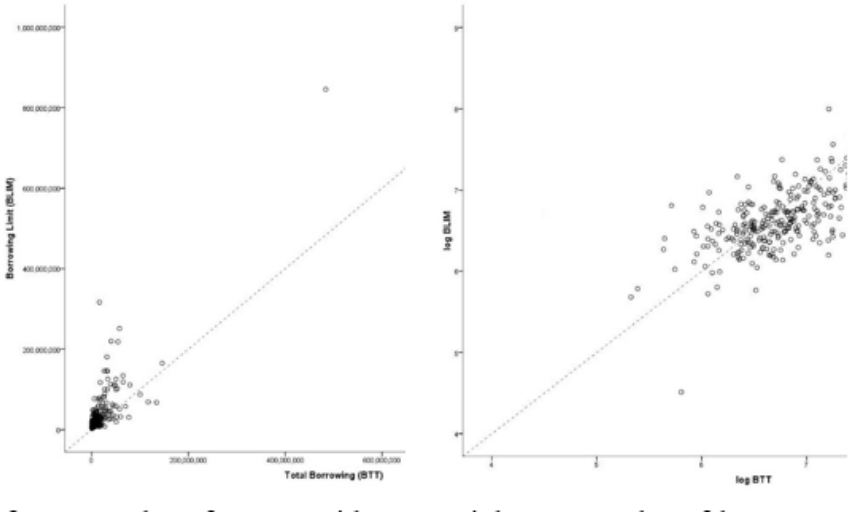

Figure 1. Left: scatterplot of BLIM with BTT; right: scatterplot of log BLIM with log BTT (2017). The 45 degrees bisecting line is drawn; three-parametric lognormality (Johnson et al., 1994) introduces slight non-linearity (right

Given that the exponential nature of multiplicative data can violate the assumptions underlying standard modelling techniques, several authors including Snedecor and Cochran (1989) and Watson (1990) have recommended applying a logarithmic transformation. This approach converts multiplicative relationships into additive ones, thereby facilitating the use of linear models and stabilizing the variance.

Regressions in which the independent variables are log-transformed i.e. 'loglinear' regressions and are routinely used to predict frequencies. In biological research and in other fields, they are called 'allometric' regressions. Schuessler (1974), Nevill and Holder (1995), and others, encourage their use and provide examples with extensive references. On the other side, although log transformation is routinely used in econometric models as a prescription for mitigating heteroscedasticity, the rationale for its use has not been incorporated into standard econometric practice. This reluctance likely stems from the challenges faced by analysts who seek not only to construct robust functional forms but also to back-transform the results to the original scale for interpretation and hypothesis testing (Dambolena et al., 2009).

Apart from their exponential behaviour, financial statement numbers are affected by the size of the reporting entity, i.e. numbers from large entities tend to be larger than those from small entities. One of the reasons for using ratios in financial analysis is the capability to eliminate this common influence of size, thereby allowing the economic features of differently sized entities to be compared.

This research assumes that the factors influencing Total Borrowing, along with their variations, can be reliably estimated using publicly available municipal data. This assumption rests on the validity of financial analysis through ratio-based methods and, more fundamentally, on the premise that the size of each entity exerts a multiplicative influence on all the figures presented in financial statements. Given that each local authority is the source of both the reported financial data and the underlying (unpublished) factors driving Total Borrowing, it follows that these latent influences are commensurate in scale with the published figures. In other words, the same underlying size effect is presumed to shape both observable and unobservable components of borrowing behavior. Accordingly, ratios of Total Borrowing with other reported numbers can be validly used. They embody an economic dimension whose variation is assumed to mirror consistent patterns in Total Borrowing, thus providing a basis for its empirical estimation.

There has been a great deal of focus on the development of tools to help identify which ratios should be used as independent variables in models (Back et al., 1996; Wang, 2004; Wu et al., 2010; Xu et al., 2014; Tian et al., 2015). Typically, authors first identify ratios from main economic features (liquidity, profitability, and so on). For each of these features, authors search for ratios that have been identified in the literature as successful in predicting the episode in question, and then make an initial selection, after which the chosen ratios are gathered and subjected to an overall screening. Finally, the least effective ratios are discarded. For public sector entities, the challenge of identifying appropriate ratios is even greater. The following lines briefly describe a two-stage method to find the set of optimal ratios to include in loglinear regressions. A typically exponential behaviour, lognormality, is assumed.

Log-transformed numbers sampled at the same moment in time from financial statements are modelled as an 'analysis of variance' where each observation is subject to two influences, one due to the type of account (e.g., receivables, cash, and so on), and the other to the size of the entity at the time of reporting, i.e., a scale level:

$$Log\ x_{ij} = m_i + s_j + u_{ij} \qquad (1)$$

where $Log\ x_{ij}$, the i^{th} log-transformed account from the j^{th} report, is depicted as an expectation m_i particular to account i, added to s_j, the influence the of size of entity j, added to unexplained u_{ij}. The u_{ij} are not necessarily independent. The log of the quotient of accounts x_{den} and x_{num} is:

$$Log\frac{x_{num}}{x_{den}} = Log\ x_{num} - Log\ x_{den}$$
$$= (m_{num} - m_{den}) + (u_{num} - u_{den}) \qquad (2)$$

where size is cancelled.

The long-standing use of ratios as a tool of financial analysis lends credence to the assumptions of multiplicative distributions and common size that underlie (2). If these assumptions were not verified, ratios for large entities would behave differently from ratios for small entities and economic features such as profitability or solvency would be useless.

It is clear that (1) also applies to negative numbers found in accounts such as Net Income, which are the result of subtracting positive numbers. If x_k and x_l are from positive-only accounts, the identity:

$$Log\ |x_k - x_l| = Log\ x_k + Log\left|1 - \frac{x_l}{x_k}\right| \qquad (3)$$

holds for any x. Since x_l/x_k is size-independent as in (2), $Log|1 - x_l/x_k|$ is size-independent and the $Log\ |x_k - x_l|$ expectation, m', is size-independent as it stems from adding the m_k from (1) to the expected $Log|1 - x_l/x_k|$. So, for any x, whatever its sign:

$$Log\ |x| = m' + s_j + u' \qquad (4)$$

where size is, as in (1), separate from the other influences explaining $Log\ |x|$. In (4), m' and the unexplained term u' do not keep the direct interpretation of m and u in (1), but s_j is the same, which explains why a quotient of such numbers eliminates size, even if negative.

Transformations to use in loglinear regressions must not treat size differently for negative and positive cases. Thus, when two transformed accounts are subtracted, they eliminate size as in (2), regardless of sign. In accounts where negative cases occur, *x* can be transformed into:

$$sign\ x\ Log\ |x|. \qquad (5)$$

In this way, size is present in absolute values no matter their signs and is cancelled by subtracting logs or forming ratios, as in (2).

In addition to ratios with components from the same report, analysts construct ratios where the denominator is from the previous period's report, or which use a single account in successive periods (e.g. $x_t/x_{t-1}$where t indicates the time period), or relative changes $(x_t - x_{t-1})/x_{t-1}$. In these cases, x cannot take zero or negative values. From (1) it is evident that these ratios incorporate the growth of s from $t-1$ to t, not the growth of x. The transformation:

$$Log\ x_t - Log\ x_{t-1} \qquad (6)$$

or similar, can be used, but is size-related, which may limit the use of loglinear forms. However, as municipalities do not grow in size in the short term, (6) is not size related in the present case. Zero cases are not accumulations and should therefore not be transformed.

Using the approach and notation just introduced, it is now possible to examine how the loglinear regression form will behave. Consider:

$$y = a + b_1 Log\ x_1 + b_2 Log\ x_2 + \cdots + e \qquad (7)$$

where x_1, x_2 ... are different accounts, e is unexplained y, and b_1, b_2 ... are regression coefficients. For the sake of simplicity, unit standard errors are assumed. Since x_1, x_2 ... obey (1):

$$y = A + b_1 u_1 + b_2 u_2 + \cdots + (b_1 + b_2 + \cdots)\, s_j + e \qquad (8)$$

where $A = a + b_1 m_1 + b_2 m_2 + \cdots$. In (8), y is explained by two terms, one of which is size-independent, i.e., $b_1 u_1 + b_2 u_2 + \cdots$ and the other is size-related, i.e., $(b_1 + b_2 + \cdots)\, s_j$. If y is size-independent, as is the case for the Borrowing Ratio (BR) and most financial indicators, then the term $(b_1 + b_2 + \cdots)\, s_j$ will be zero in order to block size-related variability from modelling y. The set of $b_1, b_2,$ ... coefficients must therefore add to zero.

As an illustration, if y is predicted by x_1 and x_2, (7) is $y = a + b_1 Log\, x_1 + b_2 Log\, x_2$, but since $b_1 + b_2 = 0$ or $b_2 = -b_1 = b$, then $y = a + b(Log\, x_2 - Log\, x_1)$ or:

$$y = a + b\, Log \frac{x_2}{x_1} \qquad (9)$$

In short, the quotient x_2/x_1 will emerge as a response to a size-independent y. Now assume that x_2/x_1 has predictive ability over BR. When the logs of accounts x_1 and x_2 are used in a loglinear regression that predicts BR, the optimal form is the one where $b_2 = -b_1$ for then size is eliminated, releasing the predictive ability of x_2/x_1 over BR. Likewise, when BR is explained by accounts x_1, x_2, x_3, the form that predicts BR optimally will be:

$$BR = a + b_1\, Log \frac{x_1}{x_3} + b_2\, Log \frac{x_2}{x_3} \qquad (10)$$

Three log transformed accounts give rise to two ratios as an answer to size-independent BR. When considering more than three accounts and a BR that is independent from size, it is clear that N accounts would produce $N - 1$ quotients.

However, regressions and other modelling techniques are not capable by themselves of combining N accounts two by two to form $N-1$ quotients. Rather, they will perform an overall estimation of parameters whereby one portion of the size-related variability offsets the other portion, as in (3). The result is $b_1 + b_2 + \cdots + b_N = 0$, the outcome being the elimination of size from the whole regression form. The incapacity of the modelling algorithms to pair accounts is not an insurmountable obstacle, as from the moment the N accounts that optimally predict BR are uncovered, an analyst can easly perform this pairing.

It can therefore be concluded that the prediction of a size-independent variable such as BR will not necessarily involve the previous finding of the set of ratios to use as independent variables. In the initial stage, the modelling algorithm discovers the N accounts with significant predictive ability. This can be done using any variable picking tool attached to most statistical software packages. The analyst then combines the N accounts into $N-1$ log ratios. The parameters of the final form are then estimated using the $N-1$ log ratios. The two-step method relieves the analyst of the tedious task of selecting appropriate ratios from an almost limitless list. Furthermore, this method also reduces the likelihood of bias due to omitted variables.

3. BRIEF DEPICTION OF THE DATA

The financial statements used in the study are collected from yearly reports (2015-2018) of Portuguese local authorities, which can be accessed in https://portalautarquico.dgal.gov.pt/. This is a period of regulatory stability, indeed, the only viable option given the earlier years of volatility caused by the public debt crisis and the exceptional circumstances that followed during the pandemic. Data on social well-being and other relevant attributes are also collected. In addition, dummy variables are included to identify the years 2016–2018 and municipalities classified as remote or isolated. The 49 variables that are collected and scanned for insertion in model forms are displayed in Table 1 together with the respective abbreviations. Of these, 37 variables are derived from financial statements, while 12 are non-financial in nature. The three target (or dependent) variables are also included.

Table 1. Names and abbreviations of the financial non-financial attributes used in this chapter

Abbrev.	Name	Abbrev.	Name
NR	Natural Resources	HX	Extraordinary Revenue, Gains
PPE	Property, Equipment	HR	Grants, Subsidies Received
FIT	Investments	HT	Revenue (total)
IMT	Fixed Assets (total)	KO	Operational Profit
RCT	Accounts Receivable	KFP	Financial Profit
DC	Cash, equivalents	KCP	Current Profit
TA	Assets (total)	KNP	Not Profit
EC	Capital	CF	KNP+GA
ER	Reserves	CA	Current Assets
ET	Equity (total)	CL	Current Liabilities
TD	Long-Term Debt	SIZE	$log\ TA$
TL	Liabilities (total)	GDPR	GDP per capita
AD	Accrued Expenses	SQKM	Municipal expanse
GV	Cost of Sales, Services	NRE	Population
GP	Personnel, Social Security Costs	NEM	Municipal employees
GA	Depreciation Costs	EMPR	Employment index
GO	Operational Costs	CRM	Crime index
GF	Financial Costs	PPR	Purchasing Power
GC	Current Costs	ATM	ATM per resident
GX	Extraordinary Losses	KWA	KWH Street lightening index
GT	Costs (total)	ILLITD	Female-male illiteracy gap
HV	Sales and Service Revenue	DEPEI	Total dependency index
HI	Taxes Collected	IS	Isolation (0, not remote, 1, remote)
HO	Operational Revenue	BTT	Total Borrowing
HF	Financial Revenue, Gains	BLIM	Borrowing Limit
HC	Current Revenue	BR	Borrowing Ratio (BTT/BLIM)

Skewness, kurtosis, and other distributional statistics are computed for the 14 variables that significantly predict the dependent variable in each model, both before and after the application of a logarithmic transformation (Table 2). Dependent variables BR, BTT and BLIM are also included. All these variables are clearly exponential because they become normal when logged. In BLIM there are traces of three-parametric lognormality (Johnson *et al.,* 1994). Data that do not conform to a power function with a zero intercept can lead to biased estimates of the allometric exponent.

NR and TD have some values at zero which are not transformed. Transformation (5) is used in accounts with negative numbers (abbreviated as E…, K…, and CF).

The correlation matrix of these variables after logarithmic transformation is also shown (Table 3). The influence of size on both the financial statement figures and on the variables SQKM, NRE, and NEM is evident, as all correlation coefficients are positive and none are negligible.

	Non-transformed					Transformed			
	Median	Skewness	Kurtosis	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
BR	0.35	2.79	10.93	0.002	3.478	-0.48	0.40	-1.04	4.30
BTT	6,203,760	9.90	131.60	34,342	483,600,555	6.83	0.56	-0.27	1.39
BLIM	16,736,475	8.68	105.26	2,103,184	845,489,076	7.30	0.38	0.92	1.02
NR	28,417,998	7.96	76.88	0	1,054,554,907	7.42	0.57	-7.00	91.71
RCT	505,160	10.97	149.63	2,292	106,672,849	5.75	0.69	0.02	0.81
FIT	1,655,946	5.17	32.74	106,483	147,584,487	6.29	0.60	0.78	0.30
CA	2,882,793	9.02	109.00	134,256	331,999,927	6.51	0.55	0.57	0.67
DC	1,805,757	7.38	70.75	27,409	221,921,800	6.25	0.64	0.25	0.55
TL	6,874,820	10.44	143.26	242,004	497,246,668	6.87	0.50	0.14	0.52
TD	4,516,450	7.65	82.62	0	272,023,142	6.61	0.86	-4.42	32.36
CL	1,861,114	12.99	199.49	29,247	225,223,526	6.30	0.52	0.28	0.61
HC	11,839,920	10.83	151.50	1,722,011	722,892,023	7.16	0.37	0.99	1.40
HR	7,111,522	2.54	8.35	1,571,275	49,873,747	6.88	0.25	0.61	0.42
GV	4,274,586	6.65	64.69	539,813	136,182,655	6.68	0.37	0.62	0.76
GP	4,045,077	10.55	145.49	560,431	218,783,862	6.67	0.36	0.97	1.49
GF	89,407	6.56	56.80	61	7,767,428	4.93	0.69	-0.22	1.03
NRE	14,634	4.50	29.23	430	547,733	4.23	0.50	0.40	-0.08

Figure 1. Compared distributional characteristics of non-transformed and transformed accounts

None of the local authorities are left out. The accounts are those included in one of the models constructed. For non-transformed accounts, the median, skewness, kurtosis, minimum and maximum are displayed. For transformed accounts, the mean, standard deviation, skewness, kurtosis are displayed. The base of logs is 10. Skewness and kurtosis are estimated so that if zero the distribution is normal.

	BR	BTT	BLIM	NR	RCT	FIT	CA	DC	TL	TD	CL	HC	HR	GV	GP	GF
BTT	0.65															
BLIM	0.02	0.64														
NR	-0.01	0.30	0.50													
RCT	0.17	0.52	0.66	0.29												
FIT	0.09	0.54	0.77	0.41	0.57											
CA	-0.13	0.44	0.84	0.45	0.66	0.65										
DC	-0.25	0.29	0.74	0.41	0.40	0.54	0.91									
TL	0.66	0.92	0.73	0.36	0.61	0.62	0.52	0.36								
TD	0.67	0.77	0.42	0.21	0.34	0.36	0.26	0.17	0.74							
CL	0.34	0.69	0.74	0.34	0.60	0.61	0.51	0.34	0.79	0.44						
HC	0.03	0.64	0.99	0.50	0.66	0.77	0.84	0.74	0.74	0.42	0.74					
HR	0.00	0.54	0.88	0.46	0.55	0.70	0.71	0.64	0.63	0.35	0.63	0.88				
GV	-0.02	0.59	0.97	0.51	0.64	0.72	0.80	0.70	0.69	0.38	0.74	0.97	0.85			
GP	0.04	0.63	0.97	0.46	0.67	0.75	0.79	0.67	0.72	0.41	0.74	0.97	0.85	0.92		
GF	0.61	0.77	0.57	0.29	0.51	0.54	0.38	0.22	0.84	0.62	0.64	0.57	0.48	0.52	0.57	
NRE	0.08	0.65	0.95	0.48	0.62	0.74	0.77	0.67	0.74	0.45	0.74	0.94	0.85	0.91	0.91	0.59

Figure 2. Pierson correlation coefficients matrix of log-transformed accounts

BR exhibits a declining drift throughout the period. The number of municipalities with BR larger than the unit (non-compliant) also decreases. Ratios that exhibit a significant correlation with BR include leverage ratios such as ET/TL and TL/AT, as well as the manner in which interest paid is balanced with revenues (GF/HT) or state handouts (GF/HR).

Total Borrowing (BTT) is a size-related sum that mimics Total Liabilities (TL). Even after accounting for size (SIZE), BTT still is correlated with TL, but there are inconsistencies between a number of instances of BTT and TL. For example, in 2017, fluctuations in BTT are aligned with fluctuations in TL in 1245 instances and not aligned in 88 instances. The Borrowing Limit (BLIM) also exhibits some correlation with TL, which subsist after controlling for SIZE.

Over the entire period, the annual average BTT exhibits an increasing trend, whereas both BLIM and TL show decreasing trends. In contrast, the annual average SIZE remains stable.

4. MODELLING MUNICIPAL BORROWING

Once a robust methodology is established to uncover the factors driving variations in municipal borrowing, analysts can more readily determine which entities exhibit more or less predictable borrowing patterns. Confidently predicted variations reflect consistency with publicly available information, while variations that are not predicted with sufficient confidence by the models indicate a mismatch with what this information suggests and should be carefully monitored. This section illustrates the use of the two-stage method in the construction of loglinear models to support the analysis of municipal debt. Total Borrowing cannot be modelled using this method because it is a size-related amount rather than a ratio. Instead, variations in Total Borrowing and Total Borrowing descaled by other amounts are modelled. Of these, the Borrowing Ratio (BR) is the most meaningful.

BR is first modelled using a 2016-2018 pooled regression. In the first stage of the method, a ‘stepwise’ procedure identifies five highly significant accounts, namely liabilities (TL, TD), liquid assets (DC), regular income (HC), costs of services (GV). Isolation (IS) is also significant. The regression form (where the unexplained term is assumed) is:

$$\log BR = -0.4 - 0.04 \log DC + 0.1 \log TD + \log TL - 0.1 \log GV - 0.9 \log HC + 0.03\, IS \quad (11)$$

accounting for 92 percent of $\log BR$ randomness ('R-squared'). There are 924 cases (3 times 308) and no outliers, that is, Cook's distances (Weisberg and Cook, 1982) of each case are not over 1.

The five significant accounts included in (11) are then combined into four ratios, e.g.:

$$\log BR = -0.1 + 0.03 \log \frac{LTD}{TL} - \log \frac{HC}{TL} - 0.07 \log \frac{GV}{TD} - 0.03 \log \frac{DC}{TD} + 0.02\, IS \quad (12)$$

R-squared and unexplained sums of squares are unaltered. Other, equally feasible regression is:

$$\log BR = -0.1 - 0.03 \log \frac{TD}{TL} - \log \frac{HC}{TL} - 0.07 \log \frac{GV}{DC} + 0.1 \log \frac{TD}{DC} + 0.02\, IS \quad (13)$$

While forms (12) and (13) are the same, analysts may prefer one over the other.

Because the second stage of the method involves manually combining a small number of preselected accounts, it eliminates the need to sift through extensive lists of ratios to identify the most appropriate ones. Using ratios, as in (12) and (13), instead of accounts, as in (11), introduces economic significance and size invariance into the form, with no loss of explanatory ability relative to (11), in which the accounts are free to express the influence of size and there is an extra predictor. Therefore, the parameters in equation (11) must be formulated as linear association structures in which the effect of size on certain accounts is counterbalanced by its effect on other accounts, as detailed in the relevant section. If not, (12) would necessarily have curtailed the R-squared relative to (11).

The residuals of (12) or (13), i.e., the differences between the observed $log\ BR$ and the $log\ BR$ predicted by the regression play an important role in the model-based analysis proposed in this chapter, as the largest among them indicate unanticipated variations in municipal borrowing. Although the accounts have exponential behaviour, the use of loglinear regressions makes their residuals behave normally. With normally distributed residuals, the larger the residual, the lower the confidence with which a given case is predicted, and vice versa.

The pooled BR regression is now repeated using standard regression to test the power of loglinear modelling and the two-stage method. The picking tool chooses 12 ratios from a set of 34 indicators. The R-squared obtained with this initial form is 91 percent, but there are multiple cases where the Cook distance is greater than one, and whenever one of these outliers is removed, the set of picked indicators becomes different, and new outliers emerge. The regression parameters are obviously dominated by outliers. To reach some stability it is necessary to keep only four indicators, yielding an R-squared of 88 percent. The relative importance of these four ratios to the total R-squared in uneven and so are the standard errors of coefficients. This impacts unfavourably the generalising ability of the standard model.

Crucially, the residuals obtained through the standard method do not permit the distinction between anticipated and unanticipated cases, due to the large number of extreme values inherent in the distributional properties of multiplicative data. This is illustrated in Figure 2, which shows an excessive number of residuals lying beyond three standard deviations above and below zero. In the normal distribution, the probability of cases falling outside this range should be less than 1 percent. Given the central role of residual analysis in detecting unanticipated variations in municipal debt, the standard method is not considered appropriate for the purpose.

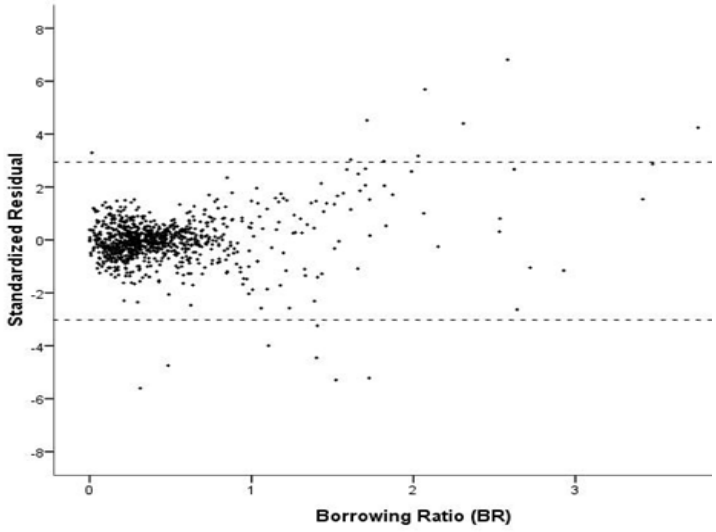

Figure 3. Scatterplot of the residuals of the standard regression with the Borrowing Ratio

Dashed lines limit the range of residuals to less than three standard deviations above and below zero; in the normal distribution, the likelihood of cases falling outside this range should be less than 1 percent.

Pooled regressions such as the one just presented may be useful as examples, but they are inappropriate for explaining $log\ BR$ since any variation in the attributes of local authorities is expected to be reflected in the following periods, not just in the period in which it takes place. Thus, residuals in regressions may be associated with each other, questioning the validity of the technique. Adding variations from the previous to the current period to the regression should result in less distorted and less verbose models. Accordingly, the regression to be constructed next, while using data from an identical period (2016-2018) includes accounts from one year before ('lag' variables) and the respective differences expressed in relative terms, as in (6). The use of relative differences does not introduce size effects into regression forms, as local authorities are not amenable to changes in size, at least in the short term.

In the first stage, there are now 82 additional predictors to choose from. Five predictors that entered (11) are also chosen here, but two of them, DC and HC, are from the previous year.

The change in Long-Term Debt $log\,TD - log\,TD_{t-1}$ (written as $log\,TD/TD_{t-1}$) is also chosen, leading to the model form:

$$log\,BR = -0.3 - 0.04\,log\,DC_{t-1} + 0.1\,log\,TD + log\,TL - log\,HC_{t-1} - 0.1\,log\frac{TD}{TD_{t-1}} + 0.03\,IS \qquad (14)$$

with an R-squared of 92 percent, therefore not smaller than what (11) achieves, while (14) is less verbose than (11). In the second stage, four accounts are combined into three ratios. The form:

$$log\,BR = -0.2 + 0.03\,log\frac{DC_{t-1}}{TL} - 0.1\,log\frac{TD}{TL} - log\frac{HC_{t-1}}{TL} - 0.1\,log\frac{TD}{TD_{t-1}} + 0.02\,IS \qquad (15)$$

is a candidate outcome with R-Squared identical to (14) and one less parameter.

The model to be described next forecasts unanticipated variations in $log\,BR$ that take place from one period to another and is more accurate and less biased than the previous ones because it incorporates the drift observed in $log\,BR$ for each municipality. Forecasted variations are unanticipated since the anticipated ones, i.e. the two-year drift, are eliminated prior to model construction. Data to be used in this example are from year 2017 and before, and the variations to be forecasted are those in 2018 relative to 2017. The drift is estimated and eliminated from the trajectory of each municipality's $log\,BR$ using the following steps:

- Compute the first differences of the log-transformed BR: Calculate $log\,BR - log\,BR_{t-1}$ for 2016-2015, 2017-2016, and 2018-2017.
- Average 2016-2015 and 2017-2016. Let it be called '2017 mean'. Average 2017-2016 and 2018-2017. Let it be called '2018 mean'.
- Deduct from $log\,BR$ of 2017 and 2018 the respective means as in 2. Call 'DTR' to the deducted $log\,BR$ in 2017, the same for 2018.

- Finally, $DIN = DTR_{2018} - DTR_{2017}$ is the variable to be forecasted by the regression.

In the first stage, five variables are chosen, of which two are the changes in TD and CA, and the other three are GF and the lagged TL and TD. These three form two ratios. The final form is:

$$DIN = -0.004 + 0.2\, log\frac{TD}{TD_{t-1}} - 0.1\, log\frac{CA}{CA_{t-1}} + 0.09\, log\frac{GF}{TD_{t-1}} - 0.05\, log\frac{GF}{TL_{t-1}} \quad (16)$$

which has four predictors and the R-squared, at 24 per cent, is identical to that of the first stage. This forecasting procedure eliminates drifts and any 'fixed' influences that do not change over time, as is the case for much of the variability observed in local authorities.

Since (16) can forecast $log\ BR$ variation one year ahead, it will be able to estimate, e.g., the 2025 change relative to 2024 before the 2025 BR is released. However, such a possibility will most likely be considered less valuable than using the DIN residuals to identify and analyse highly unanticipated variations. Since (16) includes the main sources of variability—namely drift, fixed effects, and significant predictors—should be explicitly accounted for. Any substantial unanticipated variation, beyond what is explained by these components, warrants further investigation.

An out-of-sample test of the forecasting ability of (16) can be performed by creating a binary variable that identifies each of the 308 local authorities in terms of whether DIN is below or above its median. Two samples are then drawn, one to build the logit model that predicts this binary variable using the predictors in (16), and another to test the accuracy. The classification is correct 72 percent of the time (12 percent better than tossing a fair coin) which represents a significant gain in information about future BR variations. Logit models can be used to predict when there will be an increase or decrease in BR.

Z-scores (Taffler, 1982) can also be obtained by isolating the 23 cases where BR is above 1 (not compliant) and then sampling 23 more cases from the 285 ones where BR is below 1 (compliant) to match the not compliant sample regarding IS frequency. The Z-score is then built, yielding :

$$Z = 2 - 16\ log\ GP/TL - 19\ log\ HC/TL - 8\ log\ GV/GP - 2\ log\ \ DC/GP \qquad (17)$$

Z above zero is an indication of likely non-compliance in the near future. Out-of-sample accuracy of 82 percent is obtained by constructing a model with 2016 data and testing it with 2017 data.

A comparable Z-score uses prior BR information to account for fixed effects, namely:

$$Z = 14 - 8\ log\frac{BR}{BR_{t-1}} - 9\ log\frac{HR}{GF} \qquad (18)$$

This form suggests that the future BR will be the same as the current BR unless the borrowing costs (GF) top some fraction of the state handouts (HR). Out-of-sample, (18) and (17) have identical accuracy. Obviously, $log\ BR - log\ BR_{t-1}$ contains abundant evidence concerning upcoming variations in BR, as seen in (16), where DIN is such a variation after eliminating the drift.

Although the two-stage method cannot model BTT directly, it can model its change from one period to another because size is stable over time so variations in BTT are size-independent. Models can be designed to draw attention to extreme cases of unanticipated BTT variation through any procedure that distinguishes the lowest from the highest residuals. The example now presented uses regression followed by logit model. First, a regression is constructed to describe the relative changes $log\ BTT - log\ BTT_{t-1}$. The two-stage method yields the form:

$$log\frac{DTT}{DTT_{t-1}} = 0.03 + 0.8\,log\frac{TL}{TL_{t-1}} - 0.02\,log\frac{TD}{TD_{t-1}} + 0.05\,log\frac{CL}{CL_{t-1}} - 0.2\,log\frac{HC}{HC_{t-1}} - 0.01\log\frac{TD}{GF} \quad (19)$$

The R-Squared is 65 percent. Thereafter, the outer residuals from (19), e.g. their first and last quartiles, are coded 1, while the inner residuals, e.g. the quartiles around the median, are coded 0. When a logit model predicts this coded variable, 68 percent of cases are correctly classified out of sample. The form of the respective score is:

$$Z = 3 + 2\,log\frac{NR}{NR_{t-1}} + 0.1\,log\frac{RCT}{NRE} + 0.7\,log\frac{FIT}{NRE} - 2\,log\frac{TL_{t-1}}{NRE} + 0.9\,IS \quad (20)$$

The higher the Z, the more likely it is that abrupt changes in BTT will take place. In contrast to earlier models, the focus here is on the balance between changes in natural resources (NR), investments (FIT), receivables (RCT) and previous year liabilities (TL), deflated by the number of residents (NRE). This indicates that these local authorities are resource-rich yet sparsely populated. The positive and statistically significant coefficient of the remoteness dummy supports this interpretation.

The models presented in this section suggest, as expected, that adverse increases in borrowing among Portuguese municipalities are associated with several key factors: existing liabilities, regular revenue streams, fixed expenditures, the availability (or lack) of liquid assets, the presence (or absence) of state subsidies, and the cost of borrowing. Geographical remoteness is also significant. Investments, receivables, and changes in natural resources, do not have impact on debt but indicate vulnerability to debt shocks. These or other similar models can assist the analyst's work by highlighting issues that need to be investigated in relation to outlying residuals. Furthermore, prior to the release of BR and BTT, the models can yield useful analyses such as What-If or Ceteris Paribus charts.

Identifying the local authorities with the highest residuals can serve as an early warning for analysts, highlighting potential risk cases. Comparing the position of a given municipality's residuals or predicted values in successive years will help analysts to identify trends in each municipality. For example, the models presented in (16) and (17) identified anomalous variations in the $DTR_{T+1} - DTR_T$ of the municipalities with abbreviations SV, NRD, FREC, and POR in 2018, and VRSA, MAF, NRD, and BEL in 2019. Indeed, when the official figures were released, these municipalities exhibited the largest increases in their Borrowing Ratios.

Due to the evolving economic and regulatory environment of municipal operations, models will need to be reconstructed periodically, hence the advantage of using the two-stage method to streamline the identification of the appropriate ratios.

CONCLUSION

This chapter has presented a statistical approach to identifying the key drivers of municipal borrowing, as well as detecting local authorities whose borrowing levels exceed what would be expected based on publicly reported figures. The methodology is grounded in log-linear modelling of financial statement data. It has been shown that the conventional search for appropriate financial ratios can be bypassed, and that the analysis of model residuals offers a meaningful diagnostic tool. Empirical illustrations were drawn from Portuguese local authorities. However, this approach may also prove valuable in uncovering hidden or opaque debt in other contexts.

Financial data from sets of accounts typically follow multiplicative random processes, which renders them unsuitable for standard linear regression techniques. In such cases, parameter estimates can be significantly distorted by high-impact outliers, and the presence of exponential heteroskedasticity complicates, if not precludes, meaningful analysis of residuals. For this reason, many authors advocate log-transforming multiplicative variables before use to make them additive. Although log transformation is used in econometric models as a prescription for mitigating heteroscedasticity, the rationale for its use has not been incorporated into standard practice.

This is regrettable because only a clear comprehension of the fundamentals of exponential data can lead to superior financial models and streamlined model construction.

The chapter has demonstrated that inconsistencies between observed and expected debt levels, as well as anomalous increases in borrowing, can be identified through log-linear regression models. These models effectively control for size effects by transforming variables multiplicatively, thereby allowing the construction of variable combinations from which economically meaningful ratios naturally emerge. Ratios are therefore derived from the estimation process rather than from a tedious and arbitrary routine. This also makes it easy to reconstruct models as regulatory or other circumstances evolve.

Loglinear models are functional forms with relevant structural meaning but should not be transformed back to the original non-log values for comparing the significance of effects (Dambolena et al., 2009). However, there is nothing to prevent their use in facilitating the discovery of relevant predictors and true outliers, while constructing robust models capable of reflecting accurately the multiplicative reality, as is done here.

In terms of limitations, this approach can be used with regressions to support the analysis of municipal borrowing, but there are restrictions on the use of the loglinear form and the two-stage method, namely that the predicted variable must be unrelated to size, that at least two accounts must be selected in the first stage to allow for size offsetting, and that transformation (6) should not be used when size is unstable. The effectiveness of this method—as well as the use of financial ratios more broadly—would be undermined in the presence of very small magnitudes, non-existent values, or when the underlying distribution follows a three-parameter lognormal form. However, such conditions are generally not observed in the financial data reported in sets of accounts.

REFERENCES

Adams J., Hayunga D., Mansi S., Reeb D., Verardi V., 2019. Identifying and treating outliers in Finance. Financial Management 48: 345–384.

AREB 2014. Annual report of the executive board of the IMF: Stabilization and Sustainability.

Balaguer-Coll, M., Prior, D., Tortosa-Ausina, E., 2016. On the determinants of local government debt: Does one size fit all? International Public Management Journal, 19(4), 513-542.

Barnes, P., 1990. The prediction of takeover targets in the U.K. by means of multiple discriminant analysis. Journal of Business Finance and Accounting, Vol. 17 No. 1 pp. 73-84.

Back, B., Laitinen, T., Sere, K., van Wezel, M., 1996. Choosing bankruptcy predictors. Turku Centre for Computer Science Technical Report, 40(2), 1-18.

Cabaleiro, R., Buch, E., Vaamonde, A., 2013. Developing a method for assessing municipal financial health. The American Review of Public Administration, Vol. 43, No. 6, pp. 729–751.

Choate, G., Thompson, F., 2017. The conditional irrelevance of municipal capital structure. In Handbook of debt management (pp. 129-140). (Routledge).

Dambolena, I., Eriksen, S., Kopcso, D., 2009. Logarithmic Transformations in Regression: Do You Transform Back Correctly? PRIMUS, 19:3, 280-295.

Dechow, P., Weili, G., Larson, C., Sloan, R., 2011. Predicting material accounting misstatements, Contemporary Accounting Research, Vol. 28 No. 1 pp. 17–82.

Dos Santos, P. G. and Fábio, A. 2023. Does the Average Payment Period Play a Relevant Role in Explaining the Portuguese Municipalities' Financial Distress?, Economies, Vol. 11(7), 183

Gordon, G. and Guerron-Quintana, P. (2024) On regional borrowing, default, and migration. Journal of International Economics, 150.

Hájek, P., 2010. Municipal credit rating modelling by neural networks, Decision Support Systems, Vol. 50(1), 108-118.

Hildreth, W., Miller, G., 2002. Debt and the local economy: Problems in benchmarking local government debt affordability. Public Budgeting & Finance, 22(4), 99-113.

Johnson, N., Kotz, S., Balakrishnan, N., 1994. Lognormal distributions, Continuous Univariate Distributions, Vol. 1 (Wiley, New York).

Kablan, A., 2020. Z-Score to forecast financial distress of local governments, Journal of Business Research 12(1), 498–509.

Kotia, A., Lledó, V., 2016. Do subnational fiscal rules foster fiscal discipline? New empirical evidence from Europe. International Monetary Fund.

László, V., 2019. Local Government Debts in the EU countries. In 27th NISPAcee Annual Conference, data dostępu: 24.08. 2022.

Leone, A., Minutti-Meza, M., Wasley, C., 2019. Influential Observations and Inference in Accounting Research. The Accounting Review 94 (6): 337–364.

Letelier S., 2011. Theory and evidence of municipal debt in Chile. Public Choice, 146, 395-411.

Lipnick, L., Rattner, Y., Ebrahim, L., 1999. The determinants of municipal credit quality. Government Finance Review, 15(6), 35-35.

Lucas, R., 1978. On the size distribution of firms. The Bell Journal of Economics, 508-523.

Luttmer, E., 2011. On the mechanics of firm growth. The Review of Economic Studies, 78(3), 1042-1068.

McLeay, S., 1986. The Ratio of Means, the Mean of Ratios and Other Benchmarks. Finance, Journal of the French Finance Society, VII(1), 75--93.

Navarro-Galera, A., Rodríguez-Bolívar, M., Alcaide-Muñoz, L., López-Subires, M., 2016. Measuring the financial sustainability and its influential factors in local governments. Applied Economics, 48(41), 3961-3975.

Nevill, A., Holder, R., 1995. Scaling, normalizing, and per ratio standards: an allometric modelling approach, Journal of Applied Psychology, 79 (3):1027-1031.

Ou, J., 1990. The Information content of non-earnings accounting numbers as earnings predictors. Journal of Accounting Research, 28(1), 144–163.

Schuessler, K., 1974. Analysis of ratio variables: opportunities and pitfalls. American Journal of Sociology, 80(2), 379-396.

Snedecor, G., Cochran, W., 1989. Statistical Methods, 8th ed. (Iowa state University press).

Taffler, R., 1982. Forecasting company failure in the UK using discriminant analysis and financial ratios. Journal of the Royal Statistical Society Series A: Statistics in Society, 145(3), 342-358.

Tian, H., Guo, H., Yu, Y., 2015. Variable selection and corporate bankruptcy forecasts, Journal of Banking and Finance, Vol. 52-C pp. 89-100.

Trigueiros, D., 2019. Improving the effectiveness of predictors in accounting-based models. Journal of Applied Accounting Research, Vol. 20, No. 2, pp. 207–226.

Vasvári T. & Pocsai, E. (2025) Borrowing dynamics of Hungarian local governments – a decade of experience. Regional Statistics, 15 (1), 131–167

Wagner, R., 1970. Optimal local Borrowing Limitation. National Tax Journal, 23(3), 297-305.

Wang, S., 2004. Ratio discovery for optimal modelling of default rating. Journal of Applied Finance, 14(1), 20.

Watson, C., 1990. Multivariate distributional properties, outliers, and transformation of financial ratios, The Accounting Review, Vol. 65, No. 3, pp. 682–695.

Weisberg, S., Cook, D., 1982. Residuals and Influence in Regression (Chapman and Hall).

Wilcox, R., 2010. Fundamentals of Modern Statistical Methods (Springer, New York).

Wu, Y., Gaunt, C., Gray, S., 2010. A comparison of alternative bankruptcy prediction models. Journal of Contemporary Accounting & Economics, 6(1), 34-45.

Xu, W., Xiao, Z., Dang, X., Yang, D., Yang, K., 2014. Financial ratio selection for business failure prediction using soft set theory. Knowledge-Based Systems, 63, 59–67.

Yakymova, L., Kuz, V., 2019. Discriminate analysis to assess local government's financial health. Economics & Sociology, 12(2), 64–78.

Yang, L., 2019. The impact of state intervention and bankruptcy authorization laws on local government deficits. Economics of Governance, 20(4), 305-328.

Zafra-Gómez, J., Hernandez, A., Hernández, B., 2009. A model to measure financial condition in local government. The American Review of Public Administration, 39(4), 425-449.

Zhao, Y., Li, Y., Feng, C., Gong, C., Tan, H., 2022. Early warning of systemic financial risk of local government implicit debt based on BP Neural Network model. Systems, 10(6).

Table 1. Names and abbreviations of the financial non-financial attributes used in this chapter.

Abbrev.	Name	Abbrev.	Name
NR	Natural Resources	HX	Extraordinary Revenue, Gains
PPE	Property, Equipment	HR	Grants, Subsidies Received
FIT	Investments	HT	Revenue (total)
IMT	Fixed Assets (total)	KO	Operational Profit
RCT	Accounts Receivable	KFP	Financial Profit
DC	Cash, equivalents	KCP	Current Profit
TA	Assets (total)	KNP	Not Profit
EC	Capital	CF	KNP+GA
ER	Reserves	CA	Current Assets
ET	Equity (total)	CL	Current Liabilities
TD	Long-Term Debt	SIZE	$log\ TA$
TL	Liabilities (total)	GDPR	GDP per capita
AD	Accrued Expenses	SQKM	Municipal expanse
GV	Cost of Sales, Services	NRE	Population
GP	Personnel, Social Security Costs	NEM	Municipal employees
GA	Depreciation Costs	EMPR	Employment index
GO	Operational Costs	CRM	Crime index
GF	Financial Costs	PPR	Purchasing Power
GC	Current Costs	ATM	ATM per resident
GX	Extraordinary Losses	KWA	KWH Street lightening index
GT	Costs (total)	ILLITD	Female-male illiteracy gap
HV	Sales and Service Revenue	DEPEI	Total dependency index
HI	Taxes Collected	IS	Isolation (0, not remote, 1, remote)
HO	Operational Revenue	BTT	Total Borrowing
HF	Financial Revenue, Gains	BLIM	Borrowing Limit
HC	Current Revenue	BR	Borrowing Ratio (BTT/BLIM)

Table 2. Compared distributional characteristics of non-transformed and transformed accounts (2017).

	Non-transformed					Transformed			
	Median	Skewness	Kurtosis	Min.	Max.	Mean	Std. Dev.	Skewness	Kurtosis
BR	0.35	2.79	10.93	0.002	3.478	-0.48	0.40	-1.04	4.30
BTT	6,203,760	9.90	131.60	34,342	483,6	6.83	0.56	-0.27	1.39
BLIM	16,736,475	8.68	105.26	2,103,184	845,489	7.30	0.38	0.92	1.02
NR	28,417,998	7.96	76.88	0	1,054,55	7.42	0.57	-7.00	91.71
RCT	505,160	10.97	149.63	2,292	106,67	5.75	0.69	0.02	0.81
FIT	1,655,946	5.17	32.74	106,483	147,584,	6.29	0.60	0.78	0.30
CA	2,882,793	9.02	109.00	134,256	331,99	6.51	0.55	0.57	0.67
DC	1,805,757	7.38	70.75	27,409	221,921	6.25	0.64	0.25	0.55
TL	6,874,820	10.44	143.26	242,004	497,24	6.87	0.50	0.14	0.52
TD	4,516,450	7.65	82.62	0	272,023,	6.61	0.86	-4.42	32.36
CL	1,861,114	12.99	199.49	29,247	225,223,	6.30	0.52	0.28	0.61
HC	11,839,920	10.83	151.50	1,722,011	722,892,	7.16	0.37	0.99	1.40
HR	7,111,522	2.54	8.35	1,571,275	49,873,7	6.88	0.25	0.61	0.42
GV	4,274,586	6.65	64.69	539,813	136,182,	6.68	0.37	0.62	0.76
GP	4,045,077	10.55	145.49	560,431	218,783,	6.67	0.36	0.97	1.49
GF	89,407	6.56	56.80	61	7,767,428	4.93	0.69	-0.22	1.03
NRE	14,634	4.50	29.23	430	547,733	4.23	0.50	0.40	-0.08

Caption: None of the local authorities are left out. The accounts are those included in one of the models constructed. For non-transformed accounts, the median, skewness, kurtosis, minimum and maximum are displayed. For transformed accounts, the mean, standard deviation, skewness, kurtosis are displayed. The base of logs is 10. Skewness and kurtosis are estimated so that if zero the distribution is normal.

Table 3. Pierson correlation coefficients matrix of log-transformed accounts (2017)

BTT	0.65															
BLIM	0.02	0.64														
NR	-0.01	0.30	0.50													
RCT	0.17	0.52	0.66	0.29												
FIT	0.09	0.54	0.77	0.41	0.57											
CA	-0.13	0.44	0.84	0.45	0.66	0.65										
DC	-0.25	0.29	0.74	0.41	0.40	0.54	0.91									
TL	0.66	0.92	0.73	0.36	0.61	0.62	0.52	0.36								
TD	0.67	0.77	0.42	0.21	0.34	0.36	0.26	0.17	0.74							
CL	0.34	0.69	0.74	0.34	0.60	0.61	0.51	0.34	0.79	0.44						
HC	0.03	0.64	0.99	0.50	0.66	0.77	0.84	0.74	0.74	0.42	0.74					

HR	0.00	0.54	0.88	0.46	0.55	0.70	0.71	0.64	0.63	0.35	0.63	0.88				
GV	-0.02	0.59	0.97	0.51	0.64	0.72	0.80	0.70	0.69	0.38	0.74	0.97	0.85			
GP	0.04	0.63	0.97	0.46	0.67	0.75	0.79	0.67	0.72	0.41	0.74	0.97	0.85	0.92		
GF	0.61	0.77	0.57	0.29	0.51	0.54	0.38	0.22	0.84	0.62	0.64	0.57	0.48	0.52	0.57	
NRE	0.08	0.65	0.95	0.48	0.62	0.74	0.77	0.67	0.74	0.45	0.74	0.94	0.85	0.91	0.91	0.59
	BR	BTT	BLIM	NR	RCT	FIT	CA	DC	TL	TD	CL	HC	HR	GV	GP	GF

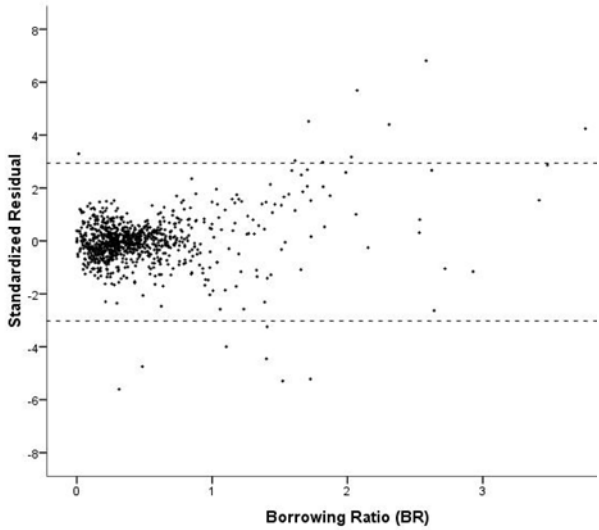

Figure 2. Scatterplot of the residuals of the standard regression with the Borrowing Ratio.

Caption: dashed lines limit the range of residuals to less than three standard deviations above and below zero; in the normal distribution, the likelihood of cases falling outside this range should be less than 1 percent.

CHAPTER 2
SALARY POLICY AS A MANAGEMENT AND MOTIVATION TOOL IN THE PUBLIC EDUCATION SYSTEM

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INTRODUCTION

In an era of accelerated change across all domains of everyday life—economic, social, technological, political, and cultural—organizations and enterprises are confronted with a wide range of challenges (Barroso, 2020), which they must address in order to adapt to contemporary realities and improve the products or services they offer to citizens (Bochulia, 2021; Kraus et al., 2022). Within this context, it is important to investigate the factors and incentives that ensure the quality of education provided by public educational institutions, by examining and analysing concepts such as salary remuneration, additional financial rewards, incentives, performance, and public education policies (Barroso, 2020; Lin et al., 2018; Grabowska & Saniuk, 2022; Kraus et al., 2022).

Ensuring high-quality teaching in contemporary education requires the recruitment and retention of high-calibre human resources. Salaries, financial benefits, additional remuneration and performance incentives, opportunities for professional development, organizational culture, and work climate, among others, constitute key factors that should be supported through public education policies in order to secure the continued presence of competent and experienced teachers in the classroom (Sadagheyani et al., 2022).

Considering that the effectiveness and success of both public and private organizations largely depend on their human resources and their development and advancement, the crucial role of incentives and motivation in employee productivity becomes evident (Hyland, 2005). Employees perform and produce effectively when they feel organizationally committed and satisfied with their work, when their efforts are recognized, and when their financial rewards meet their expectations (Lin & Joe, 2012; Webb, 1999). High-quality teaching is closely linked to teachers' professional competencies and performance (Amani & Jumriadi, 2020; Navas et al., 2020). Key factors influencing teachers' classroom performance include their satisfaction with salary remuneration (Gjefsen, 2020), the broader school and classroom environment (Altunova & Kalman, 2020; Hasbay & Altındağ, 2018).

Their cognitive competence and ability to create an effective learning environment (Van der Lans et al., 2020), opportunities for professional advancement and personal development (Che et al., 2021), as well as external factors and influences, such as social and economic conditions (Ashraf et al., 2019; Realyvásquez-Vargas et al., 2020).

Research indicates that job satisfaction, organizational commitment, and professional performance are associated with salary levels and financial incentives provided to human resources in education (Hongying, 2007; Song et al., 2020; Türkoğlu et al., 2017). Teachers' salaries, along with broader financial incentives, enhance both work efficiency and the quality of educational services delivered (Hao, 2023; Imam Makruf et al., 2020).

Although teachers' salary remuneration constitutes a strong incentive for improving professional performance (Gjefsen, 2020; Hao, 2023; Hongying, 2007; Imam Makruf et al., 2020; Song et al., 2020), other factors related to teachers' job satisfaction and their integration into the educational and school context should also be taken into consideration.

It therefore becomes evident that the design of education policy, as well as the formulation and implementation of public education policies by central authorities, directly and indirectly influence both the intrinsic and extrinsic incentives that enhance teachers' performance and the overall quality of education provided (Goldhaber, 2012; Ingersoll et al., 2018; Özgenel & Mert, 2019).

1. CHAPTER OBJECTIVE

The aim of this chapter is to highlight the significance of salary remuneration as a management tool, as well as the relationship between compensation, teachers' job satisfaction, and organizational commitment. Within this framework, key concepts will be examined, including contemporary management and leadership, additional remuneration, intrinsic and extrinsic incentives, motivation, and performance, all of which contribute to the effectiveness of public administration, the efficiency of teachers, and the overall performance of the public education system. The study and analysis of the factors influencing teachers' work are of particular importance, as they can support the improvement of educational practice and learning outcomes.

More specifically, the chapter seeks to investigate the impact of remuneration on human resource management, employee relations, the enhancement of teachers' performance and, by extension, students' achievement, as well as on the overall upgrading of the education provided. In summary, this chapter offers a clear and well-substantiated framework for strengthening and improving educational instruction through the use of remuneration as an effective tool of contemporary management, one that enhances teachers' job satisfaction while simultaneously fostering an effective and functional organizational culture within education.

2. LITERATURE REVIEW

Incentives and Their Role in Professional Performance

The quality of education provided depends on a multitude of factors that influence, in different ways, the final outcomes of the educational process. These include, for example, the job satisfaction and level of organizational commitment of human resources, salary policy, as well as broader public education policies that affect specific aspects of everyday school life, such as school infrastructure (Hartman et al., 2016; Schneider et al., 2017; Sivarajah et al., 2018), technological infrastructure (Romlah & Latief, 2021), and teachers' cognitive and pedagogical competence (Pusvitasari, 2021), among others. All of the above constitute incentives that strengthen efforts to enhance the quality of education and the educational work produced.

According to studies (Zeng et al., 2022; Ross, 2022), motivation describes the force that initiates behaviour and directs it toward the achievement of a goal in order to satisfy a specific need. Fiorelli (2004) defines motivation as a force that drives individuals in the direction determined by their internal needs. This dynamic leads individuals to become more productive and effective in their work, with benefits that often have multiplier effects (Kozłowski, 2020). According to Maximiniano (2000), incentives are classified into intrinsic incentives, which originate from the individuals themselves such as personal inclinations, interests, and skills and extrinsic incentives, which are generated by the conditions or environment in which individuals operate.

The objective of every organization and enterprise, therefore, is to create both intrinsic and extrinsic incentives that motivate employees to maximize their performance and achieve the best possible outcomes (Akparep et al., 2019; Kankisingi & Dhliwayo, 2022; Zeng et al., 2022; Ross, 2022).

Motivation is approached both as a cognitive process (Kim, 2013) and as a function of sociocultural variables that influence not only the actions individuals perform but also how they feel while acting, as well as the consequences of their actions (Vansteenkiste et al., 2020). For this reason, the motivational cycle is formed, whereby the human organism remains in a state of equilibrium until a stimulus disrupts it and creates a need (Billman, 2020). This need generates tension, replacing the previous state of balance. The tension leads to behaviour or action aimed at achieving some form of satisfaction through the fulfilment of the need. If the need is satisfied, the organism returns to its initial state of equilibrium until another stimulus appears. Each act of satisfaction essentially represents a release of tension that prompts action and allows a return to the prior state of balance (Moccia et al., 2018).

Incentives are embedded within an organization's culture as stimuli that lead to specific actions and desired outcomes (Akparep et al., 2019; Kankisingi & Dhliwayo, 2022). For instance, the provision of financial and material benefits and rewards by an organization can enhance performance and motivate employees to deliver higher-quality work (Ibrar & Khan, 2015). However, it should be emphasized that the combination of intrinsic and extrinsic incentives is more effective in motivating human resources and improving overall outcomes (Zeng et al., 2022; Ross, 2022).

3. FINANCIAL REWARD SYSTEMS AND JOB PERFORMANCE

In most public and private organizations and enterprises, salary and additional financial remuneration constitute the primary source of motivation (Bari, 2013; Meirinhos et al., 2023). According to Chiavenato (2006), salary is the monetary compensation paid by the employer to the employee in exchange for the services provided over a specific period of time.

In practice, whether as direct or indirect compensation, salary represents the main form of organizational reward, increasing individual motivation to improve job performance (Leitão et al., 2022; Setiawan et al., 2022).

Additional rewards provided to employees serve as supplementary compensation for their work (e.g. bonuses, shares, profit-sharing schemes), while indirect financial benefits (e.g. vouchers, private insurance) further enhance incentives for more efficient performance. Such reward systems render the productive model more effective and flexible, as employees are given the opportunity to choose benefits according to their individual needs (Cahyadi et al., 2022; Kankisingi & Dhliwayo, 2022). According to Kankisingi and Dhliwayo (2022), additional financial rewards enhance performance and foster innovation, and for this reason they constitute a key tool in business management and organization. It should be noted, however, that this process of motivating human resources must be continuously monitored and evaluated in order to be adjusted, improved, and to yield positive outcomes in each context (Rose, 2005).

Other studies highlight the importance of combining financial and moral incentives in enhancing job performance, as employees experience higher levels of job satisfaction and stronger organizational commitment (Gneezy et al., 2011; Elumah Lucas et al., 2016). Moral incentives are considered just as essential to job satisfaction as financial ones (Cho, 2012). Indeed, moral incentives generate positive emotional responses in employees, encouraging them to improve their effort, demonstrate greater dedication to their work, and increase productivity (Meirinhos et al., 2023).

Organizations and enterprises that lack adequate financial and moral reward incentives face the risk of low employee satisfaction and performance, as well as the loss of experienced and highly skilled personnel (Kalangulla, 2015). In particular, financial rewards such as salary, bonuses, promotions, opportunities for career advancement, and overall economic benefits derived from employment constitute decisive factors in enhancing job performance and positively influence employees' psychological well-being (Mohamad, 2009).

Nevertheless, some studies indicate that financial remuneration and economic incentives alone do not necessarily lead to the desired improvement in job performance and satisfaction (Belle, 2015).

Instead, they should operate in conjunction with other motivational factors, such as recognition of work effort, the cultivation of a collaborative organizational culture, and opportunities for personal and professional development.

4. THE ROLE OF SALARY IN THE JOB PERFORMANCE OF TEACHING STAFF

A substantial body of research focuses on the positive relationship between salary remuneration, job satisfaction, and job performance (Choi, 2017; Coomber, 2007; Hussain, 2003; Karatepe, 2006; Wolomasi et al., 2019). Teachers' salaries, as well as the prospect of salary increases, lead to higher levels of job satisfaction and constitute a key determinant of work efficiency, as they are perceived as recognition of the effort invested in professional duties (Hasanah & Supardi, 2020). Consequently, teachers who report high levels of satisfaction with their remuneration are more likely to approach their work with creativity and greater effectiveness compared to those who are dissatisfied with their salaries (Belfield & Heywood, 2008). Moreover, high levels of salary satisfaction are associated with reduced absenteeism, as teachers feel that their efforts and contributions are valued and acknowledged by their employing institutions (Utami et al., 2021; Dana, 2014; Ejere, 2010; Levorato et al., 2022; Lynch, 2012).

In addition, fair and competitive salary levels and supplementary financial rewards both attract highly qualified teaching staff and significantly reduce the proportion of teachers who leave the profession or translate frustration into professional underperformance. Fair and adequate salaries can strengthen perceptions of equity, ensuring that teachers are treated on an equal and just basis in comparison with other professional groups, thereby providing stronger incentives to exert greater effort to improve job performance (Kelley & Finnigan, 2004). When human resources perceive that salary and additional financial incentives correspond to their work, qualifications, experience, and the demands of the profession, they are more likely to perform more efficiently and remain committed to their professional role (Sahito & Väänänen, 2019).

Conversely, low salary levels are commonly interpreted as a lack of appreciation and recognition of teachers' work, as well as a broader devaluation of the profession by society (Basalamah & Asad, 2021). Low wages negatively affect the financial situation of educational personnel, reduce job satisfaction, increase work-related stress, and weaken organizational commitment, resulting in lower professional performance (Bottiani et al., 2019; Nyamubi, 2017; Schmidt & Jones-Fosu, 2019).

More broadly, teachers' salary levels reflect the value that public policies assign to citizens' education in each country, while simultaneously shaping societal perceptions of the importance of education. When teachers receive low and unsatisfactory remuneration relative to their qualifications, specialization, experience, and expertise, both the state and society at large signal a lack of recognition of the critical role teachers play in shaping productive and socially responsible individuals (Mushebo, 2015). This situation contributes to diminished self-esteem and self-confidence, factors that are closely linked to reduced job satisfaction (Hongying, 2007; Ouellette et al., 2018).

In summary, the relationship between teachers' salary satisfaction and professional performance is complex and multifaceted. Satisfaction with salary and additional financial incentives enhances overall job performance by strengthening motivation, commitment, and professional dedication. It also plays a significant role in teacher retention within the same school unit and contributes to teachers' psychological well-being.

5. SALARIES AND TEACHER MOBILITY

Teacher mobility and the movement of teachers from one school unit to another constitute a complex and global phenomenon (Seybert, 2023). Teachers change schools at regular intervals, as they tend to prefer institutions that offer higher financial remuneration, stronger incentives, and more favourable working conditions (Rage, 2022). This issue is particularly pronounced in very low-income countries (e.g. Zambia, Kenya), where teachers' salaries are extremely low and additional financial incentives are largely absent (Kiyundo Zikanga, 2021).

A large proportion of newly recruited teachers leave the public education workforce, pursuing alternative career paths, while in countries such as Australia, England, Scotland, Sweden, and the United States, a significant number of experienced teachers exit the profession several years before reaching retirement age (Kiyundo Zikanga, 2021). In other countries (e.g. Turkey), there is substantial teacher migration from rural and provincial areas to major urban centres. A primary driver of these movements and career changes is low pay and poor working conditions (Seybert, 2023).

Teachers' salaries and issues of mobility are the subject of ongoing debate in the United States of America. A central proposal in this discussion is that teachers should be remunerated competitively based on their experience, competencies, and skills, with a particular emphasis on performance-based pay linked to student progress and achievement (Seybert, 2023).

6. CHALLENGES AND ETHICAL ISSUES

The use of salary policy and financial incentives as instruments of management and motivation within the public education system is accompanied by significant challenges and ethical concerns, which must be carefully considered in the design and implementation of relevant policies. Although financial remuneration constitutes a strong factor in enhancing teachers' job satisfaction and professional performance, a one-dimensional or uncritical linkage between pay and performance may generate unintended consequences.

One of the primary challenges concerns the fair and reliable evaluation of educational work. The educational process is multifaceted and shaped by social, economic, cultural, and institutional factors that often lie beyond the direct control of teachers. Linking salary remuneration exclusively to measurable performance indicators, such as student achievement, may lead to distortions, undermining qualitative dimensions of teaching, including the pedagogical relationship, inclusion, and students' social and emotional development. At the same time, issues of equality and social justice arise, as teachers working in schools with adverse socioeconomic conditions may be placed at a disadvantage within performance-based pay systems.

Unequal resource allocation, diverse student learning needs, and limited infrastructure can affect educational effectiveness, thereby generating inequalities and reinforcing phenomena of professional frustration and the weakening of educational practice.

Another ethical concern relates to the risk of undermining teachers' intrinsic motivation. Excessive emphasis on external financial incentives may diminish the sense of pedagogical vocation and professional mission, transforming teaching into a process of competition and individual reward-seeking. In such cases, collaboration, collective culture, and the sharing of good practices within the school environment may be compromised.

Finally, a major challenge lies in ensuring transparency and institutional credibility in the management of salary policies. The absence of clear criteria, ambiguous goal-setting, and the lack of teacher participation in decision-making processes may foster distrust. For this reason, any intervention in the area of remuneration should be grounded in principles of transparency, meritocracy, and pedagogical responsibility. Overall, the effective and ethically sound use of salary remuneration in education requires a balanced approach that integrates economic, pedagogical, and social criteria, ensuring both teachers' professional well-being and the quality and social mission of public education.

7. RECOMMENDATION

Considering the close relationship between salary remuneration, job satisfaction, organizational commitment, and the quality of educational work, it is necessary to formulate targeted and effective policies that utilize salary and financial incentives as efficient management tools within the public education system.

At the level of education policy, a revision of existing salary structures is recommended, with the aim of ensuring fair and competitive remuneration that reflects teachers' qualifications, experience, and the increasing demands of the teaching profession.

Salary policy should incorporate merit-based evaluation while also taking into account specific working conditions (e.g. geographical location and the socioeconomic characteristics of school units), in order to reduce inequalities in the distribution of teaching staff and to limit excessive teacher mobility.

At the same time, the implementation of supplementary financial incentives—such as additional remuneration, allowances, and benefits—is considered appropriate. These incentives should not be linked exclusively to performance, but also to continuous professional development, participation in innovative pedagogical practices, and teachers' contributions to the school community. Linking incentives to multidimensional and qualitative criteria can strengthen teacher motivation while simultaneously avoiding the risks associated with biased and one-dimensional evaluation approaches.

Furthermore, the adoption of a comprehensive motivation system is proposed, combining financial incentives with moral and social incentives. Recognition of teachers' work, enhancement of professional autonomy, the cultivation of a positive working climate, and the provision of opportunities for training and career development can operate in a complementary manner to salary remuneration, thereby reinforcing overall job satisfaction and teachers' commitment.

Finally, at the level of research and policy evaluation, the systematic monitoring and assessment of salary interventions and incentive systems implemented in education are recommended. The collection of empirical data and the comparative analysis of international practices can contribute to evidence-based decision-making, enhancing transparency, effectiveness, and the long-term sustainability of educational administration.

CONCLUSION

The qualitative enhancement of public education requires competent teachers who possess knowledge, skills, and abilities, as well as the willingness to contribute effectively within the contemporary educational environment. Teachers' performance plays a central role in the educational process and, by extension, in students' academic achievement.

Salary and, more broadly, the financial benefits afforded to human resources in education can contribute significantly to the success and improvement of educational outcomes (Azeem et al., 2018). Conversely, low salary levels may have a substantial negative impact on various aspects of teaching practice, such as lesson planning, the use of instructional materials, as well as teachers' accuracy, sense of responsibility, and consistency.

The importance of teachers' financial remuneration is critical for the improvement of both the learning process and student performance. As educational institutions increase financial incentives, a greater number of capable and experienced teachers are likely to choose and remain within these institutions, thereby enhancing instructional outcomes (Seybert, 2023). According to the economic theory of efficiency wages, well-remunerated teachers are more likely to work diligently and with commitment in order to retain their positions and maintain favourable salary conditions (Admiraal, 2023). Indeed, teachers' remuneration has a significant impact on the effectiveness of their teaching and on students' overall educational experience.

Teachers' instructional performance is shaped by the manner in which they are treated by their respective educational institutions. The fair provision of financial remuneration and incentives based on actual job performance—grounded in the ratio between performance and output—strengthens feelings of satisfaction and recognition of the work performed (Seiph, 2021). This, in turn, leads to higher-quality teaching and an overall upgrading of the education provided.

At a global level, public education policies increasingly demonstrate a trend toward linking salaries and additional remuneration to performance, evaluation of teaching work, meritocracy, and student achievement throughout the academic year (Hughes, 2016; Mukomana, 2021). Teacher compensation programs aimed at improving the learning process and student performance include additional remuneration, bonuses, and allowances, and seek to provide incentives that motivate teachers toward improved job performance (Seiph, 2021). The purpose of performance-based remuneration is to motivate teachers to achieve high levels of performance, as well as to attract and retain capable and effective teaching professionals (Ehineni, 2017; Jyoti, 2017; Mookkiah & Prabu, 2019).

The first step toward upgrading public education is understanding the factors that enhance teachers' job satisfaction, organizational commitment, and, more broadly, the creation of a contemporary and pedagogically sound learning environment. Effective teaching is delivered by capable teachers who are both cognitively and pedagogically well trained and, above all, satisfied with their financial remuneration and working conditions.

REFERENCES

Admiraal, W. (2023). Teachers' work conditions and their job satisfaction in primary and secondary education. In Teachers' work conditions and their job satisfaction (pp. 1–12).

Akparep, J., Jengre, E., & Mogre, A. A. (2019). The influence of leadership style on organizational performance at TumaKavi Development Association, Tamale, Northern Region of Ghana. Open Journal of Leadership, 8(1), 1–22. https://doi.org/10.4236/ojl.2019.81001

Altunova, N., & Kalman, M. (2020). Factors affecting classroom teachers' job performance: A qualitative-dominant analysis with Q-sorting. Research in Pedagogy, 10(2), 285–312.

Amani, M., & Jumriadi, A. H. (2020). The influence of school principal supervision, motivation, and work satisfaction on teachers' performance. Revista Argentina de Clínica Psicológica, 29(5), 804–810. https://doi.org/10.24205/03276716.2020.1078

Ashraf, N., Yasin, M., Farid, G., Ahmad, S., & Khaliq, M. T. (2019). The impact of socio-economic characteristics of school teachers on their job performance. Journal of Economic Impact, 1(2), 59–63.

Azeem, N., Omar, M. K., & Education, V. (2019). Exploring teacher performance: A review of concepts and approaches. In Graduate Research in Education Seminar (GREduc) 2018: Revolutionalising research practices in education and human resource development (Vol. 2.0, pp. 108–118).

Bari, N., Arif, U., & Shoaib, A. (2013). Impact of nonfinancial rewards on employee attitude and performance in the workplace: A case study of business institutes of Karachi. International Journal of Scientific & Engineering Research, 4(7), 255–261.

Barroso, P. (2020). Contemporary world-society: From the globalization of communication to the communicational globalization of the world. International Journal of Philosophy & Social Values, 3, 55–80. https://doi.org/10.34632/philosophyandsocialvalues.2020.3.1

Basalamah, M. S. A., & Asad, A. (2021). The role of work motivation and work environment in improving job satisfaction. Golden Ratio of Human Resource Management, 1(2), 94–103.

Belfield, C. R., & Heywood, J. S. (2008). Performance pay for teachers: Determinants and consequences. Economics of Education Review, 27(3), 243–252. https://doi.org/10.1016/j.econedurev.2007.09.012

Belle, N., & Cantarelli, P. (2015). Monetary incentives, motivation, and job effort in the public sector: An experimental study with Italian government executives. Review of Public Personnel Administration, 35(2), 99–123. https://doi.org/10.1177/0734371X13520578

Billman, G. E. (2020). Homeostasis: The underappreciated and far too often ignored central organizing principle of physiology. Frontiers in Physiology, 11, Article 200. https://doi.org/10.3389/fphys.2020.00200

Bochulia, T. (2021). Digital business transformation: Trends, innovative models, a development program. E3S Web of Conferences, 307, Article 02001. https://doi.org/10.1051/e3sconf/202130702001

Bottiani, J. H., Duran, C. A., Pas, E. T., & Bradshaw, C. P. (2019). Teacher stress and burnout in urban middle schools: Associations with job demands, resources, and effective classroom practices. Journal of School Psychology, 77, 36–51. https://doi.org/10.1016/j.jsp.2019.10.002

Cahyadi, A., Marwa, T., Hágen, I., Siraj, N., Santati, P., Poór, J., & Szabó, K. (2022). Leadership styles, high-involvement human resource management practices, and individual employee performance in small and medium enterprises in the digital era. Economies, 10(7), Article 162. https://doi.org/10.3390/economies10070162

Che, W., Li, J., & Geng, R. (2021). Influencing factors affecting work performance and personal career development—Taking college music teachers as an example [Article withdrawn]. Aggression and Violent Behavior, 58, Article 101714. https://doi.org/10.1016/j.avb.2021.101714

Chiavenato, I. (2006). Gestão de pessoas. Elsevier.

Cho, Y. J., & Perry, J. L. (2012). Intrinsic motivation and employee attitudes: Role of managerial trustworthiness, goal directedness, and extrinsic reward expectancy. Review of Public Personnel Administration, 32(4), 382–406. https://doi.org/10.1177/0734371X11421495

Choi, E.-K., & Joung, H.-W. (2017). Employee job satisfaction and customer-oriented behavior: A study of frontline employees in the foodservice

industry. Journal of Human Resources in Hospitality & Tourism, 16(3), 235–251. https://doi.org/10.1080/15332845.2017.1266868

Coomber, B., & Barriball, K. L. (2007). Impact of job satisfaction components on intent to leave and turnover for hospital-based nurses: A review of the research literature. International Journal of Nursing Studies, 44(2), 297–314. https://doi.org/10.1016/j.ijnurstu.2006.02.004

Dana, L. B. (2014). Relationships among job satisfaction, professional efficacy, student and school performance, and teacher absenteeism (Doctoral dissertation, The University of Southern Mississippi).

Ehineni, J. O. (2017). Teachers' morale and academic performance of secondary school students in South West Nigeria. Teacher Education and Curriculum Studies, 2(5), 68–73. https://doi.org/10.11648/j.tecs.20170205.12

Ejere, E. I. (2010). Absence from work: A study of teacher absenteeism in selected public primary schools in Uyo, Nigeria. International Journal of Business and Management, 5(9), 115–123.

Elumah Lucas, O., Ibrahim Olaniyi, M., & Shobayo Peter, B. (2016). The impact of financial and moral incentives on organizational performance: A study of Nigerian universities. Arabian Journal of Business and Management Review, 6(2).

Fiorelli, J. O. (2004). Psicologia para administradores. Atlas.

Gjefsen, H. M. (2020). Wages, teacher recruitment, and student achievement. Labour Economics, 65, Article 101848. https://doi.org/10.1016/j.labeco.2020.101848

Gneezy, U., Meier, S., & Rey-Biel, P. (2011). When and why incentives (don't) work to modify behavior. Journal of Economic Perspectives, 25(4), 191–210. https://doi.org/10.1257/jep.25.4.191

Goldhaber, D. (2012). Teachers matter, but effective teacher quality policies are elusive. In D. Goldhaber (Ed.), Handbook of research in education finance and policy (pp. 168–187). Routledge.

Grabowska, S., & Saniuk, S. (2022). Assessment of the competitiveness and effectiveness of an open business model in the Industry 4.0 environment. Journal of Open Innovation: Technology, Market, and Complexity, 8(1), 57. https://doi.org/10.3390/joitmc8010057

Hao, D. (2023). Study on incentive factors and incentive effect differences of teachers in universities and colleges under the view of demographic variables. BMC Psychology, 11, Article 379. https://doi.org/10.1186/s40359-023-01426-6

Hartman, S. C., Warash, B. G., Curtis, R., & Day Hirst, J. (2016). Level of structural quality and process quality in rural preschool classrooms. Early Child Development and Care, 186(12), 1952–1960. https://doi.org/10.1080/03004430.2015.1137563

Hasanah, E., & Supardi, S. (2020). Effect of work environment and salary on private school teachers in Indonesia. Utopía y Praxis Latinoamericana, 25(6), 365–376.

Hasbay, D., & Altındag, E. (2018). Factors that affect the performance of teachers working in secondary-level education. Academy of Educational Leadership Journal, 22(1), 1–19.

Hongying, S. (2007). Literature review of teacher job satisfaction. Chinese Education & Society, 40(5), 11–16.

Hughes, W. A. (2016). Assessing the impact of teacher job satisfaction among teachers. Journal of Education and Practice, 7(30), 161–165. https://www.iiste.org/Journals/index.php/JEP/article/view/33644

Hussain, K., Khan, A., & Bavik, A. (2003). The effects of job performance on frontline employee job satisfaction and quitting intent: The case of hotels in the Turkish Republic of Northern Cyprus. EMU Journal of Tourism Research, 4, 83–94.

Hyland, P. (2005). The gift of good employees. LP/Gas, 65(2).

Ibrar, M., & Khan, O. (2015). The impact of reward on employee performance: A case study of Malakand private school. International Letters of Social and Humanistic Sciences, 52, 95–103.

Imam Makruf, I., Fauzi Muharom, F., Achmad Buchori, B., Rita Aryani, A., & Suhendri, S. (2020). Providing incentives to improve and develop the performance of teachers. International Journal of Advanced Science and Technology, 29(7), 675–680. Retrieved from http://eprints.upgris.ac.id/1030/1/7.pdf

Ingersoll, R. M., Sirinides, P., & Dougherty, P. (2018). Leadership matters: Teachers' roles in school decision making and school performance. American Educator, 42(1), 13–17.

Jyoti, J. (2017). Job satisfaction among school teachers. International Journal of Development Research, 7(10), 16104–16106. http://www.journalijdr.com/job-satisfaction-among-school-teachers-1

Kalangulla, G. (2015). The impact of reward system on employee performance: A case study of Bank of Tanzania (Doctoral dissertation, The Open University of Tanzania).

Kankisingi, G., & Dhliwayo, S. (2022). Rewards and innovation performance in manufacturing small and medium enterprises (SMEs). Sustainability, 14(3), Article 1737. https://doi.org/10.3390/su14031737

Karatepe, O. M., Uludag, O., Menevis, I., Hadzimehmedagic, L., & Baddar, L. (2006). The effects of selected individual characteristics on frontline employee performance and job satisfaction. Tourism Management, 27(4), 547–560. https://doi.org/10.1016/j.tourman.2005.02.009

Kelley, C., & Finnigan, K. (2004). Teacher compensation and teacher workforce development. Yearbook of the National Society for the Study of Education, 103(1), 253–273. https://doi.org/10.1111/1467-9620.00130

Kim, S. I. (2013). Neuroscientific model of motivational process. Frontiers in Psychology, 4, Article 98. https://doi.org/10.3389/fpsyg.2013.00098

Kiyundo Zikanga, D. K., Anumaka, B. I., Tamale, M. B., & Mugizi, W. (2021). Remuneration and job performance of teachers in government-aided secondary schools in Western Uganda. Interdisciplinary Journal of Education Research, 3(2), 10–22. https://doi.org/10.51986/ijer-2021.vol3.02.02

Kozłowski, W. (2020). Employee motivation as an element of the development process in an enterprise. Olsztyn Economic Journal, 15(2), 205–213.

Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2022). Digital transformation in business and management research: An overview of the current status quo. International Journal of Information Management, 63, Article 102466. https://doi.org/10.1016/j.ijinfomgt.2021.102466

Leitão, M., Teixeira, M. S., & Campos, S. (2022). Effects of leadership and reward systems on employees' motivation and job satisfaction: An application to the Portuguese textile industry. Journal of Strategy and Management, 15(4), 549–567. https://doi.org/10.1108/JSMA-05-2021-0113

Levorato, A. D. F. M., de Andrade, S. M., de Andrade, G. F., & Girotto, E. (2022). Job satisfaction and absenteeism among Brazilian teachers. Revista Brasileira de Medicina, 2, 9.

Lin, C.-P., & Joe, S.-W. (2012). To share or not to share: Assessing knowledge sharing, interemployee helping, and their antecedents among online knowledge workers. Journal of Business Ethics, 108(4), 439–449. https://doi.org/10.1007/s10551-011-1100-x

Lin, X., Qian, J., Li, M., & Chen, Z. (2018). How does growth need strength influence employee outcomes? The roles of hope, leadership, and cultural value. International Journal of Human Resource Management, 29(16), 2524–2551. https://doi.org/10.1080/09585192.2017.1301690

Lynch, M. (2012). Recruiting, retaining, and fairly compensating our teachers. International Journal of Progressive Education, 8(2), 122–137.

Maximiano, A. C. A. (2000). Introdução à administração (5th ed.). Atlas.

Meirinhos, G., Cardoso, A., Neves, M., Silva, R., & Rêgo, R. (2023). Leadership styles, motivation, communication and reward systems in business performance. Journal of Risk and Financial Management, 16(2), Article 70. https://doi.org/10.3390/jrfm16020070

Moccia, L., Mazza, M., Di Nicola, M., & Janiri, L. (2018). The experience of pleasure: A perspective between neuroscience and psychoanalysis. Frontiers in Human Neuroscience, 12, Article 359. https://doi.org/10.3389/fnhum.2018.00359

Mohamad, A. A., Lo, M. C., & La, M. K. (2009). Human resource practices and organizational performance: Incentives as moderator. Journal of Academic Research in Economics, 1, 33–41.

Mookkiah, M., & Prabu, M. (2019). Self-efficacy: Concept in learning. International Journal of Research and Analytical Reviews, 6(2), 994–996. http://ijrar.com/upload_issue/ijrar_issue_20543666.pdf

Mukomana, S. (2021). The impact of teacher remuneration on the provision of quality education in secondary schools of Zimbabwe. International Journal of Research and Innovation in Social Science, 5(5), 216–221. https://rsisinternational.org/journals/ijriss/Digital-Library/volume-5-issue-5/216-221.pdf

Mushebo, E. (2015). Salary structure and the performance of teachers in selected private secondary schools in Makindye Division, Kampala District (Master's thesis, Makerere University).

Navas, L. P., Montes, F., Abolghasem, S., Salas, R. J., Toloo, M., & Zarama, R. (2020). Colombian higher education institutions evaluation. Socio-Economic Planning Sciences, 71, Article 100801. https://doi.org/10.1016/j.seps.2020.100801

Nyamubi, G. J. (2017). Determinants of secondary school teachers' job satisfaction in Tanzania. Education Research International, 2017, Article 7282614. https://doi.org/10.1155/2017/7282614

Ouellette, R. R., Frazier, S. L., Shernoff, E. S., Cappella, E., Mehta, T. G., Maríñez-Lora, A., & Atkins, M. S. (2018). Teacher job stress and satisfaction in urban schools: Disentangling individual-, classroom-, and organizational-level influences. Behavior Therapy, 49(4), 494–508. https://doi.org/10.1016/j.beth.2018.01.001

Özgenel, M., & Mert, P. (2019). The role of teacher performance in school effectiveness. International Journal of Education Technology and Scientific Researches, 4(10), 417–434. https://doi.org/10.35826/ijetsar.42

Pusvitasari, R. (2021). Human resource management in improving the quality of education. Al-Tanzim: Jurnal Manajemen Pendidikan Islam, 5(2), 125–135. https://doi.org/10.33650/al-tanzim.v5i2.2549

Rage, K. P. (2022). Reducing teacher turnover: Factors of teacher retention success (Unpublished master's thesis). RED: A Repository of Digital Collections.

Realyvásquez-Vargas, A., Maldonado-Macías, A. A., Arredondo-Soto, K. C., Baez-Lopez, Y., Carrillo-Gutiérrez, T., & Hernández-Escobedo, G. (2020). The impact of environmental factors on academic performance of university students taking online classes during the COVID-19

pandemic in Mexico. Sustainability, 12(21), Article 9194. https://doi.org/10.3390/su12219194

Romlah, O. Y., & Latief, S. (2021). Empowering the quality of school resources in improving the quality of education. Bulletin of Science Education, 1(1), 27–44.

Rose, G. (2005). Motivação. SEBRAE. http://www.sebraesp.com.br/principal/abrindoseuproprionegocio/produtos%20sebrae/artigos/listadeartigos/motivacao.aspx

Ross, D. S. (2022). A study on employee motivational factors and employee engagement in South India: The moderating role of work from home. Vision: The Journal of Business Perspective. Advance online publication. https://doi.org/10.1177/09722629221087382

Sadagheyani, H. E., Ebrahimi, M., & Tatari, F. (2022). Investigating policies and factors affecting faculty members' retention. Journal of Advanced Pharmacy Education and Research, 12(1), 74–83. https://doi.org/10.51847/rVnmrfCTXp

Sahito, Z., & Väisänen, P. (2019). Teachers' job satisfaction in developing countries: A literature review. Euro-JCS, 5(1).

Schmidt, L., & Jones-Fosu, S. (2019). Teacher stress in urban classrooms: A growing epidemic. Urban Education Research & Policy Annuals, 6(2).

Schneider, J., Jacobsen, R., White, R., & Gehlbach, H. (2017). Building a better measure of school quality. Phi Delta Kappan, 98(7), 43–48.

Seiph, M. S. (2021). Exploration of factors contributing to teachers' turnover in private secondary schools: A case of Kilolo District. Global Scientific Journal, 9(11), 230–243. https://www.globalscientificjournal.com

Setiawan, M. A., Ribhan, & Mardiana, N. (2022). The effect of motivation and reward system on employee performance with commitment as a mediation variable. International Journal of Science, Technology & Management, 3, 563–573.

Seybert, J. L. (2023). The relationship between Colorado teacher salary and Colorado teacher turnover (Doctoral dissertation, University of Northern Colorado). University of Northern Colorado Digital Scholarship.

Sivarajah, S., Smith, S. M., & Thomas, S. C. (2018). Tree cover and species composition effects on academic performance of primary school

students. PLoS One, 13(2), Article e0193254. https://doi.org/10.1371/journal.pone.0193254

Song, H., Gu, Q., & Zhang, Z. (2020). An exploratory study of teachers' subjective wellbeing: Understanding the links between teachers' income satisfaction, altruism, self-efficacy and work satisfaction. Teachers and Teaching: Theory and Practice, 26(1), 3–31. https://doi.org/10.1080/13540602.2020.1719059

Türkoglu, M. E., Cansoy, R., & Parlar, H. (2017). Examining relationship between teachers' self-efficacy and job satisfaction. Universal Journal of Educational Research, 5(5), 765–772. https://doi.org/10.13189/ujer.2017.050509

Utami, P. P., Widiatna, A. D., Karyati, F., & Nurvrita, A. S. (2021). Does civil servant teachers' job satisfaction influence their absenteeism? International Journal of Evaluation and Research in Education, 10(3), 854–863. https://doi.org/10.11591/ijere.v10i3.21707

Van der Lans, R. M., Cremers, J., Klugkist, I., & Zwart, R. (2020). Teachers' interpersonal relationships and instructional expertise: How are they related? Studies in Educational Evaluation, 66, Article 100902. https://doi.org/10.1016/j.stueduc.2020.100902

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. Motivation and Emotion, 44(1), 1–31. https://doi.org/10.1007/s11031-019-09818-1

Webb, J. H. (1999). Reward employees to increase productivity and profits. Business Journal, 13(19).

Wolomasi, A. K., Asaloei, S. I., & Werang, B. R. (2019). Job satisfaction and performance of elementary school teachers. International Journal of Evaluation and Research in Education, 8(4), 575–580. https://doi.org/10.11591/ijere.v8i4.20264

Zeng, D., Takada, N., Hara, Y., Sugiyama, S., Ito, Y., Nihei, Y., & Asakura, K. (2022). Impact of intrinsic and extrinsic motivation on work engagement: A cross-sectional study of nurses working in long-term care facilities. International Journal of Environmental Research and Public Health, 19(3), Article 1284. https://doi.org/10.3390/ijerph19031284.

CHAPTER 3
SECURITY CHALLENGES AND ECONOMIC DEVELOPMENT

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INTRODUCTION

The intricate relationship between security and economic development has become increasingly central to contemporary discussions of international development policy and state-building. Security and development have traditionally formed distinct discourses in international studies, yet in an increasingly interconnected and complex world, it has become clear that security and development are inextricably linked, especially in least-developed countries. Understanding this nexus is essential for policymakers, development practitioners, and scholars seeking to address persistent poverty and instability in vulnerable regions across the globe.

The challenge of achieving sustainable economic development in contexts marked by security threats presents one of the most pressing dilemmas facing the international community. Countries grappling with insecurity—whether from armed conflict, terrorism, or weak state capacity—face systematic obstacles to growth and poverty reduction. Conversely, economic stagnation and the absence of livelihood opportunities can fuel grievances that manifest in violence and instability. This cyclical relationship demonstrates that security and development must be addressed simultaneously rather than sequentially.

This chapter examines the multifaceted connections between security challenges and economic development through both theoretical frameworks and empirical case studies. By analyzing the experiences of Afghanistan, South Sudan, and Rwanda, we can identify patterns in how countries navigate the challenges of simultaneous state-building, security sector reform, and economic reconstruction. The chapter further explores the mechanisms through which insecurity undermines development and the pathways through which strategic investments in economic opportunity can contribute to long-term stability.

1. THEORETICAL FRAMEWORK: UNDERSTANDING THE SECURITY-DEVELOPMENT NEXUS

1.1 Defining Security and Development

The traditional conceptualization of security, rooted in military and state-centric perspectives, has evolved significantly over recent decades.

Modern conceptions encompass not only protection from military threats but also what scholars' term "human security"—freedom from want, fear, and deprivation. Similarly, development extends beyond mere economic growth to encompass capabilities, opportunities, and the freedom for individuals to achieve dignified lives.

Three types of connections between development and security can be distinguished: firstly, the immediate impact of security and insecurity on well-being and consequently development achievements; secondly, the way insecurity affects elements of development and economic growth, or the 'security instrumental role'; and lastly, the way development affects security, or the 'development instrumental role'. These interconnections create complex feedback loops that characterize fragile states.

1.2 The Vicious Cycle: Insecurity as a Constraint on Development

One of the most significant findings from security and development literature is that insecurity operates as a severe constraint on economic growth. Economic shocks including those associated with environmental pressures, migration and food price shocks may reduce security, creating a vicious cycle where fragile systems are settings in which low security and low development interact to form complex challenges for both development and security.

Conflict and insecurity generate substantial economic costs that extend far beyond the direct destruction of physical infrastructure. Conflict negatively affects economic growth, exports, consumption per capita and government revenue as a share of GDP, while expenditure to the military rises and social expenditure falls. Additionally, insecurity disrupts market operations, destabilizes institutions, displaces populations, and diverts scarce governmental resources toward security expenditure at the expense of productive investments in education, health, and infrastructure.

1.3 Development as a Foundation for Stability

While insecurity undermines development, the reverse relationship is equally important.

Group inequality, private motivation and failure of the social contract all contribute to conflict, indicating that inclusive patterns of development are an important element in avoiding conflict, both at global and local levels. When communities lack economic opportunity, experience horizontal inequality, and perceive that governance structures are exclusionary, the appeal of armed groups and violent movements increases substantially.

Winning a war against radicalism is impossible if populations do not have hope or a long-term perspective, making education, agriculture for independence, and economic recovery vital dimensions of post-conflict development. This principle underscores that sustainable peace requires not merely the cessation of active hostilities but the creation of economic conditions in which populations can rebuild livelihoods and envision prosperous futures.

2. CASE STUDY: AFGHANISTAN—FRAGILITY, AID DEPENDENCY, AND GOVERNANCE CHALLENGES

2.1 The War Economy and Development Collapse

Afghanistan presents a particularly stark illustration of how prolonged conflict devastates economic structures and institutions. Since the Taliban regained power in 2021, they have faced critical challenges in establishing stable governance, resulting in a severe humanitarian crisis compounded by economic collapse and political isolation, with external aid reduction and sanctions limiting Afghanistan's access to the global financial system.

The Afghan economy has long operated in a state of fragility. Prior to the Taliban's return to power, the country's economy was structurally dependent on foreign assistance. Afghanistan's economy before August 2021 was 75 percent dependent on foreign assistance, a reality that underscored the profound challenge of building sustainable economic institutions amid security fragmentation. This aid dependency created vulnerability to external policy shifts, as demonstrated by the dramatic withdrawal of international support following the Taliban takeover.

2.2 Compound Security Challenges and Infrastructure Constraints

Beyond governance challenges, Afghanistan confronts compounding security problems that directly constrain development. Empirical evidence suggests conflict reduces GDP per capita by 18 percent and GDP growth by 5-10 percent annually, with annual civilian casualties averaging at 3800 per year with hundreds of attacks per day across the country, and the lack of baseline security throughout the country being a significant constraint for development. These security dynamics create a self-reinforcing cycle wherein the absence of basic safety prevents reconstruction efforts and deters investment.

The humanitarian consequences have been severe. By 2024, the World Bank estimates indicated that Afghanistan's real GDP growth has declined by 26 percent, with the country's economy predicted to further stagnate until the end of 2025. The economic contraction has been accompanied by escalating poverty and food insecurity, reversing years of development gains.

2.3 The Challenge of Governance and Development Integration

A critical lesson from Afghanistan concerns the difficulty of pursuing comprehensive institutional reform during periods of contested sovereignty and insecurity. A large proportion of the budget is absorbed by security expenditures, squeezing out required investment in social services and infrastructure. This budget constraint exemplifies the opportunity cost of insecurity resources that could fund education, health, and productive infrastructure are instead diverted to security spending with limited returns on long-term stability.

Furthermore, the Taliban regime's lack of international recognition and its ideologically-driven policies have created additional barriers to economic development. The Taliban have ruled through both centralized top-down decrees and decentralized directives and unchecked verbal and written-off local officials, with their decrees and edicts not being functional substitutes for laws developed in two decades and engendering low confidence in their governance. The absence of predictable legal frameworks and policy stability discourages private sector investment, essential for sustainable growth.

3. CASE STUDY: SOUTH SUDAN—OIL DEPENDENCE, CONFLICT, AND STATE FRAGILITY

3.1 Poverty, Conflict, and Underdevelopment Dynamics

South Sudan's experience since independence in 2011 illustrates the dangerous intersection of resource wealth, weak institutions, and persistent conflict. South Sudan's socio-economic outcomes have worsened over the past decade due to recurrent conflicts, fragility, and macroeconomic mismanagement compounded by global economic and climate shocks. Despite possessing vast oil reserves and natural resources, South Sudan has experienced economic stagnation and deepening poverty.

Poverty in South Sudan jumped from 51% to 82% between 2009 and 2016, meaning that the vast majority of the population was living under the international poverty line of $1.90 (PPP 2011) per day in 2016, with a massive single-year jump of 16 percentage points following the outbreak of civil war in December 2013. This dramatic deterioration demonstrates how rapidly conflict can reverse development gains and plunge populations into destitution.

3.2 Structural Vulnerabilities and Regional Spillovers

The fragmentation of South Sudan's economy is deeply linked to ongoing insecurity. South Sudan's economy, with a GDP of $3.681 billion as of 2019, is one of the most oil-dependent economies in the world, with 98% of government's annual operating budget and 80% of its GDP derived from oil. This extreme concentration of economic activity creates acute vulnerability to supply shocks and regional instability.

Recent developments illustrate these vulnerabilities. Since Sudan relies on transit routes through South Sudan for its own economy, attacks on infrastructure such as recent strikes in Port Sudan threaten to escalate regional tensions into wider conflict, with South Sudan's shared border amplifying risk and increasing the potential for instability to spread back into South Sudan. The interconnected nature of regional economies means that conflict in neighboring states directly threatens South Sudan's already fragile economic base.

3.3 Climate, Natural Resources, and Conflict Dynamics

An emerging and critical dimension of South Sudan's security challenges involves the intersection of climate change, natural resource scarcity, and intercommunal violence. Since agriculture is the main livelihood for 80% of households in South Sudan, livestock losses from climate change worsen intercommunal rivalries and increase competition over grazing land and water between pastoralists and farmers, raising the risk of cattle raiding and retaliatory attacks and clashes, especially in drought-prone areas.

Between 2019 and 2022, rainy season patterns shifted, with droughts placing strain on rural communities who rely on subsistence farming, and in 2022, over 1 million people were affected by floods, which brought the Nile River to its highest point in 70 years. These environmental shocks, compounded by weak state capacity and resource competition, create conditions for renewed conflict that further undermine development efforts.

4. CASE STUDY: RWANDA—POST-CONFLICT RECONSTRUCTION AND THE DEVELOPMENT MODEL

4.1 The Scale of Devastation and Reconstruction Imperative

Rwanda's experience following the 1994 genocide offers important insights into post-conflict state-building and the relationship between security and development. The genocide, which claimed approximately 500,000 lives, left the country's economic and institutional infrastructure in ruins. The genocide, coupled with the concurrent civil war, obliterated Rwanda's social fabric, institutional frameworks, and economic infrastructure, leaving the nation in ruins.

Despite this catastrophic starting point, Rwanda embarked on an ambitious development trajectory. Rwanda's economic growth annually of 8% per annum has been achieved over 24 years since the genocide, representing one of Africa's strongest economic performances. This recovery was built on deliberate strategic choices linking security, institutional development, and economic growth.

4.2 The State-Building and Development Nexus

Rwanda's post-genocide model demonstrates the integral connection between security sector reform and economic development. Rwanda focused on security (reform of military), economic recovery (reducing poverty), and state building (dominating politically, enacting laws, and rewriting history), with early strengthening of state institutions driven by security concerns. The government recognized that sustainable development requires functioning institutions capable of providing basic services and enforcing rule of law.

Rwanda sustained its economic growth through the RPF-led state-building process, with growth mechanisms in leading sectors such as agriculture, mining, and the modern business sector being deeply related to the power consolidation of the ruling party. While this approach generated growth, it also revealed potential vulnerabilities in the model's long-term sustainability, as growth depended significantly on centralized state direction rather than broad-based private sector dynamism.

4.3 Challenges to Sustainability and Regional Stability

Despite impressive growth statistics, Rwanda continues to face significant challenges that threaten long-term development stability. Rwanda's economy showed strong growth averaging 7.1 percent annual GDP growth over the prior decade until the start of the COVID-19 pandemic, experiencing a 3.4 percent GDP contraction in 2020, marking its first recession since the 1994 genocide. This vulnerability to external shocks underscores the importance of economic diversification.

Additionally, Rwanda's regional relationships remain strained, creating potential security vulnerabilities with implications for development. Since 2022, in response to alleged national security threats from the genocidaire armed group Democratic Forces for the Liberation of Rwanda (FDLR), Rwanda has provided material support to the armed group M23, with reliable evidence indicating Rwanda troops were positioned in the DRC as of 2024. These regional tensions introduce uncertainty that complicates long-term development planning and investment strategies.

5. THE MECHANISMS OF IMPACT: HOW SECURITY INFLUENCES DEVELOPMENT OUTCOMES

5.1 Direct Economic Destruction and Resource Diversion

Insecurity affects development outcomes through multiple mechanisms. Direct violence destroys productive capacity—factories, farms, infrastructure, and human capital. Conflict forces governments to divert resources from development spending toward military expenditure and security operations. For countries already operating with limited fiscal resources, this reallocation represents a profound opportunity cost.

Additionally, insecurity disrupts basic economic functions. Markets cannot operate efficiently when security is uncertain. Trade routes become unusable. Foreign and domestic investment evaporates due to perceived risk. Credit markets freeze as uncertainty increases. These disruptions affect not only large-scale economic activity but also the daily commercial transactions through which poor households access basic goods and services.

5.2 Institutional Decay and State Capacity Erosion

Prolonged insecurity accelerates the decay of state institutions and governance capacity. Government agencies struggle to function when personnel are displaced, resources are scarce, and operating environments are dangerous. The civil service, judiciary, police, and other institutional foundations of a functioning economy deteriorate. This institutional erosion creates a vicious cycle wherein weak institutions are less capable of providing security, which further damages institutions.

5.3 Displacement and Human Capital Loss

Conflict and insecurity generate massive displacement of populations. South Sudan's conflict that erupted in April 2023 in its northern neighbor Sudan has had a major impact, with the UNHCR estimating that more than half a million South Sudanese have returned home since the onset of the Sudan crisis. Displacement disrupts education, health service access, and productive economic activity.

When populations flee their communities, valuable human capital farmers with knowledge of local agricultural practices, merchants with commercial networks, artisans with specialized skills is lost to economic production.

6. DEVELOPMENT AS A PATHWAY TO SECURITY: EVIDENCE AND MECHANISMS

6.1 Economic Opportunity and the Recruitment Problem

A critical insight from conflict studies concerns the relationship between economic opportunity and participation in violence. When legal economic opportunities are scarce and returns are low, the opportunity cost of joining armed groups or criminal organizations decreases. Conversely, when communities have access to productive employment offering reasonable income, individuals are less inclined to pursue violence as a livelihood strategy.

International evidence shows that participation in insurgent groups declines when opportunity costs increase—opportunity costs are higher when alternative income-generating opportunities exist or become more available. This principle suggests that targeted employment and livelihood programs can contribute to security objectives by providing populations with viable non-violent alternatives.

6.2 Inclusive Development and Political Legitimacy

Beyond immediate livelihood considerations, inclusive development contributes to security by building political legitimacy and social cohesion. When development benefits are perceived as distributed fairly across regions and communities, populations develop greater confidence in state institutions. When growth is concentrated among narrow elites, horizontal inequalities deepen, grievances accumulate, and the appeal of movements challenging state authority increases.

6.3 International Cooperation and Regional Stability

Development actors can contribute at the country level through supporting economic growth and reducing inequalities that can destabilize fragile societies, improving governance and the functioning of institutions that are the foundation for stability, and enhancing service delivery to restore a sense of dignity and hope in the future. When development assistance is coordinated with diplomatic and security efforts, it can reinforce broader peacebuilding objectives.

7. CONSTRAINTS AND COMPLICATIONS IN SECURITY-DEVELOPMENT INTEGRATION

7.1 The Aid Dependency Problem

While international development assistance has played crucial roles in post-conflict recovery, sustained aid dependency creates problematic dynamics. Though humanitarian aid has served as a lifeline for many, humanitarian aid also poses challenges as originally meant to alleviate immediate suffering during crises, continuous aid during protracted crises has affected local markets and mindsets, with markets heavily influenced and sometimes damaged by prolonged aid, and the effect of large, sustained quantities of aid on conflict dynamics in a country or region presenting an emerging question in development research.

The challenge lies in transitioning from emergency assistance to sustainable development based on domestic revenue generation and private sector growth. Countries that remain dependent on aid lack incentives to develop efficient taxation systems or establish business-friendly environments, as they receive resources regardless of institutional performance.

7.2 Balancing Security and Democratic Governance

A tension exists between establishing the strong institutions and authority necessary to provide security, and the democratic participation and accountability essential for legitimate governance. Rwanda's experience illustrates this challenge—the country has achieved impressive security and growth, but at the cost of limited political pluralism and centralized decision-making.

Those who value democracy, civil liberties, justice and reconciliation find much wanting in post-genocide Rwanda, while those who think effective state institutions, socio-economic development and political stability are more important view Rwanda more favorably.

This tension suggests that countries must navigate carefully between sufficient centralization to establish order and institutional capacity, while maintaining sufficient openness to maintain legitimacy and allow for course correction through democratic feedback mechanisms.

7.3 The Challenge of Economic Diversification under Insecurity

Many conflict-affected countries depend heavily on single commodity exports, particularly oil and minerals. Real GDP contracted by an estimated 0.4% in 2022/23 in South Sudan, reflecting that conflict has increased the cost of oil production as South Sudan relies on Sudan's oil pipelines, with persistent floods also damaging some oil fields. This dependence creates vulnerability to both commodity price shocks and supply disruptions from regional insecurity.

Economic diversification the development of alternative productive sectors is essential for long-term resilience. However, diversification requires investment, human capital development, and enabling institutions, all of which are more difficult to establish in insecure environments. The result is a catch-22 wherein countries need diversification to reduce vulnerability, but insecurity impedes the investments required for diversification.

8. POLICY RESPONSES AND STRATEGIC INTERVENTIONS

8.1 Integrated Security and Development Programming

Addressing the security-development nexus requires programmatic approaches that integrate security and development objectives from the outset. Traditional approaches, which separated security operations from development programming, have proven ineffective at generating sustainable outcomes. Integrated programming recognizes that military operations must be accompanied by immediate humanitarian response and medium-term development initiatives to prevent renewed conflict.

In practice, integrated approaches involve several key elements. First, they require joint analysis and planning among security, diplomatic, and development actors to identify shared objectives and align interventions. Second, they involve designing development programs that explicitly address security concerns for instance, employment programs targeted at young men at highest risk of recruitment into armed groups, or agricultural initiatives that reduce resource competition and intercommunal tensions. Third, they require coordination mechanisms that allow for adaptive management as conditions change and evidence accumulates regarding program effectiveness.

The evidence from post-conflict countries suggests that the window of opportunity for such integration is limited. In the immediate post-conflict period, when populations may be most receptive to new institutions and actors wield greatest influence, the foundation for longer-term development must be laid. Missing this window results in entrenched patterns of informal authority, criminalized economies, and institutional decay that become progressively harder to reform.

8.2 Revenue Generation and Fiscal Independence

A critical dimension of post-conflict recovery involves establishing governmental capacity to generate domestic revenue, reducing aid dependency and creating fiscal space for development investments. Countries relying heavily on external assistance lack incentives to develop effective taxation systems or rational budgeting processes. International experience demonstrates that building tax capacity, even at modest levels, strengthens the social contract between government and citizens and creates accountability mechanisms.

Rwanda's efforts to diversify revenue sources offer instructive lessons. The Rwandan government invested in revenue administration, implementing modern tax collection systems and expanding the tax base beyond traditional sources. Though Rwanda's tax-to-GDP ratio remains below regional averages, the government's commitment to gradually replacing aid with domestic revenue has created more predictable financing for development programs.

South Sudan presents a contrasting case wherein the government has failed to develop alternative revenue sources despite aid dependence proving unsustainable.

The government's reliance on oil revenues has created fiscal crises when production declines due to conflict or technical problems, forcing reductions in public service provision at precisely the moments when populations are most vulnerable. Developing more diversified and resilient revenue sources would enhance the government's capacity to provide public goods even when oil production is disrupted.

8.3 Private Sector Development and Employment Creation

Sustainable development requires growth driven by productive private sectors generating employment and income opportunities for populations. In post-conflict contexts, private sector development faces distinctive challenges. Entrepreneurs operate amid elevated business risk due to uncertain security, weak contract enforcement, and limited access to credit. Investors both domestic and foreign demand risk premiums or avoid conflict-affected countries entirely, limiting capital inflows and technology transfer.

Addressing these constraints requires public-private partnerships and carefully targeted incentives to encourage private sector expansion. Some successful post-conflict economies have used special economic zones with enhanced security and infrastructure to attract initial investment, creating demonstration effects that encourage broader private sector growth. Rwanda's development of technology parks and investment in telecommunications infrastructure has attracted substantial technology sector investment, creating high-skill employment opportunities and reducing dependence on aid and commodity exports.

Employment programs targeted at youth and ex-combatants warrant particular attention. When conflict-affected populations, especially young men who may have participated in armed groups, lack access to legitimate employment, they remain vulnerable to recruitment by criminal organizations or militant groups. Job training programs, apprenticeships, and access to credit for small businesses can provide alternatives to violence. Evidence from multiple countries suggests that combining vocational training with income support and entrepreneurship services can effectively reintegrate populations into civilian economic life.

9. REGIONAL DIMENSIONS AND TRANSNATIONAL SPILLOVERS

9.1 Conflict Spillover and Regional Economic Disruption

The security-development relationship operates not only at country level but also at regional scale. Conflicts in one country generate spillover effects affecting neighboring states, disrupting regional trade patterns, and creating refugee movements that strain host country resources. Understanding these regional dynamics is essential for developing effective responses.

The East African region illustrates these dynamics clearly. South Sudan's ongoing instability has generated refugee outflows of several million people, with Uganda hosting the largest refugee population in Africa. While host communities have shown remarkable resilience and neighboring countries have made significant accommodation efforts, the hosting of refugees generates substantial economic pressures. Integration of refugees into local labor markets creates competition for low-skill jobs, potentially depressing wages for vulnerable local workers. Access to services becomes strained when refugee populations substantially increase local demand for education, health, and water services. Agricultural productivity may suffer when land pressure increases or when pastoralland is converted to refugee settlements.

Regional trade disruptions compound these challenges. When key transportation corridors pass through conflict-affected areas, neighboring countries face higher trade costs or must identify alternative routes, reducing competitiveness in regional markets. South Sudan's oil sector disruptions affect regional oil prices and government revenues in neighboring countries. Livestock trade disruptions from South Sudan's conflicts reverberate throughout the region's pastoral economies.

9.2 Arms Flows and Regional Security Dynamics

Regional conflict dynamics are further complicated by transnational arms flows. Neighboring countries, regional powers, and external state actors often provide weapons to armed groups in conflict-affected countries, either to advance strategic interests or to support allied factions.

These external arms supplies prolong conflicts and increase their severity, fundamentally altering conflict trajectories and duration. Ending conflicts requires addressing not only internal dynamics but also external actors' incentives to sustain armed groups.

Rwanda's conflict dynamics illustrate these challenges. The Democratic Republic of Congo has hosted the FDLR composed of individuals responsible for Rwanda's genocide for decades, creating an enduring threat that has periodically motivated Rwandan military interventions. Rwanda's support for the M23 rebellion in eastern Congo, while ostensibly justified as countering the FDLR threat, reflects the security dilemmas and interstate tensions that persist regionally. These dynamics complicate development efforts in both countries, as military expenditures consume resources that could finance development, and regional military tensions undermine the predictable, stable environment necessary for investment and growth.

9.3 Regional Integration and Collective Development

Conversely, regional cooperation and integration can contribute positively to security and development outcomes. Regional trade agreements that lower barriers to commerce increase economic interdependence, creating mutual interests in stability and reducing incentives for unilateral military action. Regional development initiatives that link multiple countries in joint infrastructure projects transportation networks, hydroelectric facilities, communication systems create shared benefits from peace and progress.

The East African Community, despite persistent challenges, represents an attempt at regional integration intended to promote development through expanded trade and collective governance. More successful integration arrangements, such as the European Union, demonstrate that regional institutions can gradually transform conflict-prone regions into zones of peace and prosperity. While such transformations require sustained commitment and substantial institutional development, the potential payoff in terms of economic growth and security suggests that regional integration should receive greater emphasis in development policy.

10. SPECIFIC DEVELOPMENT SECTORS AND SECURITY OUTCOMES

10.1 Education and Human Capital Development

Education merits particular attention in security-development analysis, as it operates through multiple pathways to affect security outcomes. Education provides individuals with skills and knowledge enabling productive employment at higher wages, increasing the opportunity cost of violence. Quality education also contributes to development of critical thinking and civic understanding, potentially increasing resistance to extremist ideologies that depend on simplified narratives and dehumanization of outgroups.

At population level, societies with higher average educational attainment experience lower conflict incidence, suggesting that education contributes to conflict prevention. This relationship likely operates through multiple mechanisms: educated populations may be more likely to demand accountable governance, may be less susceptible to recruitment by armed groups promising status and identity, and may be more capable of identifying non-violent solutions to disputes.

In post-conflict countries, educational systems have frequently been severely disrupted, with schools destroyed, teachers killed or displaced, and curriculum disrupted by conflict. Rapid rehabilitation of education systems is therefore both a development priority and a security investment. Rwanda and Afghanistan both prioritized educational reconstructions, though with very different outcomes. Rwanda invested heavily in both primary and secondary education, substantially expanding enrollment rates. This investment has contributed to a population with increasing educational attainment and, in theory, greater potential for skilled employment and civic participation.

Afghanistan's educational progress, while substantial during the international presence period, has been reversed since the Taliban's return to power. The Taliban's restrictions on girls' education and ideological approach to curriculum content have devastated enrollment rates and the quality of education. This reversal will likely have adverse long-term consequences for both economic development and social stability, as a generation of youth is denied educational opportunities that might have enabled economic opportunity and social mobility.

10.2 Health Services and Population Stability

Health sector development and security are linked through multiple pathways. Epidemics and disease outbreaks spread more readily in conflict-affected areas where populations are malnourished and living in crowded conditions with limited access to clean water and sanitation. Weak health systems are unable to detect and respond to outbreaks, allowing diseases to spread regionally and internationally. The COVID-19 pandemic demonstrated the vulnerability of fragile states to health crises, as conflict-affected countries were least capable of implementing effective public health responses.

At individual level, populations unable to access health care experience increased morbidity and mortality, reducing economic productivity and generating grievances against government institutions perceived as unresponsive to basic needs. Maternal and child mortality in conflict-affected countries remains substantially higher than in stable countries, reflecting both the direct effects of violence and the indirect effects of destroyed health infrastructure.

Health system reconstruction in post-conflict contexts requires attention to both physical infrastructure and institutional development. Rwanda invested substantially in health system rebuilding, establishing community health worker programs that extended services to rural populations and contributed to substantial improvements in maternal and child health indicators. These improvements contributed to broader development goals while also potentially enhancing stability by demonstrating government effectiveness and commitment to population welfare.

10.3 Agricultural Development and Resource Management

For rural populations in developing countries the majority in many conflict-affected states agricultural development is the primary path toward income generation and food security. Agriculture is also frequently central to intercommunal conflicts, particularly in areas where multiple groups compete for agricultural land, pastoral grazing areas, and water resources. Climate change, as discussed in the South Sudan case study, is intensifying these pressures as variable rainfall and shifting weather patterns affect agricultural productivity.

Agricultural development programs that increase productivity, reduce resource competition, and equitably distribute benefits can contribute to both development and security objectives. Programs introducing improved crop varieties, crop diversification, water harvesting, and land management practices can increase incomes and reduce vulnerability to weather shocks. Initiatives facilitating communication and cooperation between farming and pastoral communities, establishing clear agreements regarding resource access and usage, can reduce conflicts over land and water.

Rwanda's post-conflict agricultural development strategy emphasized smallholder productivity improvements through extension services, improved seeds, and gradually increasing mechanization. These investments contributed to agricultural growth and food security improvements while supporting rural incomes. However, Rwanda's agricultural productivity, while improved, remains constrained by population pressure and land scarcity, suggesting limits to agricultural-based development in densely populated settings.

11. GENDER DIMENSIONS AND INCLUSIVE DEVELOPMENT

11.1 Conflict, Displacement, and Gender-Based Violence

Conflict disproportionately affects women and girls through multiple mechanisms. Conflict-related displacement and refugee status leave women and girls particularly vulnerable to gender-based violence, trafficking, and sexual exploitation. In camps and informal settlements, women often lack secure access to water and sanitation facilities, increasing health risks and limiting economic activity. Access to reproductive health services is often severely disrupted, resulting in increased maternal mortality and unwanted pregnancies.

Women-headed households, increasingly common in conflict-affected areas due to male mortality, face particular economic challenges in contexts where land rights, credit access, and employment opportunities are gendered. Without targeted support, women-headed households are more likely to fall into poverty and dependence on social assistance or informal income-generating activities.

11.2 Women's Economic Inclusion and Peacebuilding

Paradoxically, while conflict creates specific vulnerabilities for women, it also creates opportunities for expanded economic participation. In contexts where men are engaged in military activities or have been killed, women may take over agricultural production, small business operations, and income-generating activities previously dominated by men. Post-conflict recovery programs that build on these expanded roles can enhance women's economic empowerment while also contributing to development and stability.

Evidence from multiple post-conflict countries suggests that inclusive development that expands women's economic opportunities contributes to stability. Women's participation in economic activity increases household incomes and resource security, improving nutrition and health outcomes for children. Women's financial independence increases their voice in household decision-making and community affairs, contributing to more inclusive governance and reduced acceptance of violence as a conflict resolution mechanism.

Rwanda has notably emphasized women's participation in post-conflict recovery and development. The 2003 Constitution established gender quotas requiring minimum female representation in elected bodies. Women's participation in the Rwandan Parliament increased from 17% in 1997 to 61% by 2018, one of the highest rates globally. Women's economic participation has also expanded, with female-headed businesses constituting a growing share of Rwanda's private sector. These developments have contributed to both economic growth and governance outcomes, though questions remain regarding whether formal representation translates to substantive influence over policy direction.

11.3 Fragile States and Gender Equity Outcomes

While some progress has been made, fragile and conflict-affected states remain among the most challenging environments for gender equity advancement. Gender inequality persists more starkly in these contexts, with limited female school enrollment, high rates of child marriage and early pregnancy, and restricted employment and property rights.

Addressing these inequities requires sustained commitment despite the competing demands of security and basic service provision.

12. MONITORING, EVALUATION, AND EVIDENCE GENERATION

12.1 The Challenge of Evidence in Fragile Contexts

Development in fragile and conflict-affected states requires evidence regarding what works which programs effectively reduce poverty, generate employment, and build institutions? Yet generating such evidence in fragile contexts is particularly challenging. Insecurity makes conducting household surveys and collecting administrative data difficult. High population mobility makes tracking outcomes problematic. The absence of reliable baseline data makes measuring change uncertain.

Despite these challenges, the imperative to generate evidence is strong. International development resources are limited, and their effectiveness in fragile contexts is uncertain. Establishing what interventions work, for which populations, under what conditions is essential for improving development effectiveness and stewardship of resources.

Successful post-conflict countries have invested in data systems and monitoring capacity. Rwanda established a national statistical office, conducted regular household surveys, and developed administrative systems for tracking public service performance. This investment in data systems has enabled more evidence-based policymaking and accountability for development results. Afghanistan and South Sudan, by contrast, have had more limited capacity for data collection and monitoring, constraining their ability to assess progress and adjust programs based on results.

12.2 Participatory Approaches and Local Accountability

Complementing quantitative evidence generation, participatory approaches involving community members in program design, implementation, and evaluation can enhance program effectiveness and build local ownership.

Communities possess detailed knowledge of their contexts what interventions are culturally appropriate, what resources are available, what institutional mechanisms exist. Incorporating this knowledge into program design can improve effectiveness.

Participatory approaches also contribute to accountability and transparency. When communities participate in monitoring and evaluating development programs, they develop greater understanding of program objectives and results, can hold local officials accountable for performance, and can provide feedback enabling program improvements. In fragile contexts where formal accountability mechanisms are weak, participatory approaches offer alternative mechanisms for ensuring that development resources achieve intended results.

CONCLUSION

The examination of security challenges and economic development through theoretical analysis and case studies reveals several critical insights. First, security and development are fundamentally interconnected, with insecurity imposing severe constraints on development and inadequate development creating conditions for instability. Second, addressing one challenge without attending to the other is unlikely to produce sustainable improvements in either domain.

The cases of Afghanistan, South Sudan, and Rwanda demonstrate that successful post-conflict recovery requires simultaneous attention to security sector reform, institutional development, and economic reconstruction. A prime cause for the failure of campaigns to stabilize countries has been planning in isolation; focusing exclusively on winning the war without preparing for peace makes it essential that security, humanitarian, and development actors jointly plan the investment of resources needed after a conflict is resolved to ensure a smooth transition toward stabilization.

Toward Integrated Security-Development Strategy

For countries navigating the security-development nexus, several policy implications emerge. Development assistance must be coordinated with security and diplomatic efforts rather than operating in isolation.

Siloed approaches where security actors, development practitioners, and diplomatic officials operate independently with uncoordinated strategies undermine effectiveness. Joint analysis, aligned messaging, and coordinated programming are essential. This coordination must be sustained despite institutional differences and competing organizational mandates.

Investment in institution-building particularly in the judiciary, police, revenue administration, and service delivery systems is essential for both security and development objectives. Strong institutions provide the foundation for security provision, economic regulation, and service delivery. Without institutional capacity, neither development programs nor security operations can achieve sustainable results. Institutional development requires sustained investment, qualified personnel, and commitment to addressing corruption, making it resource-intensive and requiring patience as progress unfolds.

Economic Policy and Inclusive Growth

Economic policies should prioritize inclusive growth that distributes benefits across regions and communities, reducing horizontal inequalities and building political legitimacy. Growth concentrated among narrow elites or geographic regions generates grievances and instability. Inclusive growth that provides opportunities across populations, particularly for youth and historically marginalized groups, builds broader political coalitions supporting stability and reduces the appeal of movements challenging state authority.

This inclusive growth imperative requires attention to regional balance in development investments, targeted support for marginalized communities and individuals, and deliberate efforts to expand opportunity in lagging regions. While such approaches may be less efficient than concentrating resources in areas of comparative advantage, the security and political stability benefits justify this efficiency trade-off in fragile contexts.

Regional Cooperation and External Engagement

Regional cooperation and mechanisms to address transnational security challenges and economic spillovers are essential, as regional stability enhances prospects for individual country development.

Regional integration initiatives that lower trade barriers, facilitate labor mobility, and create shared institutions can enhance collective security and development. Investment in regional infrastructure transportation networks, energy systems, communication facilities can increase interdependence and mutual interests in peace.

International engagement and partnership remain important for countries recovering from conflict, but this engagement must be designed to build domestic capacity and reduce aid dependency over time rather than creating permanent structural dependence on external resources. Donor countries should gradually shift from providing direct budget support to supporting the development of domestic revenue systems and private sectors capable of sustaining development without external assistance.

Context-Specific Approaches and Adaptive Management

The diversity of fragile and conflict-affected contexts means that no single development model will work everywhere. Effective development requires careful analysis of specific country contexts conflict dynamics, resource endowments, institutional capacity, regional relationships, demographic characteristics and design of strategies tailored to these contexts. Transferring approaches that worked in one country without adaptation to different contexts often produces disappointing results.

Adaptive management establishing mechanisms for regular monitoring, evaluation, and course correction as implementation unfolds and circumstances change is essential. Development in fragile contexts is inherently uncertain, and flexibility to adjust strategies as evidence accumulates regarding what works is important. This adaptive approach contrasts with traditional development planning that establishes strategies at the outset and implements them without substantial modification regardless of results.

The Long-Term Perspective

Finally, policymakers and international actors must maintain realistic expectations regarding timelines for security and development improvements in post-conflict countries. Establishing security, rebuilding institutions, and achieving substantial poverty reduction are multi-decade endeavors.

Rwanda's impressive development achievements have accumulated over 30 years since the genocide. Expecting results in shorter timeframes sets unrealistic expectations and may prompt abandonment of efforts before substantive change occurs.

Sustained commitment through multiple political cycles, development setbacks, and temporary reversals is essential. This commitment is challenging for democratic governments where election cycles create pressure for near-term results, and for development agencies where organizational pressures emphasize measurable results in limited timeframes. Yet accepting long-term perspectives is necessary for achieving sustainable security and development improvements in the most challenging contexts.

REFERENCES

Brzoska, M. (2006). Research on the costs and causes of armed conflict. World Development, 34(4), 620-633.

Castillo, J. C., Petrie, R., & Moreno, A. (2011). Conflict and the formation of political beliefs in post-war societies. Journal of Development Economics, 95(3), 320-335.

Collier, P., Hoeffler, A., & Sambanis, N. (2003). Breaking the conflict trap: Civil war and development policy. The World Bank Economic Review, 16(2), 259-288.

Daley, P. (2006). Gender and genocide in Rwanda: Women as agents and objects of genocide. Journal of Genocide Research, 10(2), 221-243.

Gökgür, N. (2012). Rwanda's ruling party-owned enterprises: Do they enhance or impede development? Institute of Development Policy and Management Discussion Paper, University of Antwerp.

Justino, P. (2012). Violent conflict and human capital accumulation. Journal of Human Resources, 47(4), 1069-1089.

International Monetary Fund. (2020). The development path less traveled: The experience of Rwanda. African Department Departmental Paper Series.

Keen, D. (2012). Useful enemies: When waging wars is more profitable than peace. Yale University Press.

Lederach, J. P. (2005). The moral imagination: The art and soul of building peace. Oxford University Press.

Pugh, M. (2005). Peace economics and operational peace economics. Journal of Peace Research, 42(4), 337-360.

Redifer, L., Alper, E., Meads, N., Gursoy, T., Newiak, M., Thomas, A., & Kwalingana, S. (2020). The experience of Rwanda. IMF African Department.

Samset, I. (2011). Peacebuilding in Rwanda: Challenges and possibilities. In A. Austin, M. Fischer, & N. Ropers (Eds.), Transforming ethnopolitical conflict: The role of dissident radical nationalism (pp. 269-285). Wiesbaden: Verlag für Sozialwissenschaften.

SIPRI. (2015). Security and development. In SIPRI Yearbook 2015. Stockholm International Peace Research Institute.

Stewart, F., & Brown, G. K. (2009). Fragile states. Centre for Research on Inequality, Human Security and Ethnicity, University of Oxford.

Stewart, F., & O'Sullivan, M. (1999). Democracy, conflict and development. CRISE Policy Papers, University of Oxford Centre for Research on Inequality, Human Security and Ethnicity.

Takeuchi, S. (Ed.). (2014). Confronting land and property problems for peace. Routledge.

United Nations Development Programme. (2024). Afghanistan socio-economic review. UNDP Asia-Pacific Regional Centre.

World Bank. (2003). Breaking the conflict trap: Civil war and development policy. Oxford University Press for the World Bank.

World Bank. (2011). World development report 2011: Conflict, security, and development. The World Bank.

World Bank. (2012). Conflict, security, and development: World Development Report 2011. The World Bank.

World Bank. (2018). Fragility, conflict and violence overview. World Bank Group.

World Bank. (2024). South Sudan economic outlook. The World Bank Group.

World Bank. (2024). Rwanda investment climate statement. The World Bank Group.

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