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REGIONAL AND HOUSEHOLD-LEVEL INEQUALITIES IN SOCIAL SERVICES ACCESS IN MOROCCO: A SPATIAL ECONOMETRIC APPROACH

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ABSTRACT
This study examines disparities in access to social services at the regional and household levels in Morocco, with a particular focus on health and education. It uses data from the 2021 Household Living Conditions Survey (HLCS) and applies spatial econometric techniques to analyze spatial dependence and regional heterogeneity in service accessibility. The results highlight significant inequalities between urban and rural areas, as well as between different income and education levels. The spatial autocorrelation analysis reveals distinct clusters of disadvantaged areas, particularly in the isolated regions of the south. These results highlight the need for localized political interventions, targeted social investments, and strengthened decentralized planning systems to mitigate territorial inequalities and ensure equitable access to essential social services.
Keywords: social services; inequality; spatial econometrics; healthcare; education; Morocco.

1. INTRODUCTION

Equitable access to social services is an essential foundation of sustainable development, social inclusion, and territorial cohesion. Access to healthcare and quality education is essential for improving individual well-being, strengthening human capital development, reducing poverty, and promoting sustainable economic progress. However, in many developing and emerging countries, access to these essential services remains unequal, revealing persistent socio-economic and spatial disparities.

In Morocco, despite continuous public investments and the implementation of ambitious national development initiatives, significant disparities in access to social services persist between regions. Urban areas, particularly those located along the Atlantic corridor, generally benefit from superior infrastructure and a higher density of public services. Conversely, rural and peripheral areas frequently suffer from deficiencies in healthcare infrastructure, educational institutions, qualified personnel, and transportation infrastructure. These structural inequalities disproportionately affect vulnerable households, perpetuating social exclusion and limiting their prospects for social mobility.

If national indicators show progressive improvements in social outcomes, aggregated statistics often mask significant disparities, both within regions and between them. Households' access to social services is influenced by individual socio-economic factors—such as income, education level, and household structure—as well as spatial factors, including geographical isolation, uneven regional development, and the contagion effects of adjacent areas. Neglecting these spatial dynamics can lead to biased empirical evaluations and reduce the effectiveness of public policies.

A thorough examination of disparities in access to social services in Morocco requires an analytical approach that integrates both household-related factors and spatial interdependencies. Spatial econometric methods provide a powerful framework for identifying geographical clusters, spatial autocorrelation, and regional contagion effects, which are sometimes overlooked in traditional econometric models.

In this context, the present study aims to evaluate the disparities in access to social services in Morocco and to examine their spatial patterns using sophisticated econometric methods. The report specifically addresses three main research questions:

(i) How do household-related variables influence access to health and education services?

(ii) What is the spatial distribution of access to social services in Moroccan regions, and to what extent do these disparities reveal a regional concentration?
(iii) Do spatial econometric models allow for the detection of clusters of underserved areas and provide relevant results for targeted interventions?
This study aims to improve the understanding of spatial disparities in the provision of social services and to facilitate the development of evidence-based policies by addressing these questions. The results aim to guide the formulation of social policies adapted to regional realities and in line with Morocco's development goals.

2. LITERATURE REVIEW

2.1 Socioeconomic Determinants of Access to Social Services

The existing literature on access to social services in developing countries highlights the crucial role of household socioeconomic characteristics in shaping the ability of individuals to benefit from healthcare and education. Factors such as income level, educational attainment, and household size strongly influence service utilization. Low-income households often encounter multiple financial barriers, including both direct expenses—such as consultation fees, medications, and school materials—and indirect costs related to transportation and opportunity costs. These constraints collectively limit the continuity and intensity of service use (World Bank, 2020; Gauthier & Wane, 2019). Recent micro-econometric studies based on nationally representative surveys indicate that even modest increases in household income can significantly enhance access to preventive healthcare and reduce the likelihood of school dropout, particularly in settings where out-of-pocket expenditures remain substantial (Sahn & Younger, 2021; Wagstaff et al., 2022).
The education level of the household head is another key determinant of access to social services. Higher educational attainment facilitates information acquisition, shapes health-seeking behavior, and influences perceptions regarding the long-term benefits of investing in human capital. Empirical evidence consistently shows that households with more educated heads are more likely to utilize preventive health services, seek timely medical care, and ensure continued school attendance for their children, particularly girls (Kruk et al., 2018; Baird et al., 2020). Beyond its impact on income, parental education strengthens cognitive capacities, improves risk assessment, and increases trust in formal institutions, which in turn encourages compliance with vaccination programs and participation in public health insurance schemes. Recent experimental and quasi-experimental studies conducted in Sub-Saharan Africa and South Asia further demonstrate that maternal education has a particularly strong influence on child health outcomes and educational persistence, even after controlling for household wealth and community characteristics (Andrabi et al., 2021; Duflo, 2022).
In Morocco, several empirical studies document persistent disparities in access to healthcare and education across both socioeconomic and geographic dimensions. Research using data from the Haut-Commissariat au Plan highlights significant gaps between urban and rural areas, with rural girls facing particularly severe disadvantages due to a combination of cultural factors, long travel distances to schools, and insufficient educational infrastructure (El Amrani et al., 2019). More recent analyses confirm that household income and parental education remain key predictors of school attendance, health insurance coverage, and healthcare utilization, even after controlling for regional characteristics (Haut-Commissariat au Plan, 2021). Evaluations of social policies such as the RAMED medical assistance scheme and the Tayssir conditional cash transfer program suggest that financial support can improve access to services but does not fully eliminate socioeconomic inequalities, indicating the persistence of deeper structural barriers (World Bank, 2022).
Household size also plays an important role through what is commonly referred to as the resource dilution effect. Larger households must distribute limited resources among a greater number of members, which can reduce per capita spending on health and education. Empirical research from North Africa and other developing regions finds that larger household size is associated with lower healthcare utilization, reduced vaccination completion rates, and higher probabilities of school dropout, particularly among low-income populations (Arestoff & Hurlin, 2020; Fattouh et al., 2022). More recent panel data studies suggest that this effect may be nonlinear: while moderate household size can benefit from certain economies of scale, very large households often face significant constraints in maintaining long-term investments in education (Klasen & Lawson, 2023).
Furthermore, recent research emphasizes the importance of gender dynamics and intra-household decision-making processes. Studies show that households in which women possess greater bargaining power tend to allocate a larger share of resources toward children's education and preventive healthcare (Heath & Tan, 2020). This perspective highlights that socioeconomic determinants operate not only through income and education levels but also through internal household allocation mechanisms and prevailing social norms.
Despite the importance of these micro-level determinants, they do not fully explain inequalities in access to social services when considered in isolation. Spatial constraints—such as geographic accessibility, uneven regional distribution of public services, and neighborhood effects—also play a significant role. Ignoring these spatial dimensions may lead to incomplete or biased conclusions regarding the determinants of access. Recent multilevel and spatial analyses demonstrate that even households with favorable socioeconomic characteristics may face limited access when local service provision is weak. These findings point to strong interactions between household-level characteristics and territorial contexts. Consequently, a more comprehensive analytical framework that integrates microeconomic determinants with spatial econometric approaches is necessary to capture the full complexity of social service inequalities in developing countries, including Morocco.

2.2 Spatial Inequalities and Regional Disparities

Beyond household-level characteristics, geographic location plays a critical role in determining access to social services. Factors such as rurality, geographic isolation, and regional underdevelopment are closely associated with limited availability and quality of public services. Deficiencies in infrastructure, the uneven distribution of healthcare professionals and teachers, and weaknesses in local governance structures contribute to persistent spatial inequalities. Empirical evidence from developing countries consistently shows that distance to facilities and the density of services within a region significantly influence healthcare utilization and school attendance (Gauthier & Wane, 2019; Kruk et al., 2018).

More recent cross-country studies using georeferenced household surveys and satellite-based data further highlight the spatial concentration of deprivation. Research combining Demographic and Health Surveys (DHS) with geographic information systems (GIS) demonstrates that travel time to health centers and schools remains a statistically significant determinant of service utilization, even after controlling for income, parental education, and household composition (Noor et al., 2021; Weiss et al., 2020). These findings suggest that spatial accessibility constitutes an independent structural constraint on human development outcomes.

In Morocco, regional disparities in access to social services reflect long-standing patterns of uneven territorial development and the historical concentration of investments in coastal urban areas. Interior and mountainous regions, by contrast, often experience lower levels of infrastructure and service provision. Studies based on household survey data indicate that access to healthcare and education remains significantly lower in rural and mountainous areas, even after accounting for income and education differences (Haut-Commissariat au Plan, 2021; Bargain et al., 2020). Territorial assessments conducted by the Haut-Commissariat au Plan also reveal persistent inter-regional gaps in medical density, school infrastructure, and multidimensional poverty indicators, particularly in regions such as Drâa-Tafilalet and Béni Mellal-Khénifra. These peripheral regions frequently lag behind in social infrastructure, reinforcing cycles of deprivation, lower human capital accumulation, and migration toward urban centers.

Recent empirical research using micro-spatial data at the commune and provincial levels shows that inequalities are not limited to the urban–rural divide but also occur within regions themselves. Small-area estimations combining census and survey data reveal considerable intra-regional variation in indicators such as health insurance coverage and school completion rates (World Bank, 2022). These spatial gradients suggest that territorial inequalities operate across multiple geographic scales, ranging from inter-regional disparities to differences within municipalities.

Spatial econometric methods offer powerful analytical tools to explicitly account for spatial dependence and spillover effects across regions. Luc Anselin (1988) introduced spatial autoregressive (SAR) and spatial error (SEM) models, demonstrating that neglecting spatial autocorrelation may produce biased and inefficient estimates. Later contributions by James P. LeSage and Robert Kelley Pace (2009) developed the spatial Durbin model (SDM), which allows researchers to decompose total impacts into direct effects within a region and indirect spillover effects affecting neighboring regions.

More recent empirical work has extended these methodologies to the analysis of social sector outcomes. Harry H. Kelejian and Gianfranco Piras (2017) show that spatial panel estimators improve statistical inference when regional interactions are present. Similarly, J. Paul Elhorst (2014) demonstrates that spatial Durbin models effectively capture cross-regional externalities and feedback effects, which are particularly relevant in the provision of public services. Empirical applications in Sub-Saharan Africa and South Asia (Arestoff & Hurlin, 2020; Sahn & Younger, 2021) reveal significant spatial clustering in health coverage and educational attainment, suggesting that improvements in one locality may generate positive externalities for neighboring areas through shared infrastructure and mobility networks.

In the Middle East and North Africa (MENA) region, the use of spatial analytical approaches has become increasingly prominent. Benchekroun and Haddad (2021) show that incorporating spatial autocorrelation substantially enhances the estimation of inequality patterns and helps identify clusters of underserved populations in North Africa. Similarly, Fattouh et al. (2022) document strong spatial dependence in healthcare accessibility across North African regions, emphasizing the importance of coordinated regional planning. Recent spatial panel analyses applied to Moroccan regional data for the period 2010–2022 also confirm significant Moran's I statistics for indicators such as poverty incidence, medical density, and educational attainment, revealing robust spatial clustering patterns.

merging empirical studies integrating night-time light intensity data with administrative service records provide new insights into the spatial dynamics of development. These analyses indicate that spatial spillovers are significantly stronger in regions characterized by higher connectivity and more developed transport infrastructure. In this context, infrastructure investments act as effective transmission channels through which regional development policies generate positive externalities that extend beyond local boundaries and benefit neighboring territories.

Overall, these findings demonstrate that access to social services is not randomly distributed but instead follows well-defined geographic patterns shaped by structural and spatial constraints. Consequently, policy interventions that neglect spatial interdependencies risk producing limited, inefficient, or uneven outcomes. By contrast, place-based strategies—particularly within the framework of Morocco's advanced regionalization policy—appear more appropriate for addressing persistent territorial disparities and ensuring a more balanced distribution of public services.

Within this broader framework, the recent literature on the Moroccan economy highlights a convergence of analytical approaches centered on territorial, sectoral, and social dimensions of development. On the one hand, the work of Hamid Fayou (2026) on the convergence of regional fiscal capacities shows that territorial disparities persist despite decentralization reforms, pointing to a process of conditional convergence shaped by local economic structures and the effectiveness of public policies. On the other hand, studies focusing on sectoral reforms, particularly in the pharmaceutical and health sectors (Fayou, 2025; Fayou et al., 2024), demonstrate that pricing policies alone are insufficient to significantly improve household access without complementary mechanisms such as expanded social protection and improved governance.

Furthermore, recent contributions disseminated through preprints and international academic journals (Fayou, 2025; Fayou & Boubrahimi, 2021) emphasize the central role of foreign direct investment, value chain transformation, and economic openness in shaping Morocco's growth trajectory, while highlighting heterogeneous effects across sectors and regions. Finally, research employing spatial econometric approaches (Fayou, 2026) reveals strong regional interdependencies and clusters of inequality in access to social services, confirming that disparities are driven not only by microeconomic factors but also by spatial and institutional mechanisms. Taken together, these contributions support an integrated perspective on Moroccan development, where the interaction between public policies, territorial structures, and economic agents' behavior determines the persistence or reduction of inequalities.

This study contributes to the existing literature in three principal ways. First, it integrates household-level socioeconomic determinants with regional spatial dependencies to provide a comprehensive assessment of social service access in Morocco. Second, it identifies geographic clusters of deprivation using advanced spatial econometric techniques, offering insights into inequality patterns that are often overlooked in conventional non-spatial analyses. Third, by estimating both direct and indirect (spillover) effects of regional characteristics, the study provides empirically grounded evidence to support territorially differentiated social policies aimed at reducing regional disparities, strengthening inter-regional coordination, and promoting more inclusive and balanced development.

3. DATA AND METHODOLOGY

3.1 Data

This study draws on data from the Moroccan Household Living Standards Survey (HLS) 2021, which provides comprehensive micro-level information on household demographics, income, education, healthcare utilization, and geographic location. The household constitutes the primary unit of analysis. Households are geocoded at the regional level, allowing the integration of spatial information and enabling the application of spatial econometric techniques.

The empirical analysis incorporates both household-level and regional-level variables. Household covariates include income quintiles, the education level of the household head, household size, and the gender of the household head. At the regional level, the model includes variables capturing structural and infrastructural characteristics, such as the urbanization rate, the density of public service facilities, and road network density.

Two main outcome variables are considered in the analysis. The first measures access to healthcare services, defined as a binary indicator equal to one if the household reports access to a nearby clinic or hospital. The second captures access to education, measured through school enrollment among children aged 6 to 18 within the household. Together, these variables allow the study to assess how socioeconomic and spatial factors jointly influence households' access to essential social services.

Table 1. Descriptive Statistics of Social Service Access (HLS 2021)

Variable	Urban (%)	Rural (%)	Total (%)
Access to Healthcare	85	62	73
School Enrollment (6–18)	92	74	82
Average Household Size	4.2	5.1	4.6
Household Head with Secondary+ Education	67	41	54
Female-headed Household	18	12	15

Source: Author's calculations.

The table reveals a pronounced urban–rural disparity in access to social services and in household socioeconomic characteristics. Urban households exhibit higher levels of access to healthcare and education services, as well as higher educational attainment. In contrast, rural households tend to be larger and display lower levels of education, illustrating the structural constraints that affect service provision in peripheral and less developed regions. These differences underscore the persistent territorial inequalities that shape households' access to essential social services.

Table 2. Definition of Variables

Variable	Description	Level

Healthcare Access	Access to nearby public clinic/hospital (1=yes)	Household
Education Access	Child (6–18) enrolled in school (1=yes)	Household
Income Quintile	Household income quintile (1–5)	Household
Head Education	Years of schooling of household head	Household
Household Size	Number of household members	Household
Urban Residence	1 if household is located in urban area	Regional
Urbanization Rate	Share of urban population (%)	Regional
Public Facilities Density	Facilities per 10,000 inhabitants	Regional
Road Density	Km of paved roads per km²	Regional

Source: Author's

3.2 Methodology

To jointly examine household-level determinants and spatial interdependencies in access to social services, this study adopts a spatial econometric framework. Conventional regression models generally rely on the assumption of independence across observational units; however, in the presence of spatial interactions such as geographic spillovers or clustering effects, this assumption may lead to biased and inefficient estimations. Drawing on the pioneering contributions of Luc Anselin (1988) and subsequent methodological advances developed by James P. LeSage and Robert Kelley Pace (2009), this study estimates several spatial econometric specifications aimed at capturing both direct regional effects and indirect spillover effects transmitted across neighboring regions.

3.2 Spatial Econometric Specifications

3.2.1 Spatial Lag Model (SLM)

To account for endogenous spatial interaction effects in access to social services, we estimate a Spatial Lag Model (SLM), specified as:

$Y=\rho wy+X\beta$

In this specification, Y represents the regional indicator of access to social services—either healthcare or education—while X denotes a matrix of explanatory variables capturing both household-level and regional characteristics. The matrix W corresponds to the spatial weights matrix, which reflects the geographic structure of interactions across regions based on contiguity or distance criteria. The parameter ρ\rhoρ measures the degree of spatial dependence in the dependent variable and captures endogenous interaction effects among neighboring regions. The disturbance term ε\varepsilonε is assumed to be independently and identically distributed, with a zero mean and constant variance.

Rearranging the model yields:

$(I-\rho W)Y=X\beta+\varepsilon$

which implies the reduced-form expression:

$Y = (I - \rho W)^{-1} X\beta+(I - \rho W)^{-1} \varepsilon$

This formulation highlights the presence of spatial spillovers, as shocks affecting one region propagate to neighboring regions through the spatial multiplier $(I - \rho W)^{-1}$. The SLM is particularly appropriate when access outcomes are shaped by diffusion mechanisms such as shared infrastructure networks, cross-regional mobility of service users, or interregional policy coordination.

3.2.2 Spatial Error Model (SEM)

To capture spatial dependence arising from omitted or unobserved spatially correlated factors, we also estimate a Spatial Error Model (SEM), defined as:

$Y=X\beta+u,\ u=\lambda Wu+\varepsilon$

In this specification, spatial autocorrelation is captured exclusively in the error term uuu, while the observable covariates X enter directly into the systematic component of the model. The parameter λ\lambdaλ measures the extent of spatial dependence in unobserved factors—such as institutional quality, infrastructure availability, or governance characteristics—that tend to be spatially clustered across regions. The innovation term ε\varepsilonε is assumed to be independently and identically distributed.

The reduced-form representation of the SEM is:

$Y = X\beta+(I - \rho W)^{-1} \varepsilon$

Unlike the SLM, the SEM does not imply substantive interaction effects in the dependent variable; rather, it corrects for spatial correlation in the disturbances. Therefore, the SEM is appropriate when spatial clustering primarily reflects latent or omitted factors rather than direct interregional spillovers.

Model selection between the SLM and SEM specifications is guided by Lagrange Multiplier (LM) diagnostics and robustness checks, ensuring correct identification of the underlying spatial dependence process and avoiding model misspecification.

3.2.3 Measurement of Inequality

To measure disparities in access to healthcare and education, this study employs the Gini coefficient as an overall indicator of inequality. In addition, Theil entropy indices are used to decompose total inequality into within-region and between-region components. This decomposition makes it possible to distinguish inequalities arising from heterogeneity within regions from those resulting from structural differences across regions. Such an approach is

particularly relevant in the Moroccan context, where significant territorial disparities persist across administrative regions.

3.2.4 Estimation and Software

All empirical analyses are carried out using the R statistical environment. Spatial data processing and mapping are conducted with the sf package, while spatial econometric estimations are implemented using spdep. Measures of inequality are computed with the ineq package. To ensure the robustness of the results, several checks are performed, including the use of alternative spatial weight matrices—both contiguity-based and inverse-distance—and sensitivity analyses to evaluate the stability of the estimated spatial parameters.

4. RESULTS

4.1 Descriptive Statistics

Descriptive statistics indicate pronounced disparities in access to social services across both socioeconomic and geographic groups. Urban households display healthcare access rates of around 85% and school enrollment rates of 92%, whereas rural households show considerably lower levels, reaching only 62% and 74%, respectively (Table 1). These gaps largely reflect structural inequalities related to infrastructure availability, the distribution of healthcare personnel and teachers, and the physical distance separating households from essential service facilities. Income-related differences are also particularly marked. Households belonging to the highest income quintile benefit from nearly universal access to healthcare and education services, while those in the lowest quintile continue to face substantial barriers. These findings are consistent with recent micro-econometric evidence suggesting that even modest increases in household income can significantly improve the use of preventive healthcare services and school attendance, especially in contexts where out-of-pocket expenditures remain relatively high (Sahn & Younger, 2021; Wagstaff et al., 2022).

Household size also plays a critical role. Larger households display a resource dilution effect, allocating fewer resources per member for health and education. Empirical studies in North Africa and other developing regions suggest that very large households are particularly vulnerable to school dropout and lower healthcare utilization (Klasen & Lawson, 2023; Arestoff & Hurlin, 2020).

Table 1. Descriptive statistics of social service access by household characteristics

Characteristic	Healthcare Access (%)	School Enrollment (%)
Urban	85	92
Rural	62	74
Top income quintile	98	97
Bottom income quintile	55	65
Large households (>6 members)	60	68

Source: Author's calculations.

4.2 Spatial Autocorrelation

Spatial clustering of low-access regions was assessed using Global Moran's I.

Table 2. Global Moran's I for healthcare and education access

Variable	Moran's I	z-value	p-value
Healthcare Access	0.32	4.87	<0.01
Education Access	0.28	4.12	<0.01

Source: Author's calculations.

The positive and statistically significant Moran's I statistics reveal a strong presence of spatial autocorrelation, indicating that regions with low levels of access to social services tend to be geographically clustered rather than randomly dispersed. The LISA cluster maps (Figure 1) further illustrate these spatial patterns, showing that underserved areas are primarily concentrated in southern and mountainous regions, while clusters with higher levels of access are predominantly located in coastal and metropolitan zones. These findings are consistent with previous empirical evidence on spatial dependence in service accessibility in North Africa (Fattouh et al., 2022) and emphasize the importance of incorporating geographic spillover effects in empirical analyses of social service inequalities.

Figure 1. Spatial clustering of healthcare access in Morocco

Region	Healthcare_Access (%)	Education_Access (%)
Tanger-Tetouan-Al Hoceima	78	82
Oriental	70	75

Fès-Meknès	74	78
Rabat-Salé-Kénitra	88	92
Béni Mellal-Khénifra	72	76
Casablanca-Settat	90	95
Marrakech-Safi	75	80
Drâa-Tafilalet	65	70
Souss-Massa	73	77
Guelmim-Oued Noun	60	65
Laâyoune-Sakia El Hamra	68	72
Dakhla-Oued Ed Dahab	62	68

Source: Haut-Commissariat au Plan (2021), Moroccan Household Living Standards Survey (HLS).

4.3 Spatial Econometric Regression

We estimated a Spatial Lag Model (SLM) to capture both direct household effects and spatial spillovers.

Table 3. Spatial Lag Model (SLM) estimates for social service access

Variable	Coefficient	Std. Error	p-value
Income Quintile	0.21	0.04	0.001
Head Education	0.15	0.06	0.012
Household Size	-0.05	0.02	0.041
Urban Residence	0.34	0.05	0.001
Spatial Lag (ρ)	0.29	0.08	0.001
Constant	0.42	0.07	0.001

Source: Author's calculations.

The empirical findings emphasize the significant influence of household income and the education level of the household head on access to healthcare and education services. The positive and statistically significant coefficients associated with these variables suggest that households with higher income and more educated heads are considerably more likely to benefit from social services. Greater financial resources help alleviate barriers related to transportation costs, medical fees, and schooling expenses, thereby facilitating service utilization. At the same time, higher levels of education among household heads enhance awareness of the importance of investing in health and education, improve the capacity to interact with administrative systems, and strengthen trust in public institutions. These results are consistent with prior empirical studies showing that parental education plays a crucial role in increasing preventive healthcare utilization and sustaining children's educational participation, particularly among girls (Baird et al., 2020; Kruk et al., 2018).

The analysis also identifies a negative and statistically significant effect of household size on access to social services, providing support for the resource dilution hypothesis. Larger households must distribute limited financial and time resources among a greater number of members, which can reduce per capita investment in healthcare and education. As household size expands, expenditures related to medical consultations, medicines, school supplies, and transportation may become more constrained, especially among low-income families. This situation can lead to lower rates of preventive healthcare use and increase the likelihood of school dropout among children. Similar patterns have been observed in various developing countries, where larger households face structural challenges in sustaining long-term investments in human capital (World Bank, 2022).

Another key determinant emerging from the results is urban residence, which is strongly associated with improved access to healthcare and education services. Urban households benefit from more developed infrastructure, including a higher concentration of hospitals, clinics, schools, and transportation networks. These structural advantages reduce the physical distance to service facilities and enhance the reliability and quality of service provision. Moreover, urban areas tend to attract a larger number of qualified healthcare professionals and teachers, as well as stronger institutional and administrative capacities. These conditions contribute to higher service accessibility compared with rural and peripheral areas, confirming previous research highlighting persistent urban–rural inequalities in Morocco (El Amrani et al., 2019).

The spatial dimension of the analysis provides additional insights into regional dynamics in access to social services. The estimated spatial lag coefficient ($\rho = 0.29$) is positive and statistically significant, indicating the presence of spatial dependence across regions. This finding suggests that improvements in healthcare and education access in one region can generate positive spillover effects in neighboring regions. Such spillovers may occur through mechanisms such as population mobility, shared infrastructure, interconnected labor markets, and regional administrative coordination. For instance, improved healthcare infrastructure in one region may serve populations from adjacent regions who travel across administrative boundaries to access better services. Similar spatial interactions have been documented in studies focusing on the MENA region (Benchekroun & Haddad, 2021).

Overall, these results underline the combined influence of socioeconomic and spatial factors in shaping access to social services. While household-level characteristics such as income, education, and household composition significantly affect individual access opportunities, regional infrastructure, geographic location, and spatial spillovers also play an important role. This interaction implies that policies aimed at improving access to healthcare and education should address both socioeconomic inequalities and territorial disparities. Implementing coordinated regional development strategies alongside targeted social investments may therefore be essential for reducing inequalities and promoting more balanced access to essential services across Moroccan regions.

4.4 Inequality Measures

Table 4 reports the Gini and Theil indices for healthcare and education access across urban regions, rural regions, and at the national level. These indicators provide a comparative overview of the distributional structure of access to social services and highlight the extent to which inequalities vary across different territorial

Area	Gini Index	Theil Index
Urban Regions	0.21	0.17
Rural Regions	0.38	0.31
National	0.29	0.24

Source: Author's calculations.

Access to social services exhibits markedly higher levels of inequality in rural areas, reflecting both lower average access and a wider dispersion of outcomes among households. This situation indicates that rural populations face not only structural limitations related to infrastructure and service availability but also significant disparities within the same localities. To further identify the sources of these inequalities, the Theil index is decomposed into within-region and between-region components. This decomposition makes it possible to assess the respective contribution of intra-regional heterogeneity and structural differences across regions. The results of this analysis are summarized in Table 5**.**

Table 5. Theil decomposition of total inequality

Component	Share of Total Inequality (%)
Within-region	55
Between-region	45
Total	100

Source: Author's calculations.

Approximately 45% of total inequality arises from differences between regions, highlighting the structural importance of spatial disparities. These findings are consistent with Weiss et al. (2020), who report that geographic imbalances explain a substantial share of service access inequality in developing countries.

5. DISCUSSION

The results of this study demonstrate that, in Morocco, households' access to social services is conditioned by a combination of their socioeconomic situation and their geographical location. Access to education and healthcare is more likely for wealthy, educated individuals living in urban areas. Moreover, access to these resources is restricted for larger households, as the available resources must be distributed among a greater number of individuals. These results are consistent with previous microeconomic research conducted in North Africa and other development contexts, which have highlighted the double disadvantage faced by low-income and less educated households in accessing essential services (Baird et al., 2020; World Bank, 2022). Significantly, these household-level factors alone are not sufficient to fully explain the disparities, highlighting the importance of considering the geographical and institutional framework in which households reside.

Spatial analyzes highlight a notable concentration of regions with high and low access levels across Morocco. This indicates that the regional context has an autonomous effect on access outcomes. Southern, mountainous, and peripheral areas generally show a lack of health and education services, while metropolitan and coastal regions exhibit a high density of these services. The Spatial Lag Model has highlighted positive and notable spatial

interaction effects, emphasizing that progress made in one region can benefit neighboring regions. This underscores the importance of considering interregional dependencies when formulating policies. These results are consistent with recent evidence from the MENA region that shows the significant impact of spatial autocorrelation on social service outcomes (Fattouh et al., 2022; Benchekroun & Haddad, 2021).

These geographical configurations reflect the historical methods of infrastructure construction, the diverse potentials of local institutions, and the development trajectories adopted by different regions. Cities have dense networks of schools, healthcare facilities, and qualified personnel, while rural and mountainous regions remain structurally disadvantaged. These inequalities are exacerbated by failing transportation systems, a lack of skilled workers, and poor local governance, leading to the formation of persistent groups deprived of essential services. These structural elements show that access is not distributed randomly, but rather influenced by longestablished institutional and spatial restrictions.

These results have three policy implications. It is essential to prioritize certain regions: targeted investments in areas with limited access, particularly in the south and mountainous regions, can significantly promote equity and expand the overall coverage of services. Next, aid programs aimed at households, such as conditional cash transfers or subsidies for low-income and low-education households, can help overcome constraints related to limited household resources and promote the use of existing services. Thirdly, it is crucial to adopt decentralized planning: by strengthening the capacity of local governments to design and implement interventions tailored to their regions, we can improve the efficiency of resource allocation and ensure that policies meet the specific needs of each area. By combining micro-level socio-economic determinants with spatial econometric analysis, we are able to develop a comprehensive framework to understand inequalities in access to social services. By combining these methods, we can identify both household-level vulnerabilities and regional clusters of deprivation, thus providing concrete perspectives for policy development. By taking into account the interaction between socioeconomic status and spatial context, policymakers can develop inclusive and territorially adapted strategies that reduce disparities, strengthen equity in the distribution of services, and promote balanced human capital development across Morocco.

6. CONCLUSION

This research offers a detailed assessment of disparities in access to social services at the household and regional levels in Morocco, combining micro-level socio-economic factors with spatial econometric techniques. Our results confirm that access to healthcare and education is jointly influenced by household characteristics and regional spatial factors. Wealthier and better-educated households, particularly those residing in urban areas, consistently have a higher service utilization rate, while larger families and those located in peripheral regions face structural constraints.

These results highlight the need to consider both microeconomic and territorial dimensions to fully understand the disparities in access to social services. Spatial analyzes highlight a marked geographical concentration of underserved regions, with southern, mountainous, and remote areas consistently showing limited access to healthcare and education. Significant spatial externalities suggest that improvements made in one region can have positive effects on neighboring regions, highlighting the importance of coordinated and localized interventions. These interregional dependencies indicate that policies focusing solely on isolated households or regions may be inadequate, and that integrated territorial planning is essential for effective service delivery and improved equity.

These results have numerous policy implications. First of all, investments must be directed toward regions with low access, particularly in structurally disadvantaged areas, in order to optimize the effect of public spending. Secondly, targeted support measures for households—such as conditional cash transfers, subsidies, or scholarships—continue to be essential to alleviate the constraints faced by low-income and less educated families. Thirdly, by strengthening local governance and decentralizing planning, we can improve responsiveness to regional needs, optimize resource allocation, and promote the sustainable development of human capital. Together, these strategies can help reduce inequalities both at the household level and the regional level in a coordinated and effective manner.

Overall, this research demonstrates that integrating microeconomic and spatial perspectives provides a powerful framework for understanding and addressing inequalities in access to social services. By explicitly taking into account spatial autocorrelation, regional spillovers, and household diversity, policymakers can develop inclusive and territorial interventions that reduce inequalities and promote balanced development. Future research could develop this method by integrating longitudinal data to analyze trends over time and by evaluating the effectiveness of recent national policies aimed at improving equity in healthcare and education. Such evidence will be essential to guide Morocco's ongoing efforts toward inclusive social development and sustainable regional planning.

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