

## Does Fiscal Decentralization Deliver an Equity Dividend? Inconclusive Evidence from Morocco's Regions

**Mohammed MAACH, (PhD Candidate)**

*Faculty of Law, Economics and Social Sciences of Souissi  
Mohammed V University in Rabat, Morocco*

**Ahmed LAKSSISSAR, (Professor)**

*Faculty of Law, Economics and Social Sciences of Souissi  
Mohammed V University in Rabat, Morocco*

|                                |                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Correspondence address:</b> | Faculty of Legal, Economic and Social Sciences – Souissi, Mohammed V University, B.P. 6430, Rabat, Morocco.<br>Phone : +212 5 37 67 17 19<br><a href="mailto:fsjes-souissi@um5r.ac.ma">fsjes-souissi@um5r.ac.ma</a>                                                                                                                           |
| <b>Disclosure Statement:</b>   | The authors declare that they have not received any financial support that could have influenced the objectivity of this study. They take full responsibility for any potential plagiarism, the use of artificial intelligence in the writing process, as well as for the results presented in this article.                                  |
| <b>Conflict of Interest:</b>   | The authors report no conflicts of interest.                                                                                                                                                                                                                                                                                                  |
| <b>Cite this article:</b>      | MAACH, M., & LAKSSISSAR, A. (2026). Does Fiscal Decentralization Deliver an Equity Dividend? Inconclusive Evidence from Morocco's Regions. International Journal of Accounting, Finance, Auditing, Management and Economics, 7(13), 288–310.<br><a href="https://doi.org/10.5281/zenodo.23483990">https://doi.org/10.5281/zenodo.23483990</a> |
| <b>License</b>                 | <b>This is an open access article under the CC BY-NC-ND license</b>                                                                                                                                                                                                                                                                           |

**International Journal of Accounting, Finance, Auditing, Management and Economics - IJAFAME**

**ISSN: 2658-8455**

**Volume 7, Issue 13 (2026)**

## Does Fiscal Decentralization Deliver an Equity Dividend? Inconclusive Evidence from Morocco's Regions

### Abstract:

Although often presented as a lever for equity, fiscal decentralization has not yet been related directly to household poverty in a unitary middle-income state with equalization funds. This article asks: is the regional distribution of territorial-authority expenditure and revenue associated with a reduction in multidimensional poverty across Morocco's twelve regions? It is measured by the expenditure decentralization index (IDFD) and the revenue decentralization index (IDFR), each region's share of the national total. Poverty is measured by the multidimensional poverty rate (IPM) of the High Commission for Planning (HCP) in 2014 and 2024. The primary test, suited to twelve observations, relates ten-year changes; an annual panel on household consumption complements it. The IDFD coefficient is negative ( $-0.48$  poverty points per standard deviation; 95% confidence interval:  $-1.00$  to  $0.03$ ) but unstable across specifications, the IDFR coefficient is never significant, and the panel shows no favourable association with consumption. The evidence is inconclusive: it neither confirms nor rules out an economically large effect. Equalization and administrative capacity are avenues for research, not conclusions.

**Keywords:** Fiscal decentralization, multidimensional poverty, territorial equity, fiscal equalization, Morocco.

**JEL Classification:** H71, H75, H77, I32, R11, C21, C23.

**Paper type:** Empirical Research.

### Résumé :

Souvent présentée comme un levier d'équité, la décentralisation fiscale n'a pas encore été reliée directement à la pauvreté des ménages dans un État unitaire à revenu intermédiaire doté de fonds de péréquation. Cet article pose la question : la répartition régionale des dépenses et des recettes des collectivités territoriales est-elle associée à une réduction de la pauvreté multidimensionnelle dans les douze régions du Maroc ? Elle est mesurée par l'indice de décentralisation fiscale des dépenses (IDFD) et l'indice de décentralisation fiscale des recettes (IDFR), soit la part de chaque région dans le total national. La pauvreté est mesurée par le taux de pauvreté multidimensionnelle (IPM) du Haut-Commissariat au Plan (HCP) en 2014 et 2024. Le test principal, adapté à douze observations, relie les variations sur dix ans ; un panel annuel sur la consommation des ménages le complète. Le coefficient de l'IDFD est négatif ( $-0,48$  point de pauvreté pour un écart-type ; intervalle de confiance à 95 % :  $-1,00$  à  $0,03$ ) mais instable selon la spécification, celui de l'IDFR n'est jamais significatif, et le panel ne montre aucun effet favorable sur la consommation. Le résultat est non concluant : il ne confirme ni n'exclut un effet économiquement important. La péréquation et la capacité administrative constituent des pistes de recherche, non des conclusions.

**Mots clés :** Décentralisation fiscale, pauvreté multidimensionnelle, équité territoriale, péréquation fiscale, Maroc.

**JEL Classification :** H71, H75, H77, I32, R11, C21, C23.

**Type du papier :** Recherche empirique.

## 1. Introduction

Since the 2011 Constitution and the 2015 organic laws, Morocco has engaged in an advanced regionalization that transfers responsibilities and resources to twelve regions, alongside prefectures, provinces and communes. The reform pursues two goals: more efficient local public action and greater territorial cohesion, the latter supported by two dedicated equalization funds. Yet regional resources remain dominated by the state, which provides about 93% of them (Cour des comptes, 2023), and multidimensional poverty, although nearly halved between 2014 and 2024, remains predominantly rural (HCP, 2025). Whether the transfer of fiscal resources to territorial authorities helps reduce household deprivation is therefore a central question for the reform.

The theoretical case for decentralization rests on two distinct promises. The allocative argument holds that subnational governments, being closer to local preferences, can provide public goods more efficiently (Oates, 1972). The distributive argument holds that local information can improve the targeting of social spending and reduce deprivation (Alderman, 2002; Galasso & Ravallion, 2005). The empirical literature does not settle the matter. Cross-country studies find that decentralization reduces regional disparities in high-income countries but can widen them in lower-income settings (Rodríguez-Pose & Ezcurra, 2010; Lessmann, 2012), and that its social returns depend on government quality (Kyriacou et al., 2015, 2017; Nakatani et al., 2022). Poverty itself may rise even where income inequality falls (Sepulveda & Martinez-Vazquez, 2011).

Two gaps motivate this article. First, most of the evidence comes from federal or high-income countries, whereas the distributive effect of decentralization introduced within a unitary, fiscally centralized, middle-income state that operates explicit equalization funds has rarely been tested directly. Second, Moroccan studies have examined decentralization through national time series or aggregate outcomes: a composite social-inclusion index (Boukbech & Liouaeddine, 2023), regional human development (Kissami & Zbair, 2020) and a territorial Gini index of regional GDP per capita (Amrani & Elouardirhi, 2026). None of them relates decentralization to household-based multidimensional poverty using the official regional observations published by the High Commission for Planning (HCP).

The article therefore addresses the following question: are expenditure decentralization and revenue decentralization associated with a reduction in multidimensional poverty across Morocco's regions? Two sub-questions follow. Does the association differ between the expenditure side, which finances services, and the revenue side, which in Morocco consists mainly of shared national taxes? And what can be learned from only twelve regions, that is, which effect sizes can the available data confirm or rule out? Hypotheses H1a and H1b formalize these questions (Section 2.6).

The design rests on the only two official observations of regional multidimensional poverty, for 2014 and 2024. Decentralization is measured, for each region, by its share of national territorial-authority expenditure and revenue, so that the test concerns how decentralized resources are distributed across regions rather than the overall degree of decentralization, which is common to all regions. The primary test relates the ten-year change in poverty to the change in these shares across the twelve regions, with heteroskedasticity-robust standard errors and permutation inference. An annual panel on household consumption, restricted to the years with official regional accounts, complements it; annual poverty is not used, because it is observed only twice. The contribution is twofold. Empirically, the article provides a direct test of the equity claim for Moroccan regions based on official poverty data, distinguishing the expenditure and revenue sides. Methodologically, it applies and documents small-sample inference practices (wild-cluster bootstrap, studentized permutation tests, confidence intervals, minimum detectable

effects and an equivalence test) that make explicit what twelve regional observations can and cannot establish.

The results are inconclusive. The expenditure-side coefficient is negative, about  $-0.5$  poverty point for a one-standard-deviation change in the expenditure share, but its 95% confidence interval ranges from  $-1.0$  to  $0.03$  point, it loses significance under several reasonable specifications, including when the index is expressed per capita, and the revenue-side coefficient is never significant. The design has adequate power only for effects of about  $0.7$  point per standard deviation, some 15% of the average decline in poverty, so it can neither confirm nor exclude an economically meaningful equity dividend. In the consumption panel, the expenditure share is associated with slightly lower, not higher, household consumption within regions. Rather than establishing a zero effect, the article delimits the plausible range of effects and identifies the data that would be needed to narrow it.

The remainder of the article is organized as follows. Section 2 reviews the literature and sets out the conceptual framework and the hypotheses. Section 3 presents the institutional and fiscal context. Section 4 describes the data, the construction of the variables and the empirical strategy. Section 5 reports the results, Section 6 discusses them in light of previous studies, and Section 7 concludes.

## **2. Literature Review and Conceptual Framework**

### **2.1. The distributive case for decentralization**

Decentralization may improve distribution because local authorities can possess better information about beneficiaries and local needs. Evidence on the decentralized targeting of social assistance in Albania and of a food-for-education program in Bangladesh supports improved local targeting (Alderman, 2002; Galasso & Ravallion, 2005); these studies concern the targeting of individual transfers, a mechanism that is only indirectly comparable with the regional financing of public services examined here. In Africa, municipal evidence from Côte d'Ivoire links fiscal decentralization to better access to public services and lower poverty (Sanogo, 2019), and evidence from Burkina Faso shows that municipal capital spending and own revenue improve access to basic services such as water, with spillovers across neighbouring municipalities (Zallé & Bakouan, 2024). In cross-country data, revenue decentralization has also been associated with lower income inequality (Neyapti, 2006). These studies support the possibility of an equity dividend, but they concern contexts in which local governments control spending decisions directly, which is only partly the case for Moroccan regions.

### **2.2. Why the distributive promise can fail: converging and diverging evidence**

A second strand of the literature, larger and more critical, identifies the conditions under which decentralization fails to reduce, or even widens, deprivation and disparities. Efficiency gains themselves are not guaranteed: in OECD countries, fiscal decentralization has been found to be negatively associated with growth (Rodríguez-Pose & Ezcurra, 2011). Three mechanisms recur in the distributive literature. The first is elite capture and weak accountability, which may redirect decentralized resources toward local elites (Prud'homme, 1995; Bardhan & Mookherjee, 2006; Mookherjee, 2015). The second is unequal fiscal and administrative capacity: richer jurisdictions are better able to raise and execute resources, as the decentralization of secondary schools in Argentina illustrates, where gains were concentrated in better-off municipalities while schools in poor areas did not improve (Galiani et al., 2008). The third is the quality of government: decentralization narrows regional disparities where government quality is high but widens them where it is poor (Kyriacou et al., 2015, 2017), and

its effects on health and education depend on governance (Nakatani et al., 2022, 2024; Kyriacou & Roca-Sagalés, 2024).

Cross-country evidence on regional disparities converges on a development threshold. Rodríguez-Pose and Ezcurra (2010) find that decentralization is associated with lower regional disparities in high-income countries and with higher disparities in low- and middle-income countries, and Lessmann (2012) reports that the inequality-reducing effect of decentralization is concentrated in more developed countries. Within Western Europe, the relationship between decentralization and income inequality varies with regional development (Tselios et al., 2012). Evidence on poverty is less convergent: Sepulveda and Martinez-Vazquez (2011) find that fiscal decentralization can raise poverty while reducing income inequality, and Jütting et al. (2004), reviewing developing countries, conclude that outcomes are mixed and depend on institutional capacity. These studies share two limits. Decentralization is measured by national expenditure or revenue ratios that ignore the composition of subnational financing, and few studies address the endogeneity of decentralization to existing disparities (Martinez-Vazquez et al., 2017). A related mechanism is geographic: measured decentralization may follow pre-existing economic activity, because richer regions collect more revenue and execute more spending, so that decentralization raises average performance without reducing territorial deprivation, the pattern documented for lower-income countries by Rodríguez-Pose and Ezcurra (2010).

### **2.3. Equalization and intergovernmental transfers**

Fiscal equalization is the standard response to differences in local revenue capacity and expenditure needs. Its purpose is to allow comparable service provision without eliminating the incentives associated with decentralization. The design of transfers matters: Bird and Smart (2002) argue that equalization should rest on transparent formulas reflecting capacity and need and be accompanied by accountability for results, and OECD work emphasizes that equalization and place-based regional policy should be designed jointly where fiscal capacity differs substantially across territories (Moisio & Vidal Bover, 2023; OECD, 2023). Second-generation fiscal federalism adds that the financing mix shapes local incentives: subnational governments financed mainly by transfers have weaker incentives to foster local development than those that keep the revenue they raise (Weingast, 2009).

Evidence on redistribution confirms that the form of decentralization matters. In OECD regions, greater tax decentralization is associated with less redistribution within regions, whereas local spending can move redistribution in the opposite direction when sufficient resources are available (Pietrovito et al., 2023). The implication for this article is narrow: an efficiency gain cannot be taken as evidence of an equity gain, and the revenue side of decentralization, when it consists mainly of shared taxes, should not be expected to operate like own-source fiscal autonomy.

### **2.4. Evidence from Morocco**

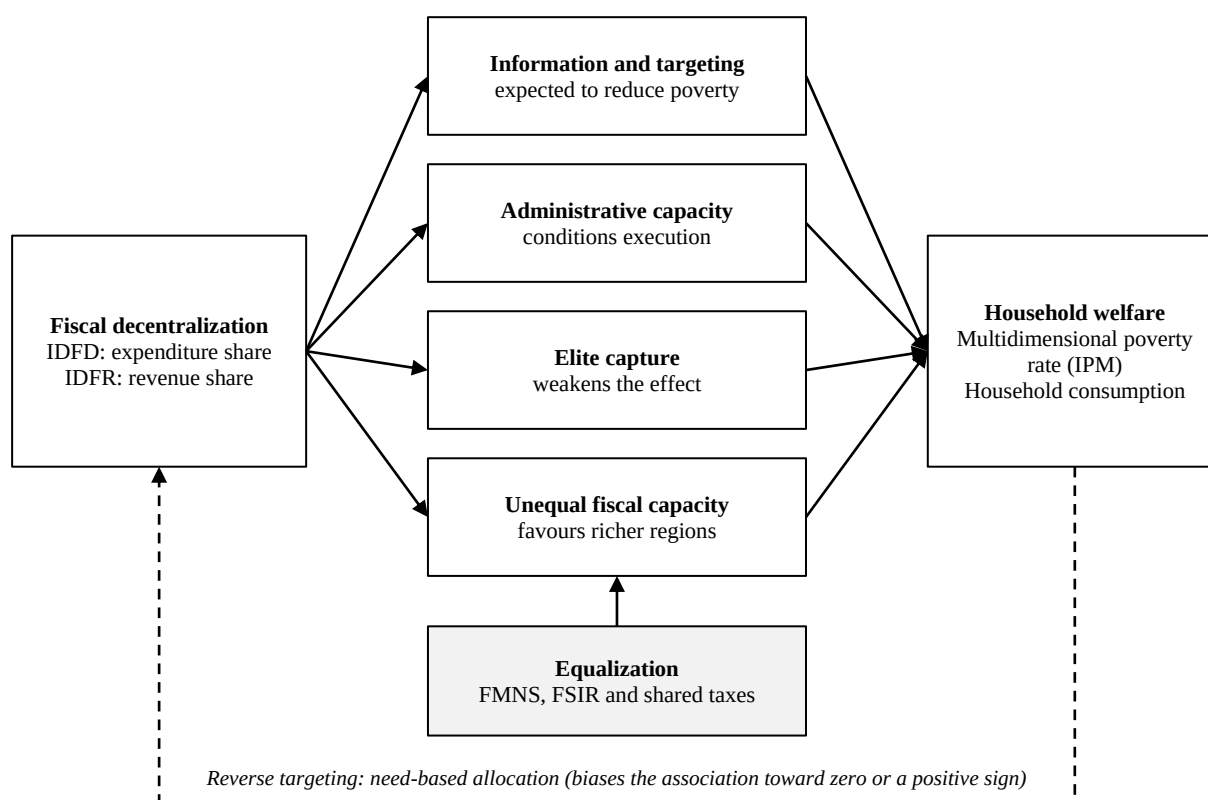
Empirical research on Moroccan decentralization is recent. Kissami and Zbair (2020) show that, for regions and prefectures, own local taxation is marginal and resources depend mainly on state transfers, and they report a positive association between local tax resources and regional human development in a panel of regions. Boukbech and Liouaeddine (2023), using national time series for 2002–2017 and the same distinction between expenditure (IDFD) and revenue (IDFR) decentralization, find no significant effect of expenditure decentralization on a composite social-inclusion index and a significant negative effect of revenue decentralization. Amrani and Elouardirhi (2026), using national data for 2014–2022, find that revenue decentralization reduces a territorial Gini index of regional GDP per capita, with a statistically more fragile effect of expenditure decentralization.

These studies differ from the present article in three respects. In design, they rely on national time series or on panels of regional aggregates, whereas this article exploits cross-regional differences in the change of decentralization. In data, their outcomes are a composite inclusion index, human development or inequality between regions, whereas this article uses the HCP multidimensional poverty rate, which is built from household deprivations and is observed officially for 2014 and 2024. In results, they report significant effects of revenue decentralization, in opposite directions, whereas this article finds no robust association on either side. The contrast is itself informative: an effect on aggregate indices or on income disparities between regions need not translate into lower deprivation among households.

## 2.5. Conceptual framework

The literature can be organized into a framework that links decentralization to household deprivation through four channels and one moderating factor (Figure 1). The framework combines second-generation fiscal federalism, which focuses on how the financing mix shapes local incentives (Weingast, 2009), with the political economy of targeting, which focuses on information, accountability and capture (Bardhan & Mookherjee, 2006; Mookherjee, 2015).

**Figure 1: Conceptual framework linking fiscal decentralization to household welfare**



*Source: Author's elaboration based on the literature reviewed in Section 2*

The information and targeting channel predicts that resources spent by territorial authorities reach deprived households better, which would lower poverty. The capacity channel predicts that this effect materializes only where authorities can plan and execute investment. The capture channel predicts that part of the resources is diverted toward better-connected groups, which weakens the effect. The fiscal-capacity channel predicts that decentralized resources follow existing economic activity, so that richer regions gain more. Equalization transfers moderate the last two channels by redirecting resources toward regions with greater needs. Finally, if the

state allocates resources according to need, poorer regions receive more resources because they are poor: this reverse-targeting relationship runs from poverty to decentralization.

Three expectations follow. First, the expenditure side, which finances services, is more likely than the revenue side, which in Morocco consists mainly of shared national taxes, to be associated with deprivation. Second, any association should be weaker where fiscal and administrative capacity is low. Third, reverse targeting would bias the estimated association toward a positive sign, and measurement error in the administrative series would bias it toward zero, so that a non-significant estimate is compatible with a true negative effect. With twelve regions, the second expectation cannot be tested through interaction terms without exhausting the degrees of freedom; it is used to structure the discussion (Section 6.2).

## 2.6. Hypotheses

*H1a (expenditure side):* an increase in the region's share of national territorial-authority expenditure ( $\Delta IDFD$ ) between 2014 and 2023 is associated with a larger reduction in the multidimensional poverty rate between 2014 and 2024.

*H1b (revenue side):* an increase in the region's share of national territorial-authority revenue ( $\Delta IDFR$ ) over the same period is associated with a larger reduction in the multidimensional poverty rate.

Each hypothesis is supported if the coefficient on the decentralization variable in the primary specification (Section 4.4) is negative and significant at the 5% level, using the studentized permutation p-value after a Holm correction for the two tests (one per index). A non-significant coefficient is interpreted as an inconclusive result, whose informativeness is assessed by its confidence interval, the minimum detectable effect and an equivalence test, and not as evidence of a zero effect.

## 3. Institutional and Fiscal Context in Morocco

### 3.1. Legal framework of advanced regionalization

The 2011 Constitution establishes the principle of free administration of territorial authorities, and its Article 142 (Constitution du Royaume du Maroc, 2011) creates two funds for the regions: a social upgrading fund (Fonds de mise à niveau sociale, FMNS) and an interregional solidarity fund (Fonds de solidarité interrégionale, FSIR). The 2015 organic laws organize the three levels of territorial authorities: regions (Organic Law No. 111-14, 2015), prefectures and provinces (Organic Law No. 112-14, 2015) and communes (Organic Law No. 113-14, 2015). Regions are responsible mainly for economic development, vocational training, rural development and regional planning, while communes provide local services such as water distribution, sanitation, public lighting and solid-waste management. The 2015 reform also redrew the regional map, replacing the sixteen regions of 1997 with twelve (Decree No. 2-15-40, 2015).

### 3.2. Regional finances and the equalization funds

Regional finances rely overwhelmingly on the state. Resources assigned by the state account for 93% of the regions' total resources, excluding carry-overs and borrowing, and own resources do not exceed 7%, or about 583 million dirhams per year. Assigned resources rose from 771 million dirhams in 2015 to 9.25 billion in 2022; over 2016–2022 they came from shares of corporate and income taxes (49%), general budget allocations (44%) and the insurance contract tax (7%) (Cour des comptes, 2023). Territorial authorities also receive a share of VAT revenue, whose statutory minimum was raised from 30% to 32% by the Finance Law for 2025 (Finance Law No. 60-24, 2024), in application of the tax reform framework law (Framework

Law No. 69-19, 2021; DGI, 2025). The tax system itself has long been described as concentrated on a narrow base (CESE, 2019).

The two equalization funds were made operational by decrees published in December 2017. The FMNS (Decree No. 2-17-598, 2017) targets deficits in human development, infrastructure and equipment; its eligibility criteria include regional GDP per capita, the rural population, the volume of investment by the state and public establishments in the region, the share of vulnerability and the nature of the projects. The FSIR aims at an equitable distribution of resources to reduce disparities between regions, on the basis of the human development index, GDP per capita, the number of unemployed persons, the rural and peri-urban population and the nature of the projects; the weights of the criteria are set by the Ministry of the Interior after consultation of the presidents of the regional councils. The FSIR mobilized 4.33 billion dirhams over 2018–2022 (Cour des comptes, 2023).

Execution capacity is uneven across regions. Over 2016–2022, the equipment credits allocated by eleven regions to their regional project-execution agencies totalled 8.51 billion dirhams, exceeding 1.1 billion in Souss-Massa, Tanger-Tétouan-Al Hoceima, Béni Mellal-Khénifra and Fès-Meknès, but remaining below 250 million in Casablanca-Settat, Guelmim-Oued Noun and Marrakech-Safi (Cour des comptes, 2023). Region-by-region allocations of the two equalization funds are not published in a form that allows them to be used in the regressions, a limitation discussed in Section 7.

Two implications follow for measurement. Because state transfers dominate regional resources, the regional distribution of territorial-authority revenue, which includes shared taxes, reflects the distribution of transfers rather than fiscal autonomy. And the regions with the largest metropolitan economies, Casablanca-Settat and Rabat-Salé-Kénitra, mechanically hold large shares of territorial-authority revenue and spending because of their size and urbanization.

## **4. Research Methodology**

### **4.1. Data and variables**

The analysis covers Morocco's twelve regions, defined on the post-2015 regional map. Three sources are combined: the HCP regional accounts, which provide regional GDP, household final consumption, gross fixed capital formation, population and sectoral value added; the HCP multidimensional poverty mapping (HCP, 2025); and the regional data on territorial-authority finances of the Directorate of Territorial-Authority Finances (Direction des Finances des Collectivités Territoriales), part of the Directorate General of Territorial Authorities (DGCT) of the Ministry of the Interior (DGCT, 2000–2023). All variables are defined in Table A1 (Appendix).

The outcome is the HCP multidimensional poverty rate, defined as the share of the population that is multidimensionally poor according to the counting approach of Alkire and Foster (2011), in which deprivations in education, health and living conditions are aggregated at household level; it is denoted IPM in the tables. This outcome is preferred to monetary poverty or regional GDP for two reasons. It covers dimensions in which territorial authorities hold responsibilities, notably basic infrastructure, water, sanitation and rural access, and it is the only household-based poverty measure published by the HCP for all twelve regions on the current map. Household final consumption per capita, taken from the regional accounts, is used as a complementary monetary measure of welfare.

The control variables are defined as follows. FBCF is gross fixed capital formation in the region (formation brute de capital fixe), POP is the regional population, and PRIM and SEC are the shares of the primary and secondary sectors in regional value added; all four are taken from the HCP regional accounts. Regional GDP per capita is not included in the panel equation because

it may be a channel through which decentralization affects welfare rather than a confounder; it is used in the benchmark test only as a sensitivity check (Section 5.4).

#### 4.2. Construction of the decentralization indices

The two indices measure the regional distribution of decentralized resources. For region  $i$  and year  $t$ ,  $IDFD_{it} = 100 \times DCT_{it} / \sum_j DCT_{jt}$ , where  $DCT$  is the consolidated expenditure of the communes, prefectures, provinces and region located in the region, and  $IDFR_{it} = 100 \times RCT_{it} / \sum_j RCT_{jt}$ , where  $RCT$  is territorial-authority revenue (local taxes, shared national taxes and non-tax own resources). Each index is the region's share, in percent, of the national total, so that the twelve shares sum to 100 every year. Both are computed from the regional expenditure and revenue series of the Directorate of Territorial-Authority Finances of the DGCT, which are observed for every year from 2000 to 2023; no year of the indices is interpolated or backcast. This definition has three consequences. First, the indices measure how decentralized resources are distributed across regions, not the degree of decentralization: a nationwide increase in the resources of territorial authorities raises the resources of all regions but leaves their shares unchanged, so that the vertical dimension of decentralization, common to all regions in a given year, cannot be identified with the twelve regions of a single country. The question tested is therefore whether regions that gained a larger share of decentralized resources recorded larger poverty reductions. Second, the shares reflect regional size: Casablanca-Settat and Rabat-Salé-Kénitra hold large shares because of their population and economic weight. Because the benchmark test uses changes within regions, this size effect is largely differenced out, and a per capita version, the ratio of the region's share of expenditure to its share of the national population, is used as a robustness check (Section 5.4). Third, because the shares sum to 100, their changes sum to zero: over 2014–2023,  $\Delta IDFD$  has a mean of zero and a standard deviation of only 0.30 point (0.47 point for  $\Delta IDFR$ ), so that the cross-regional variation used in the benchmark test is small (Table 1).

Because  $RCT$  includes shared national taxes,  $IDFR$  describes the regional distribution of public resources accruing to territorial authorities, not their fiscal autonomy; since own resources represent at most 7% of regional resources (Section 3.2), it is closer to an indicator of the distribution of transfers, and the label of revenue decentralization is retained only for comparability with the Moroccan literature. The two indices are highly correlated in levels across regions ( $r = 0.94$ ) and less so in their 2014–2023 changes ( $r = 0.69$ ), which is why they are estimated in separate equations. Because the changes are small, even modest recording or reclassification errors in the administrative series would represent a sizeable share of their variance and would bias the estimated coefficients toward zero (Section 6.3).

#### 4.3. Poverty outcome and official benchmarks

Official regional multidimensional poverty rates are available only for 2014 and 2024. The HCP's May 2025 mapping publishes the 2024 regional rates together with their change since 2014, which allows the 2014 level to be recovered from the 2024 level and the published change. Table A2 (Appendix) reports, for each region, the published 2024 rate, the change and the recovered 2014 rate. For eight regions, the HCP synthesis reports the change in percentage points (HCP, 2025); for the four others (Fès-Meknès, Oriental, Souss-Massa and Guelmim-Oued Noun), the 2014 level was recovered from the regional results of the mapping. Because the published values are rounded to one decimal, the reconstruction error on the 2014 level is about 0.1 percentage point at most, which is small relative to the cross-regional standard deviation of the 2014 rate (4.5 points); the reconstruction therefore cannot by itself generate the strong negative association between the initial level and the subsequent change. The population-weighted national rate computed from the recovered regional values (11.87% in 2014 and 6.80% in 2024) matches the published national rates (11.9% and 6.8%).

Regional poverty rates are not observed between the two benchmarks. Interpolated annual values would contain no independent information on poverty, and they are therefore not used in this article; the annual analysis is conducted on household consumption, which is observed in the regional accounts (Section 4.5).

#### 4.4. Primary specification and inference

The primary specification, defined before the robustness analyses, is a cross-sectional regression of the change in poverty on the change in decentralization, estimated separately for each index:

$$\text{Model A: } \Delta IPM_i = \beta_0 + \beta_1 \Delta IDFD_i + \beta_2 IPM2014_i + \varepsilon_i$$

$$\text{Model B: } \Delta IPM_i = \beta_0 + \beta_1 \Delta IDFR_i + \beta_2 IPM2014_i + \varepsilon_i$$

where  $\Delta IPM_i$  is the change in region  $i$ 's multidimensional poverty rate between 2014 and 2024 (percentage points),  $\Delta IDFD_i$  and  $\Delta IDFR_i$  are the changes in the indices between 2014 and 2023 (percentage points), 2023 being the latest year available in the fiscal data, and  $IPM2014_i$  is the initial poverty rate. The initial level is a pre-determined control that absorbs convergence: regions starting from higher poverty have more room to decline, and the two regions with the lowest initial rates face a floor. Because  $IPM2014$  enters both sides of the equation, its coefficient also captures regression to the mean (Friedman, 1992); it is therefore treated as a control and is not interpreted. A level specification, regressing  $IPM2024$  on  $IPM2014$  and the change in decentralization, is an algebraic reparametrization of Models A and B and yields identical decentralization coefficients; it is not reported separately.

Inference follows small-sample practice. Standard errors are heteroskedasticity-robust (HC3), and confidence intervals use the  $t$  distribution with 9 degrees of freedom. P-values are also computed by Freedman-Lane permutation (Freedman & Lane, 1983), with 20,000 replications of the studentized HC3  $t$ -statistic: the residuals of the model estimated under the null hypothesis are permuted across regions and added to the fitted values. The procedure assumes that these residuals are exchangeable under the null, an assumption that is plausible when the units are regions of a single country observed over the same period; studentization makes the test robust to moderate heteroskedasticity, and randomization-based tests are less prone than asymptotic tests to overstate significance in small samples (Young, 2019).

The family of tests corrected for multiplicity is defined ex ante as the two primary coefficients,  $\Delta IDFD$  in Model A and  $\Delta IDFR$  in Model B, to which the Holm correction is applied. The other specifications are sensitivity analyses and are not used to test the hypotheses, which avoids the specification search that would call for a stepwise correction over many models (Romano & Wolf, 2005). To assess what a non-significant estimate can establish, three statistics are reported: the 95% confidence interval; the minimum detectable effect at 80% power for a 5% two-sided test, equal to  $(t_{0.975} + t_{0.80})$  times the standard error; and a two one-sided tests (TOST) equivalence procedure (Lakens, 2017), which gives the smallest equivalence margin within which the effect could be declared negligible.

#### 4.5. Complementary design: annual consumption panel

The annual analysis uses household final consumption per capita, observed in the HCP regional accounts for 2013–2019 and 2022–2023. The primary panel sample is restricted to these nine years with official regional accounts ( $N = 108$ ). Two variants are reported: the full 2000–2023 period, in which 2000–2012 is backcast from the 2013 level at each region's observed 2013–2019 growth rate and 2020–2021 is interpolated around the pandemic shock, and the 2015–2023 sub-period. The specification is a static two-way fixed-effects model:

$$\ln(CONS_{it}) = \beta \cdot DEC_{it} + \gamma_1 \ln(FBCF_{it}) + \gamma_2 \ln(POP_{it}) + \gamma_3 PRIM_{it} + \gamma_4 SEC_{it} + \alpha_i + \lambda_t + \varepsilon_{it}$$

where  $CONS_{it}$  is household final consumption per capita,  $DEC_{it}$  is IDFD or IDFR, and  $\alpha_i$  and  $\lambda_t$  are region and year fixed effects. Standard errors are clustered by region, the level at which the

indices vary (Abadie et al., 2023). P-values are computed by the restricted wild-cluster bootstrap (Cameron et al., 2008; Roodman et al., 2019), first with Rademacher weights, whose 4,096 sign patterns are fully enumerated so that the p-values carry no simulation error, and then with the six-point weights of Webb (2023), recommended when clusters are very few (MacKinnon & Webb, 2018; MacKinnon et al., 2023), with 19,999 replications. The panel identifies associations from year-to-year movements of the shares within regions, which are small (within-region standard deviation of 0.11 point for IDFD over the official years); it therefore complements rather than replaces the benchmark test.

#### 4.6. Identification and scope of inference

Neither design provides exogenous variation in decentralization. The change in decentralization over 2014–2023 and the change in poverty over 2014–2024 are contemporaneous, so that the direction of the relationship is not established: if resources were directed toward regions according to their expected poverty dynamics, the estimated association would reflect allocation rather than impact. The estimates are therefore conditional associations. With twelve regions, conventional asymptotic inference has limited precision, which is why permutation and bootstrap inference are used and why the informativeness of non-significant results is assessed explicitly.

#### 4.7. Data and code availability

The regional dataset and the estimation code are available from the author upon reasonable request. The estimations reported here were carried out in Python (NumPy and SciPy), with permutation and wild-cluster bootstrap procedures implemented following Freedman and Lane (1983) and Roodman et al. (2019); they reproduce the benchmark coefficients and standard errors of the original estimates exactly.

### 5. Results

#### 5.1. Descriptive evidence

Table 1 reports descriptive statistics for the twelve regions and Table 2 the correlation matrix. Average expenditure shares over 2015–2023 range from 1.0% in Dakhla-Oued Ed-Dahab to 18.5% in Casablanca-Settat, but their changes over 2014–2023 are small, from –0.45 point in Béni Mellal-Khénifra to +0.38 point in Casablanca-Settat. The multidimensional poverty rate fell in every region between 2014 and 2024, by 4.9 points on average, from 0.9 point in Laâyoune-Sakia El Hamra to 7.9 points in Marrakech-Safi.

**Table 1: Descriptive statistics (N = 12 regions)**

| Variable                             | Mean  | Std. dev. | Min.  | Max.  |
|--------------------------------------|-------|-----------|-------|-------|
| IDFD, average 2015–2023 (%)          | 8.33  | 5.29      | 0.96  | 18.46 |
| IDFR, average 2015–2023 (%)          | 8.33  | 7.52      | 0.90  | 27.75 |
| $\Delta$ IDFD 2014–2023 (points)     | 0.00  | 0.30      | –0.45 | 0.38  |
| $\Delta$ IDFR 2014–2023 (points)     | 0.00  | 0.47      | –0.87 | 0.89  |
| GDP per capita 2023 (national = 100) | 109.0 | 49.6      | 63    | 221   |
| IPM 2014 (%)                         | 11.14 | 4.48      | 3.30  | 17.30 |
| IPM 2024 (%)                         | 6.28  | 2.44      | 2.40  | 9.80  |
| $\Delta$ IPM 2014–2024 (points)      | –4.86 | 2.26      | –7.90 | –0.90 |

*Note:* IDFD and IDFR are the regions' shares of national territorial-authority expenditure and revenue (Section 4.2); their changes sum to zero across regions.  $\Delta$ IPM is the change in the multidimensional poverty rate in percentage points.

*Source:* Author's calculations; DGCT; HCP regional accounts; HCP (2025)

**Table 2: Correlation matrix (Pearson, N = 12 regions)**

|                           | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8) |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-----|
| (1) IDFD (avg. 2015–2023) | 1     |       |       |       |       |       |       |     |
| (2) IDFR (avg. 2015–2023) | 0.94  | 1     |       |       |       |       |       |     |
| (3) $\Delta$ IDFD         | 0.19  | 0.38  | 1     |       |       |       |       |     |
| (4) $\Delta$ IDFR         | −0.17 | 0.04  | 0.69  | 1     |       |       |       |     |
| (5) GDP per capita        | −0.33 | −0.04 | 0.59  | 0.49  | 1     |       |       |     |
| (6) IPM 2014              | 0.27  | −0.02 | −0.65 | −0.46 | −0.90 | 1     |       |     |
| (7) IPM 2024              | 0.34  | 0.06  | −0.74 | −0.57 | −0.89 | 0.96  | 1     |     |
| (8) $\Delta$ IPM          | −0.16 | 0.10  | 0.50  | 0.30  | 0.84  | −0.95 | −0.82 | 1   |

*Source: Author's calculations*

Table 3 presents the regional profile. The expenditure share is high in the two richest core regions, Casablanca-Settat and Rabat-Salé-Kénitra, but also in poorer regions such as Marrakech-Safi and Fès-Meknès, whereas the Saharan regions combine the highest GDP per capita with the lowest shares. The rank correlations between the average IDFD over 2015–2023 and GDP per capita ( $\rho = -0.28$ ), 2014 poverty ( $\rho = 0.25$ ) and 2024 poverty ( $\rho = 0.30$ ) are weak, and identical when the averages are computed over 2000–2023, but their 95% confidence intervals are wide, ranging from about  $-0.74$  to  $0.75$ . With twelve regions, these correlations cannot establish that decentralized resources are unrelated to wealth or to need; they show only that no strong alignment is apparent.

**Table 3: Decentralized resources, relative income and multidimensional poverty by region**

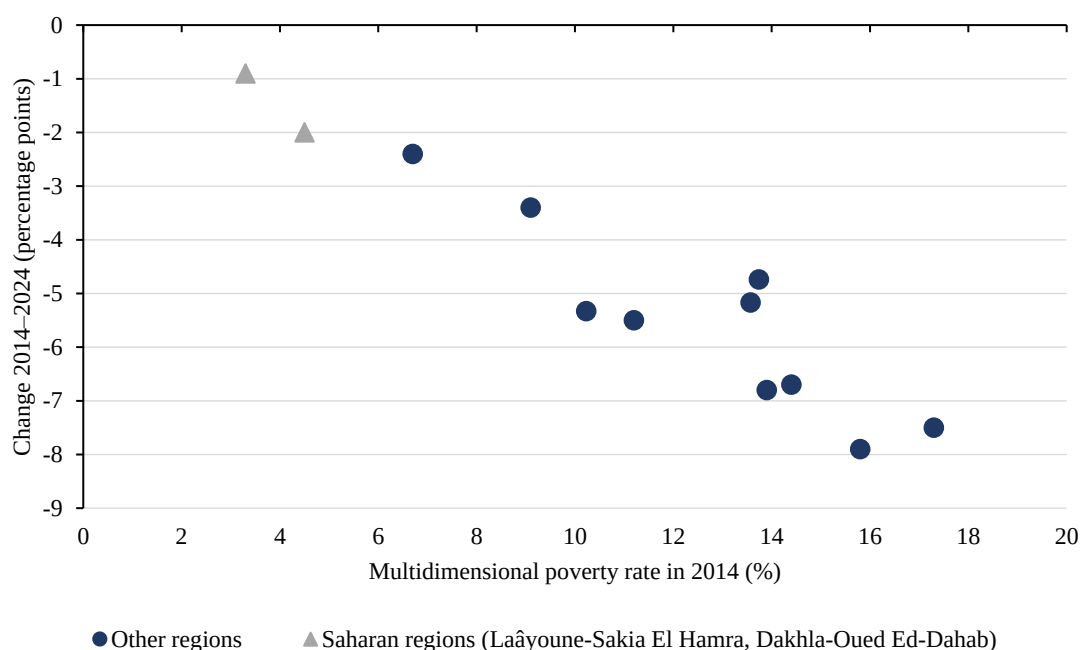
| Region                    | IDFD<br>2015–2023<br>(%) | IDFR<br>2015–2023<br>(%) | $\Delta$ IDFD<br>(points) | $\Delta$ IDFR<br>(points) | GDP p.c.<br>2023<br>(nat. = 100) | IPM<br>2014<br>(%) | IPM<br>2024<br>(%) | $\Delta$ IPM<br>(points) |
|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|----------------------------------|--------------------|--------------------|--------------------------|
| Casablanca-Settat         | 18.5                     | 27.8                     | 0.38                      | 0.38                      | 155                              | 6.7                | 4.3                | −2.4                     |
| Rabat-Salé-Kénitra        | 13.1                     | 15.2                     | 0.22                      | −0.25                     | 113                              | 9.1                | 5.7                | −3.4                     |
| Marrakech-Safi            | 12.5                     | 10.1                     | −0.08                     | −0.44                     | 64                               | 15.8               | 7.9                | −7.9                     |
| Fès-Meknès                | 11.8                     | 9.8                      | −0.32                     | −0.87                     | 69                               | 13.7               | 9.0                | −4.7                     |
| Tanger-Tétouan-Al Hoceima | 10.7                     | 10.8                     | 0.37                      | 0.89                      | 97                               | 13.9               | 7.1                | −6.8                     |
| Souss-Massa               | 8.4                      | 7.2                      | 0.19                      | 0.04                      | 80                               | 11.2               | 5.7                | −5.5                     |
| Béni Mellal-Khénifra      | 7.7                      | 6.4                      | −0.45                     | −0.46                     | 78                               | 17.3               | 9.8                | −7.5                     |
| Oriental                  | 7.2                      | 5.6                      | −0.43                     | −0.05                     | 80                               | 13.6               | 8.4                | −5.2                     |
| Drâa-Tafilalet            | 5.4                      | 3.3                      | −0.22                     | 0.06                      | 63                               | 14.4               | 7.7                | −6.7                     |
| Guelmim-Oued Noun         | 1.9                      | 1.4                      | −0.06                     | 0.05                      | 117                              | 10.2               | 4.9                | −5.3                     |
| Laâyoune-Sakia El Hamra   | 1.8                      | 1.6                      | 0.17                      | 0.42                      | 171                              | 3.3                | 2.4                | −0.9                     |
| Dakhla-Oued Ed-Dahab      | 1.0                      | 0.9                      | 0.23                      | 0.23                      | 221                              | 4.5                | 2.5                | −2.0                     |

*Source: DGCT (IDFD, IDFR); HCP regional accounts (GDP per capita); HCP (2025) (poverty)*

Note: IDFD and IDFR: regional shares of national territorial-authority expenditure and revenue, averages over 2015–2023; changes over 2014–2023. GDP per capita: 2023, current prices. Spearman rank correlations with average IDFD (N = 12), with 95% confidence intervals (Fisher transformation): GDP per capita  $-0.28$  ( $p = 0.38$ ;  $-0.74$  to  $0.36$ ); IPM 2014  $0.24$  ( $p = 0.44$ ;  $-0.39$  to  $0.72$ ); IPM 2024  $0.30$  ( $p = 0.34$ ;  $-0.34$  to  $0.75$ ). Identical rank correlations are obtained with 2000–2023 averages.

Figure 2 plots the 2014–2024 change in poverty against the 2014 level. The relationship is strongly negative ( $r = -0.95$ ): regions with higher initial poverty recorded larger declines. The two Saharan regions, with the lowest initial rates (3.3% and 4.5%), recorded the smallest declines, a floor effect that coincides with their low decentralization and makes the control for initial poverty indispensable in the primary specification.

**Figure 2: Initial poverty and poverty change, 2014–2024 (twelve regions)**



*Source: Author's elaboration based on HCP (2025)*

## 5.2. Primary result: the benchmark test

Table 4 reports the primary specification. In Model A, the coefficient on  $\Delta IDFD$  is  $-1.60$  (HC3 standard error 0.75): conditional on initial poverty, regions where expenditure decentralization increased more over 2014–2023 recorded larger poverty reductions by 2024. The 95% confidence interval, from  $-3.31$  to  $0.10$ , includes zero; the HC3 p-value is 0.062 and the studentized permutation p-value is 0.055, which becomes 0.110 after the Holm correction. In Model B, the coefficient on  $\Delta IDFR$  is  $-0.87$  (standard error 0.67), with a confidence interval from  $-2.37$  to  $0.64$  and a permutation p-value of 0.214. Neither H1a nor H1b is therefore supported at the 5% level. When both indices enter jointly, neither is significant and the  $\Delta IDFD$  coefficient changes sign, which reflects their correlation and the small sample.

**Table 4: Primary specification, official 2014 and 2024 HCP poverty observations**

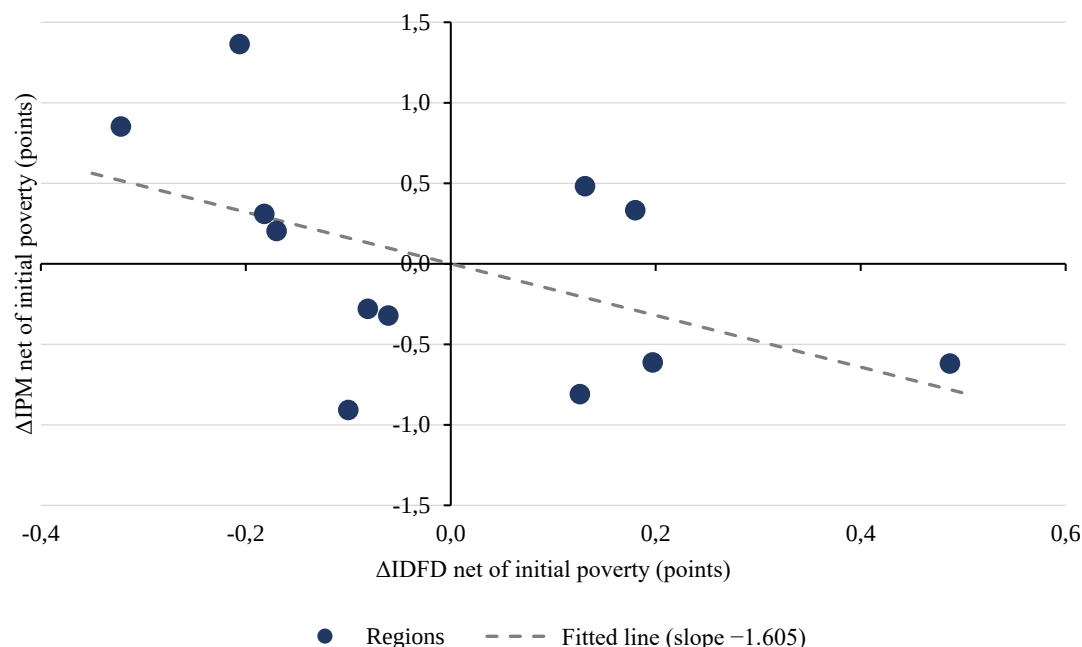
|                                                         | Model A: $\Delta IDFD$        | Model B: $\Delta IDFR$        |
|---------------------------------------------------------|-------------------------------|-------------------------------|
| Decentralization coefficient                            | $-1.605$                      | $-0.866$                      |
| HC3 standard error                                      | 0.754                         | 0.665                         |
| 95% confidence interval                                 | $-3.31$ to $0.10$             | $-2.37$ to $0.64$             |
| HC3 t-test p-value                                      | 0.062                         | 0.225                         |
| Permutation p-value (studentized)                       | 0.055                         | 0.214                         |
| Holm-adjusted permutation p-value                       | 0.110                         | 0.214                         |
| Effect of a one-standard-deviation change (95% CI)      | $-0.48$ ( $-1.00$ to $0.03$ ) | $-0.41$ ( $-1.11$ to $0.30$ ) |
| IPM2014 coefficient (HC3 s.e.)                          | $-0.549$ (0.041)              | $-0.521$ (0.047)              |
| Minimum detectable effect, per index point (per s.d.)   | 2.37 (0.71)                   | 2.09 (0.98)                   |
| Smallest equivalence margin, per index point (TOST, 5%) | 2.99                          | 2.09                          |
| Observations (regions)                                  | 12                            | 12                            |

*Source: Author's estimates based on HCP (2025)*

*Note:* Dependent variable: change in the multidimensional poverty rate, 2014–2024 (percentage points). Decentralization variables: changes in the regional shares, 2014–2023 (percentage points); standard deviations 0.30 ( $\Delta IDFD$ ) and 0.47 ( $\Delta IDFR$ ). Confidence intervals use the t distribution with 9 degrees of freedom. Permutation p-values: 20,000 Freedman-Lane replications of the studentized HC3 t-statistic, stable across seeds (0.050 to 0.055 for Model A; 0.213 to 0.217 for Model B). Holm adjustment over the two primary tests.

Figure 3 plots the partial relationship underlying Model A: the change in poverty and the change in the expenditure share, both net of initial poverty. The slope of this relationship is the Model A coefficient. Fès-Meknès, whose poverty declined less than its initial level predicts while its share fell, has the largest residual and is the most influential observation (Section 5.4).

**Figure 3: Partial relationship between poverty change and change in the expenditure share (Model A)**



*Source: Author's estimates based on HCP (2025) and DGCT data*

### 5.3. Precision, power and economic magnitude

A non-significant estimate is informative only if the design could have detected an economically meaningful effect. Because the shares sum to 100,  $\Delta IDFD$  has a standard deviation of only 0.30 point, so that the per-point coefficient overstates the economic magnitude. A one-standard-deviation increase in  $\Delta IDFD$  is associated with a poverty decline larger by 0.48 point (95% confidence interval:  $-1.00$  to  $0.03$ ), about 10% of the average decline of 4.86 points (standard deviation 2.26); for  $\Delta IDFR$ , the corresponding figure is 0.41 point ( $-1.11$  to  $0.30$ ). The minimum detectable effect at 80% power is 2.37 points per index point for  $\Delta IDFD$ , that is 0.71 point per standard deviation or about 15% of the average decline; for  $\Delta IDFR$ , it is 2.09 points per index point, or 0.98 point per standard deviation. The equivalence test leads to the same conclusion: in Model A, the 90% confidence interval ranges from  $-2.99$  to  $-0.22$  per index point, so that the effect could be declared negligible only for an equivalence margin of 0.90 point per standard deviation, about one fifth of the average decline.

The design can therefore neither confirm nor exclude an effect of economically meaningful size: the evidence is inconclusive rather than null. A direct comparison of magnitudes with the literature is not possible, because cross-country studies use national decentralization ratios and income-based outcomes whose scales differ from those used here.

### 5.4. Influence and specification sensitivity

Table 5 reports the influence analysis. Excluding each region in turn leaves the  $\Delta IDFD$  coefficient negative in all twelve cases, between  $-1.14$  and  $-1.90$ , with HC3 p-values between 0.031 and 0.225. Fès-Meknès is the most influential observation: its exclusion reduces the coefficient to  $-1.14$  ( $p = 0.200$ ), and it is the only region whose DFBETAS exceeds the conventional threshold of  $2/\sqrt{N}$  in absolute value ( $-0.60$ ); no Cook's distance exceeds  $4/N$

(maximum 0.23, for Fès-Meknès). Excluding both Saharan regions jointly gives  $-1.89$  ( $p = 0.155$ ), and robust estimators give similar point estimates with wider intervals (Huber M-estimator:  $-1.56$ ,  $p = 0.143$ ; median regression:  $-1.36$ ). For  $\Delta IDFR$ , the coefficient remains negative in all exclusions ( $-0.39$  to  $-1.30$ ) and is never significant at the 5% level; Fès-Meknès and Tanger-Tétouan-Al Hoceima are influential (Cook's distances of 0.45 and 0.31).

**Table 5: Influence analysis for Models A and B**

| Region excluded (N = 11)                     | Model A:<br>$\Delta IDFD$ | 95% CI         | p     | Model B:<br>$\Delta IDFR$ | 95% CI        | p     |
|----------------------------------------------|---------------------------|----------------|-------|---------------------------|---------------|-------|
| Casablanca-Settat                            | -1.860                    | -4.04 to 0.32  | 0.085 | -0.919                    | -2.70 to 0.87 | 0.269 |
| Rabat-Salé-Kénitra                           | -1.789                    | -3.94 to 0.37  | 0.092 | -0.826                    | -2.61 to 0.95 | 0.316 |
| Marrakech-Safi                               | -1.435                    | -2.90 to 0.03  | 0.053 | -1.005                    | -2.21 to 0.20 | 0.090 |
| Fès-Meknès                                   | -1.144                    | -3.03 to 0.75  | 0.200 | -0.386                    | -1.51 to 0.74 | 0.451 |
| Tanger-Tétouan-Al Hoceima                    | -1.902                    | -4.81 to 1.00  | 0.169 | -1.296                    | -4.34 to 1.75 | 0.355 |
| Souss-Massa                                  | -1.484                    | -3.18 to 0.22  | 0.079 | -0.852                    | -2.21 to 0.50 | 0.185 |
| Béni Mellal-Khénifra                         | -1.596                    | -3.78 to 0.59  | 0.130 | -0.846                    | -2.68 to 0.99 | 0.318 |
| Oriental                                     | -1.336                    | -3.68 to 1.01  | 0.225 | -0.904                    | -3.06 to 1.26 | 0.363 |
| Drâa-Tafilalet                               | -1.673                    | -3.37 to 0.03  | 0.053 | -0.853                    | -2.52 to 0.81 | 0.272 |
| Guelmim-Oued Noun                            | -1.814                    | -3.42 to -0.21 | 0.031 | -0.863                    | -2.16 to 0.44 | 0.165 |
| Laâyoune-Sakia El Hamra                      | -1.639                    | -3.66 to 0.38  | 0.098 | -0.874                    | -2.42 to 0.67 | 0.229 |
| Dakhla-Oued Ed-Dahab                         | -1.668                    | -3.50 to 0.16  | 0.069 | -0.893                    | -2.48 to 0.70 | 0.231 |
| <b>Joint exclusion and robust estimators</b> |                           |                |       |                           |               |       |
| Both Saharan regions excluded (N = 10)       | -1.887                    | -4.69 to 0.92  | 0.155 | -0.893                    | -2.53 to 0.74 | 0.237 |
| Huber M-estimator (N = 12)                   | -1.561                    | -3.76 to 0.64  | 0.143 | -0.884                    | -2.39 to 0.63 | 0.218 |
| Median regression (N = 12)                   | -1.356                    |                |       | -0.791                    |               |       |

Note: Full-sample coefficients:  $-1.605$  (Model A) and  $-0.866$  (Model B). HC3 standard errors; confidence intervals and p-values use the t distribution with  $N - 3$  degrees of freedom (Huber: 9). Influence diagnostics, Model A: largest Cook's distance 0.23 (Fès-Meknès), below  $4/N = 0.33$ ; DFBETAS above  $2/\sqrt{N} = 0.58$  in absolute value only for Fès-Meknès ( $-0.60$ ). Model B: Cook's distances 0.45 (Fès-Meknès) and 0.31 (Tanger-Tétouan-Al Hoceima); DFBETAS  $-1.05$  and  $0.85$ .

Source: Author's estimates; DGCT; HCP (2025)

Table 6 separates pre-determined controls from contemporaneous variables. Among pre-determined controls, adding the 2014 share of the primary sector, a proxy for rurality, leaves the  $\Delta IDFD$  coefficient negative ( $-1.76$ ) and significant at the 5% level (permutation  $p = 0.031$ ). Contemporaneous variables, measured over 2014–2023, are potential channels through which decentralization may affect poverty. Controlling for the change in log GDP per capita or in log household consumption per capita removes significance; the latter is strongly correlated with  $\Delta IDFD$  ( $r = -0.84$ ), so that the loss of significance may reflect over-control or severe collinearity, with twelve observations and four parameters, rather than the fragility of the underlying association. Functional form matters more. Without any control for initial poverty, the coefficient becomes positive ( $+3.74$ ,  $p = 0.109$ ); it is close to zero when initial poverty enters in logarithms ( $-0.50$ ,  $p = 0.624$ ); and it is marginal when the outcome is the relative change in poverty ( $-0.23$ ,  $p = 0.099$ ). Panel D replaces the change in the index by its 2014 level or its 2014–2023 average, which reduces the simultaneity between changes in decentralization and in poverty: neither is associated with the poverty change ( $p = 0.24$  in both cases). Panel E expresses the index per capita, as the ratio of the region's share of expenditure to its share of the population: the coefficient becomes positive and is not significant ( $p = 0.60$ ).

**Table 6: Sensitivity of the expenditure-side coefficient to controls, functional form, timing and normalization (N = 12)**

| Specification                                            | $\Delta$ IDFD coef. | HC3 s.e. | 95% CI          | HC3 p | Perm. p |
|----------------------------------------------------------|---------------------|----------|-----------------|-------|---------|
| <b>A. Pre-determined controls</b>                        |                     |          |                 |       |         |
| Baseline (control: IPM2014)                              | −1.605              | 0.754    | −3.31 to 0.10   | 0.062 | 0.055   |
| + Primary-sector share 2014                              | −1.760              | 0.709    | −3.39 to −0.13  | 0.038 | 0.031   |
| <b>B. Contemporaneous variables (potential channels)</b> |                     |          |                 |       |         |
| + $\Delta \ln$ GDP per capita 2014–2023                  | −1.863              | 1.433    | −5.17 to 1.44   | 0.230 | 0.176   |
| + $\Delta \ln$ population 2014–2023                      | −1.462              | 0.960    | −3.68 to 0.75   | 0.166 | 0.071   |
| + $\Delta \ln$ consumption per capita 2014–2023          | −2.134              | 2.687    | −8.33 to 4.06   | 0.450 | 0.345   |
| <b>C. Functional form</b>                                |                     |          |                 |       |         |
| No control for initial poverty                           | +3.743              | 2.206    | −1.17 to 8.66   | 0.121 | 0.109   |
| $\ln$ IPM2014 instead of IPM2014                         | −0.499              | 1.215    | −3.25 to 2.25   | 0.691 | 0.624   |
| Dependent variable $\Delta \ln$ IPM (control: IPM2014)   | −0.228              | 0.124    | −0.51 to 0.05   | 0.100 | 0.099   |
| <b>D. Timing of the decentralization measure</b>         |                     |          |                 |       |         |
| IDFD level in 2014 instead of $\Delta$ IDFD              | +0.045              | 0.035    | −0.04 to 0.12   | 0.237 | 0.191   |
| IDFD average 2014–2023 instead of $\Delta$ IDFD          | +0.042              | 0.034    | −0.03 to 0.12   | 0.240 | 0.192   |
| <b>E. Normalization</b>                                  |                     |          |                 |       |         |
| $\Delta$ IDFD per capita (share / population share)      | +3.185              | 5.920    | −10.21 to 16.58 | 0.604 | 0.351   |

Note: Dependent variable: change in the multidimensional poverty rate, 2014–2024 (percentage points), unless stated.

Controls are added one at a time to Model A; all specifications in panels D and E control for IPM2014. Coefficients in panels D and E are expressed per unit of the corresponding measure and are not comparable in size with those of panels A to C. Permutation p-values: 20,000 Freedman-Lane replications of the studentized HC3 t-statistic. The  $\Delta$ IDFR coefficient is not significant in any specification.

Source: Author's estimates; HCP regional accounts, 2014–2023, current prices

Taken together, these results show that the estimate is unstable: its sign depends on how convergence is modelled and on the normalization of the index, and its significance depends on the controls retained. The benchmark evidence therefore does not support a robust poverty-reducing association, and the point estimate cannot serve as a basis for policy recommendations.

## 5.5. Complementary evidence: household consumption panel

Table A3 (Appendix) reports the consumption panel. Over the nine years with official regional accounts, IDFD is negatively associated with household consumption per capita within regions (−0.068 log point per index point; 95% confidence interval −0.110 to −0.027; wild-cluster bootstrap p = 0.021 with Rademacher weights and 0.022 with Webb weights, 0.043 after a Holm correction for the two indices), whereas IDFR is not (p = 0.82). The IDFD association holds over 2015–2023 (−0.091; p = 0.005), when the interpolated years 2020–2021 are excluded (−0.094; p = 0.005) and with the index lagged one year (−0.055; p = 0.048), but it disappears over the full 2000–2023 period (+0.001; p = 0.94), in which the pre-2013 segment is backcast. Given the small within-region variation of the index, a one-standard-deviation increase (0.11 point) corresponds to a consumption level lower by about 0.75%. The panel therefore provides no evidence of a favourable association between decentralized resources and household welfare.

## 6. Discussion

### 6.1. Comparison with previous studies

The inconclusive results are consistent with the conditional view that dominates the cross-country literature. Studies that find inequality-reducing effects of decentralization concern mainly high-income countries or settings with high government quality (Rodríguez-Pose &

Ezcurra, 2010; Lessmann, 2012; Kyriacou et al., 2015, 2017), whereas Morocco combines a middle-income level with regional finances dominated by state transfers. The absence of a robust revenue-side effect is consistent with Pietrovito et al. (2023), for whom the redistributive role of decentralization depends on its form, and with the fact that IDFR mainly reflects shared taxes rather than own revenue. The pattern of a negative but imprecise expenditure-side coefficient alongside a non-significant revenue-side coefficient is also compatible with the finding of Sepulveda and Martinez-Vazquez (2011) that decentralization does not translate mechanically into lower poverty.

For Morocco, the results contrast with studies that report significant effects of revenue decentralization: a negative effect on social inclusion in national time series (Boukbech & Liouaeddine, 2023) and a reduction of inequality between regions (Amrani & Elouardirhi, 2026). Three differences can explain the contrast. The outcome differs, since household-based multidimensional poverty is not the same object as an aggregate inclusion index or the dispersion of regional GDP per capita. The source of variation differs, since national time series identify associations from movements over time, whereas this article exploits differences between regions. And the inference differs, since short national series rely on asymptotic standard errors whose reliability is limited in such samples. The positive association between local taxation and human development reported by Kissami and Zbair (2020) is likewise not directly comparable, because own local taxation is marginal for the regions considered here.

## **6.2. Interpretive channels: what the data can and cannot establish**

The framework of Section 2.5 suggests interpretations that the present data cannot test formally; they are stated as hypotheses for future research.

*Fiscal and administrative capacity.* Descriptively, the six regions with GDP per capita above the median recorded smaller poverty declines (3.5 points on average) than the six regions below it (6.3 points), which reflects their lower initial poverty, while average decentralization was similar in both groups (7.7% and 9.0%). Execution capacity also differs: the regional project-execution agencies received very unequal credits over 2016–2022, but the regions with the largest envelopes (Souss-Massa, Tanger-Tétouan-Al Hoceima, Béni Mellal-Khénifra and Fès-Meknès) did not record systematically larger poverty declines than Marrakech-Safi, which received one of the smallest envelopes and recorded the largest decline (Cour des comptes, 2023). These comparisons reveal no clear capacity gradient, but with six regions per group they cannot rule one out.

*Equalization.* The equalization funds explicitly target human development deficits and rurality (Section 3.2), so that their regional allocation could offset the fiscal-capacity channel. Testing this requires the regional allocations of the FMNS and the FSIR, which are not available in usable form.

*National programmes.* Part of the poverty decline reflects national programmes that are not controlled for here. The HCP reports that, in the 702 rural communes targeted by the first two phases of the National Initiative for Human Development (INDH), the multidimensional poverty rate fell from 27.8% in 2014 to 15.5% in 2024, against a fall from 19.0% to 10.6% in non-targeted communes (HCP, 2025). If such programmes were concentrated in regions whose share of decentralized resources changed in a particular direction, the estimated association would partly reflect them.

*Capture and reverse targeting.* If resources were directed toward regions where poverty was expected to fall less, the estimated association would be biased toward zero or toward a positive sign. The design cannot separate this channel from a weak impact of decentralization.

### 6.3. Measurement error and attenuation

The decentralization indices are computed from administrative series whose changes over 2014–2023 are small (standard deviation of 0.30 point for  $\Delta IDFD$ ). In this setting, even modest recording or reclassification errors would account for a sizeable share of the observed variance, and classical measurement error attenuates the estimated coefficient by the reliability ratio  $\lambda$ , the share of the observed variance of  $\Delta IDFD$ , conditional on the control, that reflects true variation. If the reliability were 0.9, 0.75 or 0.5, the coefficient corrected for attenuation would be approximately  $-1.78$ ,  $-2.14$  or  $-3.21$ , with confidence intervals from  $-3.68$  to  $0.11$ , from  $-4.41$  to  $0.14$  and from  $-6.62$  to  $0.20$  respectively. Correcting for attenuation increases the magnitude of the point estimate but widens the interval in the same proportion, so that the conclusion is unchanged: the evidence remains inconclusive. Because the two indices come from the same administrative source, neither can serve as an instrument for the other; a second, independent measure, such as the budget execution data of the TGR, would be required.

### 6.4. Interpreting the consumption panel

The negative within-region association between the expenditure share and household consumption is the opposite of what an equity dividend would imply. It is compatible with compensatory allocation, if regions whose consumption grew less than the national trend received a rising share of territorial-authority expenditure, which is one form of the reverse targeting discussed in Section 2.5, and it is small in magnitude. Because it rests on small year-to-year movements of the regional shares, it is not interpreted as an impact of decentralization.

## 7. Conclusion

This article asked whether the regional distribution of territorial-authority expenditure and revenue is associated with a reduction in multidimensional poverty across Morocco's twelve regions. Using the official HCP poverty rates for 2014 and 2024 and small-sample inference, it finds a negative but imprecise and unstable expenditure-side coefficient, about  $-0.5$  point per standard deviation, no significant revenue-side coefficient, and no favourable association with household consumption in the annual panel. The confidence intervals and the minimum detectable effects show that the data can neither confirm nor exclude an economically meaningful equity dividend. The contribution is empirical and methodological: the article provides a direct test of the equity claim for Moroccan regions based on official poverty data, and it documents what twelve regional observations can establish when inference is adapted to the sample size.

The results do not support recommendations on the level of decentralization. They suggest three policy hypotheses that deserve to be tested: that deprivation-sensitive criteria in the allocation of the equalization funds increase their poverty-reducing effect; that linking part of intergovernmental transfers to measurable social outcomes improves their targeting; and that stronger regional execution capacity increases the share of allocated resources that reaches households. The most direct implication concerns data. Assessing these hypotheses requires annual region-level and province-level accounts of territorial-authority revenue and expenditure, distinguishing own revenue, shared taxes and transfers, published by the TGR and the DGCT; the annual regional allocations of the FMNS and the FSIR; and multidimensional poverty indicators produced more often than every ten years, for instance from household surveys.

Five limitations define the evidentiary boundary of the study. The indices measure the regional distribution of decentralized resources rather than the overall degree of decentralization, and their changes over the period are small; poverty is observed only in 2014 and 2024; regional aggregates cannot capture distribution within regions; no instrument isolates exogenous

variation in decentralization, and national programmes such as the INDH are not controlled for; and inference rests on twelve regions. Whether the findings extend to other middle-income unitary states that combine shared-tax financing with formula-based equalization funds would require comparative evidence beyond the scope of this article.

Future research can address these limits with designs that more disaggregated data would make possible. At the level of the 75 prefectures and provinces, for which the HCP produces poverty mappings (HCP, 2025), a difference-in-differences design around the 2015 reform could compare provinces with different initial exposure to decentralized resources. The allocation formulas of the equalization funds and of shared taxes could provide instruments for decentralized resources. Equity indicators could be extended to inequality within regions and to access to the services for which territorial authorities are directly responsible, such as water, sanitation and rural roads.

## References:

- (1). Abadie, A., Athey, S., Imbens, G. W., & Wooldridge, J. M. (2023). When should you adjust standard errors for clustering? *The Quarterly Journal of Economics*, 138(1), 1–35. <https://doi.org/10.1093/qje/qjac038>
- (2). Alderman, H. (2002). Do local officials know something we don't? Decentralization of targeted transfers in Albania. *Journal of Public Economics*, 83(3), 375–404. [https://doi.org/10.1016/S0047-2727\(00\)00145-6](https://doi.org/10.1016/S0047-2727(00)00145-6)
- (3). Alkire, S., & Foster, J. (2011). Counting and multidimensional poverty measurement. *Journal of Public Economics*, 95(7–8), 476–487. <https://doi.org/10.1016/j.jpubeco.2010.11.006>
- (4). Amrani, W., & Elouardirhi, S. (2026). Décentralisation financière et inégalités territoriales au Maroc : une analyse empirique. *International Journal of Accounting, Finance, Auditing, Management and Economics*, 7(8), 82–101. <https://ijafame.org/index.php/ijafame/article/view/2505>
- (5). Bardhan, P., & Mookherjee, D. (2006). Decentralisation and accountability in infrastructure delivery in developing countries. *The Economic Journal*, 116(508), 101–127. <https://doi.org/10.1111/j.1468-0297.2006.01049.x>
- (6). Bird, R. M., & Smart, M. (2002). Intergovernmental fiscal transfers: International lessons for developing countries. *World Development*, 30(6), 899–912. [https://doi.org/10.1016/S0305-750X\(02\)00016-5](https://doi.org/10.1016/S0305-750X(02)00016-5)
- (7). Boukbech, R., & Liouaeddine, M. (2023). Impact de la décentralisation fiscale sur l'inclusion sociale au niveau local au Maroc : une analyse empirique à l'aide de l'approche ARDL en séries chronologiques. *Les Cahiers du Plan*, (53), 43–54. <https://revues.imist.ma/index.php/Cahiers-du-plan/article/view/43116>
- (8). Cameron, A. C., Gelbach, J. B., & Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The Review of Economics and Statistics*, 90(3), 414–427. <https://doi.org/10.1162/rest.90.3.414>
- (9). Freedman, D., & Lane, D. (1983). A nonstochastic interpretation of reported significance levels. *Journal of Business & Economic Statistics*, 1(4), 292–298. <https://doi.org/10.1080/07350015.1983.10509354>
- (10). Friedman, M. (1992). Do old fallacies ever die? *Journal of Economic Literature*, 30(4), 2129–2132.
- (11). Galasso, E., & Ravallion, M. (2005). Decentralized targeting of an antipoverty program. *Journal of Public Economics*, 89(4), 705–727. <https://doi.org/10.1016/j.jpubeco.2003.01.002>
- (12). Galiani, S., Gertler, P., & Schargrodsky, E. (2008). School decentralization: Helping

- the good get better, but leaving the poor behind. *Journal of Public Economics*, 92(10–11), 2106–2120. <https://doi.org/10.1016/j.jpubeco.2008.05.004>
- (13). Jütting, J., Kauffmann, C., McDonnell, I., Osterrieder, H., Pinaud, N., & Wegner, L. (2004). *Decentralisation and poverty in developing countries: Exploring the impact* (OECD Development Centre Working Paper No. 236). OECD Publishing. <https://doi.org/10.1787/132704628030>
- (14). Kissami, R., & Zbair, E. M. (2020). Développement régional et fiscalité locale au Maroc. *Revue du Contrôle, de la Comptabilité et de l'Audit*, 4(2), 1096–1110. <https://www.revuecca.com/index.php/home/article/view/610>
- (15). Kyriacou, A. P., Muinelo-Gallo, L., & Roca-Sagalés, O. (2015). Fiscal decentralization and regional disparities: The importance of good governance. *Papers in Regional Science*, 94(1), 89–108. <https://doi.org/10.1111/pirs.12061>
- (16). Kyriacou, A. P., Muinelo-Gallo, L., & Roca-Sagalés, O. (2017). Regional inequalities, fiscal decentralization and government quality. *Regional Studies*, 51(6), 945–957. <https://doi.org/10.1080/00343404.2016.1150992>
- (17). Kyriacou, A. P., & Roca-Sagalés, O. (2024). Fiscal decentralization and health care access and quality: Evidence from local governments around the world. *Publius: The Journal of Federalism*, 54(2), 313–338. <https://doi.org/10.1093/publius/pjad049>
- (18). Lakens, D. (2017). Equivalence tests: A practical primer for t tests, correlations, and meta-analyses. *Social Psychological and Personality Science*, 8(4), 355–362. <https://doi.org/10.1177/1948550617697177>
- (19). Lessmann, C. (2012). Regional inequality and decentralization: An empirical analysis. *Environment and Planning A*, 44(6), 1363–1388. <https://doi.org/10.1068/a44267>
- (20). MacKinnon, J. G., Nielsen, M. Ø., & Webb, M. D. (2023). Cluster-robust inference: A guide to empirical practice. *Journal of Econometrics*, 232(2), 272–299. <https://doi.org/10.1016/j.jeconom.2022.04.001>
- (21). MacKinnon, J. G., & Webb, M. D. (2018). The wild bootstrap for few (treated) clusters. *The Econometrics Journal*, 21(2), 114–135. <https://doi.org/10.1111/ectj.12107>
- (22). Martinez-Vazquez, J., Lago-Peñas, S., & Sacchi, A. (2017). The impact of fiscal decentralization: A survey. *Journal of Economic Surveys*, 31(4), 1095–1129. <https://doi.org/10.1111/joes.12182>
- (23). Moio, A., & Vidal Bover, M. (2023). *Fiscal equalisation and regional development policies: Is there a case for enhanced synergies?* (OECD Regional Development Papers No. 58). OECD Publishing. <https://doi.org/10.1787/0d28a879-en>
- (24). Mookherjee, D. (2015). Political decentralization. *Annual Review of Economics*, 7, 231–249. <https://doi.org/10.1146/annurev-economics-080614-115527>
- (25). Nakatani, R., Zhang, Q., & Garcia Valdes, I. (2022). *Fiscal decentralization improves social outcomes when countries have good governance* (IMF Working Paper No. 22/111). International Monetary Fund. <https://doi.org/10.5089/9798400211768.001>
- (26). Nakatani, R., Zhang, Q., & Garcia Valdes, I. (2024). Health expenditure decentralization and health outcomes: The importance of governance. *Publius: The Journal of Federalism*, 54(1), 59–87. <https://doi.org/10.1093/publius/pjad031>
- (27). Neyapti, B. (2006). Revenue decentralization and income distribution. *Economics Letters*, 92(3), 409–416. <https://doi.org/10.1016/j.econlet.2006.03.025>
- (28). Oates, W. E. (1972). *Fiscal federalism*. Harcourt Brace Jovanovich.
- (29). OECD. (2023). *OECD regional outlook 2023: The longstanding geography of inequalities*. OECD Publishing. <https://doi.org/10.1787/92cd40a0-en>
- (30). Pietrovito, F., Pozzolo, A. F., Resce, G., & Scialà, A. (2023). Fiscal decentralization and income (re)distribution in OECD countries' regions. *Structural Change and Economic Dynamics*, 67, 69–81. <https://doi.org/10.1016/j.strueco.2023.07.002>

- (31). Prud'homme, R. (1995). The dangers of decentralization. *The World Bank Research Observer*, 10(2), 201–220. <https://doi.org/10.1093/wbro/10.2.201>
- (32). Rodríguez-Pose, A., & Ezcurra, R. (2010). Does decentralization matter for regional disparities? A cross-country analysis. *Journal of Economic Geography*, 10(5), 619–644. <https://doi.org/10.1093/jeg/lbp049>
- (33). Rodríguez-Pose, A., & Ezcurra, R. (2011). Is fiscal decentralization harmful for economic growth? Evidence from the OECD countries. *Journal of Economic Geography*, 11(4), 619–643. <https://doi.org/10.1093/jeg/lbq025>
- (34). Romano, J. P., & Wolf, M. (2005). Stepwise multiple testing as formalized data snooping. *Econometrica*, 73(4), 1237–1282. <https://doi.org/10.1111/j.1468-0262.2005.00615.x>
- (35). Roodman, D., Nielsen, M. Ø., MacKinnon, J. G., & Webb, M. D. (2019). Fast and wild: Bootstrap inference in Stata using boottest. *The Stata Journal*, 19(1), 4–60. <https://doi.org/10.1177/1536867X19830877>
- (36). Sanogo, T. (2019). Does fiscal decentralization enhance citizens' access to public services and reduce poverty? Evidence from Côte d'Ivoire municipalities in a conflict setting. *World Development*, 113, 204–221. <https://doi.org/10.1016/j.worlddev.2018.09.008>
- (37). Sepulveda, C. F., & Martinez-Vazquez, J. (2011). The consequences of fiscal decentralization on poverty and income equality. *Environment and Planning C: Government and Policy*, 29(2), 321–343. <https://doi.org/10.1068/c1033r>
- (38). Tselios, V., Rodríguez-Pose, A., Pike, A., Tomaney, J., & Torrisi, G. (2012). Income inequality, decentralisation, and regional development in Western Europe. *Environment and Planning A*, 44(6), 1278–1301. <https://doi.org/10.1068/a44334>
- (39). Webb, M. D. (2023). Reworking wild bootstrap-based inference for clustered errors. *Canadian Journal of Economics*, 56(3), 839–858. <https://doi.org/10.1111/caje.12661>
- (40). Weingast, B. R. (2009). Second generation fiscal federalism: The implications of fiscal incentives. *Journal of Urban Economics*, 65(3), 279–293. <https://doi.org/10.1016/j.jue.2008.12.005>
- (41). Young, A. (2019). Channeling Fisher: Randomization tests and the statistical insignificance of seemingly significant experimental results. *The Quarterly Journal of Economics*, 134(2), 557–598. <https://doi.org/10.1093/qje/qjy029>
- (42). Zallé, O., & Bakouan, P. (2024). Spillover effects of fiscal decentralization on access to basic social services in Burkina Faso. *Growth and Change*, 55(1), e12714. <https://doi.org/10.1111/grow.12714>
- (43). CESE (Conseil Économique, Social et Environnemental). (2019). *Un nouveau système fiscal, pilier du nouveau modèle de développement* (rapport adopté le 28 mars 2019). <https://www.cese.ma>
- (44). Constitution du Royaume du Maroc. (2011). Promulguée par le Dahir n° 1-11-91 du 29 juillet 2011, notamment l'article 142.
- (45). Cour des comptes. (2023). *Rapport thématique sur la mise en œuvre de la régionalisation avancée : synthèse*. <https://www.courdescomptes.ma/wp-content/uploads/2023/10/Synthese-Regionalisation-fr.pdf>
- (46). Decree No. 2-15-40. (2015). Décret n° 2-15-40 du 20 février 2015 fixant le nombre des régions, leurs dénominations, leurs chefs-lieux et les préfectures et provinces qui les composent.
- (47). Decree No. 2-17-598. (2017). Décret n° 2-17-598 relatif au Fonds de mise à niveau sociale, *Bulletin officiel*, décembre 2017.
- (48). DGCT (Direction Générale des Collectivités Territoriales, Direction des Finances des Collectivités Territoriales). (2000–2023). *Données financières régionales des*

- collectivités territoriales (dépenses et recettes)*. Ministère de l'Intérieur.
- (49). DGI (Direction Générale des Impôts). (2025). *Note synthétique des mesures fiscales de la loi de finances n° 60-24 pour l'année budgétaire 2025*. Ministère de l'Économie et des Finances. <https://www.tax.gov.ma>
- (50). Finance Law No. 60-24. (2024). Loi de finances n° 60-24 pour l'année budgétaire 2025.
- (51). Framework Law No. 69-19. (2021). Loi-cadre n° 69-19 portant réforme fiscale, promulguée par le Dahir n° 1-21-86 du 26 juillet 2021, *Bulletin officiel* n° 7010 du 5 août 2021.
- (52). HCP (Haut-Commissariat au Plan). (2025). *Cartographie de la pauvreté multidimensionnelle : paysage territorial et dynamique*. [https://www.hcp.ma/Synthese-Cartographie-de-la-pauvrete-multidimensionnelle-paysage-territorial-et-dynamique-Mai-2025\\_a4103.html](https://www.hcp.ma/Synthese-Cartographie-de-la-pauvrete-multidimensionnelle-paysage-territorial-et-dynamique-Mai-2025_a4103.html)
- (53). Organic Law No. 111-14. (2015). Loi organique n° 111-14 relative aux régions, promulguée par le Dahir n° 1-15-83 du 7 juillet 2015.
- (54). Organic Law No. 112-14. (2015). Loi organique n° 112-14 relative aux préfectures et provinces, promulguée par le Dahir n° 1-15-84 du 7 juillet 2015.
- (55). Organic Law No. 113-14. (2015). Loi organique n° 113-14 relative aux communes, promulguée par le Dahir n° 1-15-85 du 7 juillet 2015.

**AI use statement:** The authors used an artificial intelligence tool to assist with drafting and formatting. The authors verified all content, data and results and take full responsibility for them.

## Appendix

**Table A1: Data sources and construction of the variables**

| Variable                       | Definition                                                                                                                        | Source                                                       | Observed (official)  | Reconstructed                 | Method      |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------|-------------------------------|-------------|
| IDFD                           | Region's share (%) of national territorial-authority expenditure: $100 \times \text{DCT} / \Sigma \text{DCT}$                     | DGCT, Direction des Finances des Collectivités Territoriales | 2000–2023            | None                          | Section 4.2 |
| IDFR                           | Region's share (%) of national territorial-authority revenue, including shared taxes: $100 \times \text{RCT} / \Sigma \text{RCT}$ | DGCT, Direction des Finances des Collectivités Territoriales | 2000–2023            | None                          | Section 4.2 |
| GDP per capita, POP, PRIM, SEC | Regional GDP per capita, population, shares of the primary and secondary sectors in value added                                   | HCP regional accounts                                        | 2013–2019; 2022–2023 | 2000–2012; 2020–2021          | Rule F      |
| FBCF                           | Gross fixed capital formation in the region (formation brute de capital fixe)                                                     | HCP regional accounts                                        | 2013–2019; 2022–2023 | 2000–2012; 2020–2021          | Rule F      |
| Consumption                    | Household final consumption per capita                                                                                            | HCP regional accounts                                        | 2013–2019; 2022–2023 | 2000–2012; 2020–2021          | Rule F      |
| IPM                            | Multidimensional poverty rate (% of population)                                                                                   | HCP (2025)                                                   | 2014; 2024           | None (annual values not used) | Table A2    |

**Source:** Author's elaboration

*Note:* Rule F: 2000–2012 backcast from the 2013 level at the region's observed 2013–2019 growth rate; 2020–2021 interpolated between 2019 and 2022. The primary panel sample is restricted to the years with official regional accounts (2013–2019 and 2022–2023).

**Table A2: Official HCP values used for the benchmark test**

| Region                    | IPM 2024,<br>published (%) | Change 2014–2024<br>(points) | IPM 2014,<br>recovered (%) |
|---------------------------|----------------------------|------------------------------|----------------------------|
| Casablanca-Settat         | 4.3                        | –2.4                         | 6.7                        |
| Rabat-Salé-Kénitra        | 5.7                        | –3.4                         | 9.1                        |
| Marrakech-Safi            | 7.9                        | –7.9                         | 15.8                       |
| Fès-Meknès                | 9.0                        | –4.74                        | 13.74                      |
| Tanger-Tétouan-Al Hoceima | 7.1                        | –6.8                         | 13.9                       |
| Souss-Massa               | 5.7                        | –5.5                         | 11.2                       |
| Béni Mellal-Khénifra      | 9.8                        | –7.5                         | 17.3                       |
| Oriental                  | 8.4                        | –5.17                        | 13.57                      |
| Drâa-Tafilalet            | 7.7                        | –6.7                         | 14.4                       |
| Guelmim-Oued Noun         | 4.9                        | –5.33                        | 10.23                      |
| Laâyoune-Sakia El Hamra   | 2.4                        | –0.9                         | 3.3                        |
| Dakhla-Oued Ed-Dahab      | 2.5                        | –2.0                         | 4.5                        |

*Source: HCP (2025); author's calculations*

*Note:* Changes for Marrakech-Safi, Béni Mellal-Khénifra, Tanger-Tétouan-Al Hoceima, Drâa-Tafilalet, Rabat-Salé-Kénitra, Casablanca-Settat, Laâyoune-Sakia El Hamra and Dakhla-Oued Ed-Dahab are those reported in percentage points in the HCP synthesis; for the four other regions, the 2014 level is recovered from the regional results of the mapping, hence two decimals. Population-weighted national rates computed from these values: 11.87% (2014) and 6.80% (2024), against 11.9% and 6.8% published.

**Table A3: Household consumption panel (static two-way fixed effects,  $G = 12$  regions)**

| Index, sample                                                                       | Coef.  | Cluster-<br>robust<br>s.e. | 95% CI           | p (t) | WCR p<br>(Rad.) | WCR p<br>(Webb) | R <sup>2</sup><br>(within) | Obs. |
|-------------------------------------------------------------------------------------|--------|----------------------------|------------------|-------|-----------------|-----------------|----------------------------|------|
| <b>Primary sample: years with official regional accounts (2013–2019, 2022–2023)</b> |        |                            |                  |       |                 |                 |                            |      |
| IDFD                                                                                | –0.068 | 0.019                      | –0.110 to –0.027 | 0.004 | 0.021           | 0.022           | 0.53                       | 108  |
| IDFR                                                                                | –0.003 | 0.012                      | –0.029 to 0.023  | 0.792 | 0.819           | 0.821           | 0.46                       | 108  |
| IDFD, lagged one year                                                               | –0.055 | 0.019                      | –0.097 to –0.012 | 0.016 | 0.048           | 0.044           | 0.51                       | 108  |
| IDFR, lagged one year                                                               | –0.001 | 0.011                      | –0.024 to 0.023  | 0.963 | 0.968           | 0.966           | 0.46                       | 108  |
| <b>Variants</b>                                                                     |        |                            |                  |       |                 |                 |                            |      |
| IDFD, 2015–2023                                                                     | –0.091 | 0.014                      | –0.121 to –0.061 | 0.000 | 0.005           | 0.003           | 0.77                       | 108  |
| IDFR, 2015–2023                                                                     | –0.008 | 0.011                      | –0.033 to 0.017  | 0.499 | 0.591           | 0.578           | 0.70                       | 108  |
| IDFD, 2015–2023 excl.<br>2020–2021                                                  | –0.094 | 0.015                      | –0.128 to –0.060 | 0.000 | 0.005           | 0.003           | 0.76                       | 84   |
| IDFR, 2015–2023 excl.<br>2020–2021                                                  | –0.008 | 0.011                      | –0.033 to 0.017  | 0.479 | 0.500           | 0.502           | 0.68                       | 84   |
| IDFD, 2000–2023                                                                     | +0.001 | 0.021                      | –0.044 to 0.047  | 0.945 | 0.944           | 0.949           | 0.85                       | 288  |
| IDFR, 2000–2023                                                                     | +0.013 | 0.008                      | –0.005 to 0.031  | 0.136 | 0.109           | 0.112           | 0.85                       | 288  |

*Source: Author's estimates; DGCT; HCP regional accounts*

*Note:* Dependent variable: ln household final consumption per capita. All models include ln(FBCF), ln(POP), PRIM, SEC, region and year fixed effects. Standard errors clustered by region; confidence intervals use the t distribution with 11 degrees of freedom. WCR: restricted wild-cluster bootstrap; Rad.: Rademacher weights with full enumeration of the 4,096 sign patterns, and Webb six-point weights with 19,999 replications. Within R<sup>2</sup>: two-way demeaned model.