

## RESEARCH ARTICLE

## Africa's rising middle class: Development, mobility, and the path to inclusive growth

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## Abstract

The emergence of middle-class populations represents a critical demographic transition with profound implications for social stratification, mobility patterns, and economic development across African societies. This study examines the bidirectional relationship between economic development and middle-class expansion over 2000–2020, investigating whether development drives middle-class formation or whether middle-class growth catalyzes broader development outcomes. Using an unbalanced panel of 44 African countries observed at five-year intervals (approximately 196 country-year observations), we employ a two-step system generalized method of moments estimator to simultaneously address endogeneity, control for unobserved country heterogeneity through fixed effects, and capture the dynamic persistence of middle-class formation. We focus on populations with daily expenditures between \$2 and \$20, disaggregated into the floating class (\$2–\$4), lower-middle class (\$4–\$10), and upper-middle class (\$10–\$20). Our panel findings reveal that per capita income growth robustly drives the expansion of floating and lower-middle-class segments within countries over time, whereas the relationship weakens for upper-middle-class segments—a result that holds after including country and time fixed effects. Significant persistence in middle-class formation (coefficients 0.451–0.567) confirms path dependence and underscores the cumulative nature of development. Regional heterogeneity analysis demonstrates significant differences between North African and Sub-Saharan African countries. Income inequality and multidimensional poverty independently constrain middle-class formation, indicating that growth alone is insufficient for broad-based middle-class development.

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## 1. Introduction

The relationship between middle-class development, social mobility, and economic growth has emerged as a central question in development economics, particularly given Africa's sustained economic transformation since 2000 and its rapidly evolving social

structure. Africa's Gross Domestic Product (GDP) per capita nearly doubled in real terms between 2000 and 2020, yet the distribution of these gains across income classes remains contested. This study addresses a fundamental empirical question: Does economic development drive middle-class expansion within African countries over time, or does middle-class growth catalyze broader development outcomes? Furthermore, what are the implications of these temporal dynamics for intergenerational and intragenerational social mobility?

Understanding social mobility, the movement of individuals or households across income categories over time, is essential for evaluating the sustainability and equity of middle-class expansion. A growing middle class resulting from genuine upward mobility out of poverty represents durable economic progress, whereas one sustained primarily by demographic processes within existing middle-class households implies fundamentally different policy implications. This distinction has profound consequences for poverty reduction strategies and inclusive growth policies across African economies (Alesina *et al.*, 2021; Ferreira *et al.*, 2013).

Three empirical challenges motivate our methodological choices. First, middle-class size and economic development are determined simultaneously: economic growth creates employment opportunities that enable households to transition into middle-class status, while middle-class expansion generates consumption demand and entrepreneurial activity that stimulates growth (Banerjee & Duflo, 2008; Kharas, 2010; Murphy *et al.*, 1989a; Ncube & Lufumpa, 2015). Standard cross-sectional estimation cannot adequately address this endogeneity. Second, African economies exhibit enormous heterogeneity in economic structure, institutional quality, and development levels that may generate fundamentally different middle-class dynamics (Kodila-Tedika *et al.*, 2016; Ncube & Lufumpa, 2015). Third, the temporal dimension of social mobility, whether middle-class gains persist, erode, or compound over time, is entirely invisible to single-year analysis, yet represents the core policy question (Birdsall, 2010; Ravallion, 2010).

To address these challenges, we construct an unbalanced panel of 44 African countries covering five benchmark years at five-year intervals: 2000, 2005, 2010, 2015, and 2020. Middle-class shares are extracted from the World Bank's Poverty and Inequality Platform (PIP), which provides harmonized consumption distributions aligned with national accounts. We employ the two-step system generalized method of moments (GMM) estimator of Blundell and Bond (1998), which simultaneously: (i) eliminates country fixed effects through first-differencing;

(ii) controls for global shocks through time fixed effects; (iii) addresses endogeneity using lagged levels and differences as instruments; and (iv) models the dynamic persistence of middle-class formation through the lagged dependent variable.

This study makes five contributions to the literature. First, it provides the first systematic panel evidence on the development–middle class relationship in Africa using a dynamic GMM framework, establishing within-country causal effects net of time-invariant heterogeneity. Second, it documents significant persistence in middle-class formation—a finding with direct implications for path dependence in social stratification. Third, it confirms and quantifies regional heterogeneity between North African and Sub-Saharan African countries within a panel setting. Fourth, it enriches the discussion by systematically comparing panel findings to recent literature (2020–2024). Fifth, it draws out concrete policy implications for inclusive growth strategies that are robust to the temporal dynamics revealed by panel analysis.

The remainder of the article is structured as follows. Section 1.1 describes the conceptual framework and theoretical foundations. Section 1.2 reviews the literature and develops testable hypotheses. Section 1.3 describes the evolution and profile of Africa's middle classes over 2000–2020. Section 2 presents data sources, panel construction, and the system GMM methodology. Section 3 presents the results, and Section 4 discusses the findings and policy implications. Section 5 reports the study's conclusion.

## 1.1. Conceptual framework

### 1.1.1. Theoretical foundations and transmission mechanisms

The relationship between middle-class development, social mobility, and economic growth operates through multiple channels, creating complex feedback loops. Understanding these mechanisms is crucial for establishing our empirical framework and interpreting panel results in the diverse African context, where institutional structures, informal economic arrangements, and development challenges differ substantially from other regions. The following subsections systematically examine supply-side, demand-side, and reverse-causality mechanisms before turning to the social mobility and institutional dimensions that are particularly salient for Africa.

Supply-side mechanisms suggest that the middle class drives development through several pathways. First, middle-class households invest more in human capital, allocating a larger share of their income to education and healthcare. In African contexts, this manifests through

enrollment in private schools, after-school tutoring, and post-secondary education—expenditures largely absent from poor households and that create intergenerational human capital accumulation. Second, entrepreneurship and business formation represent crucial middle-class contributions to development. Middle-class households possess greater access to formal credit, can absorb business risks without catastrophic welfare consequences, and maintain social networks that facilitate business transactions (Banerjee & Duflo, 2008; Granovetter, 1985; Ravallion, 2010).

Demand-side mechanisms indicate that the middle class stimulates growth through consumption patterns that create markets for domestic production. However, in African economies with limited manufacturing capacity, middle-class consumption may primarily benefit imports, reducing domestic multiplier effects. The African Continental Free Trade Area, whose investment protocol was adopted in 2023, may gradually alter this dynamic by creating larger domestic markets for African manufacturers (United Nations Conference on Trade and Development [UNCTAD], 2024).

Reverse-causality mechanisms operate when economic development creates middle classes through job creation, structural transformation, and institutional development. Formal sector employment expansion in manufacturing and services provides stable wages that enable households to transition to middle-class status (McMillan *et al.*, 2014; Mubila *et al.*, 2011). In a panel context, these mechanisms imply that lagged GDP growth should predict subsequent middle-class formation—the core identifying assumption of our empirical strategy.

### **1.1.2. Social mobility and middle-class sustainability**

Social mobility—the movement of individuals or households across income categories—represents both a driver and consequence of middle-class formation. The panel dimension of our analysis uniquely permits examination of persistence, which in turn reveals the sustainability of middle-class gains. A middle class that is highly persistent across periods may reflect genuine structural consolidation, while one that is volatile may consist of households near the poverty boundary who oscillate between poverty and floating-class status depending on economic conditions (Dang & Dabalen, 2019; López-Calva & Ortiz-Juarez, 2014).

The “floating class” earning \$2–\$4 (United States Dollar) daily faces substantial vulnerability to health shocks, agricultural failures, and economic downturns that can eliminate modest savings and force asset liquidation

(Banerjee & Duflo, 2007; Dercon, 2005; Mubila *et al.*, 2011). In a dynamic panel, this vulnerability should manifest as lower persistence coefficients for the floating class relative to the lower and upper-middle classes—a testable prediction we examine through the system GMM persistence parameter. Downward mobility risk distinguishes Africa's floating class from counterparts in more developed economies and has been documented at the individual level by Alesina *et al.* (2021), who found that intergenerational mobility in educational attainment in Africa is strongly influenced by birth region and birth cohort, with progress stalling during periods of macroeconomic stress.

The sustainability of middle-class expansion depends on whether growth generates genuine mobility opportunities or merely expands a vulnerable class susceptible to subsequent reversal. Commodity-driven growth, which characterized much of Africa's recent economic expansion, may generate temporary middle-class formation through employment in extractive industries and associated services without creating the structural economic changes that enable sustained mobility and middle-class consolidation (Auty, 2001; McMillan *et al.*, 2014; Rodrik, 2016). Panel data spanning 2000–2020 captures this cycle—including the commodity price boom, the 2008 financial crisis, and the subsequent adjustment—enabling a more complete assessment of middle-class sustainability than any single cross-section.

### **1.1.3. African institutional context and heterogeneity**

The prevalence of informal economic activity fundamentally shapes patterns of middle-class formation. Informal sector employment, which predominates in most African economies—estimated at 60–80% in Sub-Saharan Africa—typically provides lower and more variable incomes than formal employment (IMF, 2017; International Labour Organization, 2018). Countries differ substantially in formalization rates, with North African economies exhibiting higher shares of formal employment. This institutional differential, persistent over the 2000–2020 panel period, generates the regional heterogeneity that our empirical models must accommodate.

Natural resource dependence creates distinctive middle-class patterns in many African economies. Resource rents may generate middle-class employment in extractive industries and government services funded by resource revenues, but this middle class depends on continued resource extraction and prices rather than productive economic transformation (Auty, 2001; Collier, 2007; Ross, 2012). Panel data spanning the 2003–2013 commodity supercycle and the subsequent price collapse

provide a natural experiment for identifying whether GDP growth from resource rents generates less middle-class formation than equivalent growth from manufacturing or services.

#### **1.1.4. Definitional approach and middle-class categories**

Following the African Development Bank's classification, we disaggregate the middle class into three categories based on daily per capita expenditure (2011 Purchasing Power Parity dollars): the floating class (\$2–\$4/day), the lower-middle class (\$4–\$10/day), and the upper-middle class (\$10–\$20/day) (Mubila *et al.*, 2011). This classification enables examination of heterogeneous development effects across vulnerability levels. Each segment faces distinct economic vulnerabilities and exhibits different sensitivities to the macroeconomic and institutional drivers examined in our panel.

This definitional approach has important limitations. Absolute income thresholds may not capture relative social position and subjective middle-class identification, which influence political behavior and consumption patterns. Němečková *et al.* (2020) demonstrate that income-flow measures systematically distort middle-class estimates in Africa relative to asset-based alternatives, as households classified as middle class based on consumption expenditure may differ substantially in asset endowments and economic resilience. However, absolute thresholds are a methodological necessity for our panel approach: relative thresholds based on country-specific medians would be incommensurable across countries and time as median incomes change, making it impossible to track middle-class formation longitudinally with a consistent welfare benchmark.

### **1.2. Literature review and hypothesis development**

#### **1.2.1. Empirical evidence on middle-class development effects**

The empirical literature provides mixed evidence on relationships between middle-class development and other outcomes, with significant variations across regional contexts that inform our African-focused analysis. Research on consumption and growth linkages demonstrates that middle-class demand can stimulate development under certain conditions. Murphy *et al.* (1989b) demonstrate how mass consumption enables economies of scale in manufacturing. Banerjee and Duflo (2008), analyzing household surveys across 13 developing countries, found that distinct middle-class consumption patterns focused on higher-quality goods, entertainment, and education. However, Birdsall (2010) noted that demand effects depend

critically on whether consumption favors domestic versus imported goods.

Entrepreneurship effects show consistent patterns across studies. Banerjee and Duflo (2008) report that 34–36% of middle-class households engage in entrepreneurial activities compared to 20–22% among poorer households. For African economies with weak property rights and contract enforcement, entrepreneurial contributions may be attenuated.

Human capital mechanisms have received substantial attention. Easterly (2001) provides influential evidence that countries with larger middle classes in 1960 achieved higher subsequent schooling and growth rates. Cárdenas *et al.* (2015) showed that middle-class status increases the completion of secondary education by 23 percentage points. Research specifically addressing social mobility and middle-class dynamics remains limited for African contexts. Ferreira *et al.* (2013) examined Latin American mobility, finding that economic growth generates substantial upward mobility but also creates a “vulnerable” class at risk of downward mobility during economic contractions. Shimeles and Ncube (2015), using the Demographic and Health Surveys data from African countries, found that middle-class status increases the probability of entrepreneurship by 15 percentage points.

Moreover, Alesina *et al.* (2021) provided landmark panel-based evidence on intergenerational educational mobility across 27 African countries, finding that upward mobility varies enormously across birth cohorts and within countries over time. The International Monetary Fund (IMF) (Ouedraogo & Syrichas, 2021) documents substantial geographical variation in intergenerational occupational mobility in Africa, identifying urbanization, education infrastructure, and institutional quality as the key drivers. In a measurement study, Němečková *et al.* (2020) demonstrated that income-flow measures systematically distort middle-class estimates in Africa relative to asset-based alternatives.

#### **1.2.2. Regional heterogeneity in development—middle class relationships**

The literature reveals substantial regional variations that motivate our attention to heterogeneity. East Asian studies (Chun, 2010; Gill & Kharas, 2007) showed strong contributions from the middle class during rapid industrialization. Latin American evidence (Ferreira *et al.*, 2013; Tornarolli *et al.*, 2014) suggests more modest effects during commodity-driven growth, with substantial vulnerability among newly middle-class households.

African studies indicate even greater heterogeneity. Ncube *et al.* (2011) estimate Africa's middle class at 310–500

million people depending on definitional thresholds, while Melber (2016) demonstrates that much of this “middle class” remains highly vulnerable. Melber (2022) revisits this assessment a decade later, cautioning that the concept of the middle class in Africa remains a fragile construct whose positive developmental impacts were widely overstated. North African countries exhibit distinctive characteristics—higher formal sector employment, closer integration with European markets, and better educational outcomes—that set countries like Morocco, Tunisia, and Egypt apart from most Sub-Saharan African economies.

### 1.2.3. Recent panel evidence on income distribution in Africa (2020–2024)

A growing body of panel evidence addresses inequality, income distribution, and inclusive growth in Africa. Gyamfi *et al.* (2022) examined financial development, institutional quality, and inclusive growth across a panel of African countries, finding that institutional quality significantly moderates the extent to which financial development translates into broad-based income gains—a finding directly relevant to the development–middle class nexus we study. Kumeka *et al.* (2024) extend this to globalization, showing in a 45-country African panel that the distributional benefits of economic openness are amplified by institutional quality, with implications for which segments of the income distribution benefit most from growth.

Niño-Zarazúa *et al.* (2023) estimated income inequality and redistribution relationships in a Sub-Saharan African panel using two-stage least squares, finding a significant negative effect of income inequality on government revenue capacity—a mechanism that constrains the fiscal space for the social protection and human capital investments needed to sustain middle-class formation. The Journal of African Economies special issue on growth, inequality, and poverty (Thorbecke *et al.*, 2024) synthesized country-level panel evidence from Cameroon, Ghana, Kenya, South Africa, and Togo, concluding that economic growth alone does not reduce poverty when accompanied by persistently high inequality—directly motivating our inclusion of the Gini coefficient as a control variable. The UNCTAD (2024) Africa Development Report documents how commodity price volatility and COVID-19 disruptions set back middle-class formation in resource-dependent Sub-Saharan economies, providing empirical context for the 2000–2020 panel period we analyzed.

### 1.2.3. Research gaps and hypothesis development

The literature review identifies four gaps that our panel study addresses. First, most African middle-class studies rely on cross-sectional data and cannot establish within-

country temporal dynamics. Second, the endogeneity between development and middle-class formation has not been adequately addressed in a panel framework for Africa. Third, the persistence of middle-class formation has not been directly estimated. Fourth, the institutional moderation of the development–middle class relationship remains empirically underexplored at the panel level.

Based on this literature synthesis, we developed five testable hypotheses (H):

- (i) H1: Economic development primarily drives middle-class expansion in African contexts, particularly for vulnerable segments (\$2–\$10 daily expenditure).
- (ii) H2: The development–middle class relationship varies across income thresholds, with stronger effects for lower-middle-class segments.
- (iii) H3: Middle-class formation exhibits significant positive persistence, with past middle-class shares predicting subsequent formation even after controlling for development levels.
- (iv) H4: Substantial heterogeneity exists between North African and Sub-Saharan African countries due to differences in economic structure and institutional quality.
- (v) H5: Income inequality exerts a negative effect on middle-class formation within countries over time, constraining upward mobility independently of development levels.

## 1.3. Evolution and profile of Africa's middle classes

### 1.3.1. Aggregate trends

The 2000–2020 panel period encompasses Africa's most dramatic economic transformation. Real GDP per capita across our 44-country sample grew at an average annual rate of 3.1% between 2000 and 2014, slowed during the commodity price adjustment of 2015–2016, partially recovered in 2017–2019, and contracted in 2020 due to COVID-19. The middle class (\$2–\$20/day) expanded from approximately 26% of the continent's population in 2000 to 34% in 2018, before the 2020 contraction reversed some gains. Table 1 presents the panel evolution of middle-class shares across our benchmark years, disaggregated by region and income category.

Three patterns are visible. First, middle-class shares expanded monotonically from 2000 to 2015, then contracted in 2020. The 2020 contraction—concentrated in the floating class—reflects the pandemic's disproportionate impact on vulnerable households. Second, the North Africa–Sub-Saharan divergence is pronounced and persistent: at every benchmark year, North African lower-middle-class shares exceeded those in Sub-Saharan Africa. Third, the upper-middle class shows slower growth and

**Table 1. Panel evolution of middle-class shares (%) of 44 African countries (2000–2020)**

| Region/Category                         | 2000 | 2005 | 2010 | 2015 | 2020 | Δ 2000–2020 |
|-----------------------------------------|------|------|------|------|------|-------------|
| North Africa—Floating (\$2–\$4)         | 17.2 | 18.4 | 19.8 | 20.1 | 19.3 | +2.1        |
| North Africa—Lower MC (\$4–\$10)        | 22.8 | 25.1 | 27.6 | 29.2 | 28.4 | +5.6        |
| North Africa—Upper MC (\$10–\$20)       | 10.4 | 12.1 | 13.9 | 15.2 | 14.8 | +4.4        |
| Sub-Saharan Africa—Floating (\$2–\$4)   | 9.4  | 10.8 | 12.3 | 13.6 | 12.1 | +2.7        |
| Sub-Saharan Africa—Lower MC (\$4–\$10)  | 6.2  | 7.4  | 8.8  | 9.9  | 8.7  | +2.5        |
| Sub-Saharan Africa—Upper MC (\$10–\$20) | 2.8  | 3.2  | 3.9  | 4.6  | 4.0  | +1.2        |
| Full sample—Total MC (\$2–\$20)         | 26.4 | 29.6 | 32.3 | 34.8 | 32.4 | +6.0        |

Note: Shares expressed as a percentage of the national population.

Sources: World Bank (2022); authors' calculations.  $N = 44$  (6 North Africa, 38 Sub-Saharan Africa); ~196 country-year observations.

Abbreviation: MC: Middle class.

greater 2020 vulnerability in Sub-Saharan Africa (from 4.6% to 4.0%) than in North Africa (from 15.2% to 14.8%).

### 1.3.2. Country-level heterogeneity and outlier analysis

Within Sub-Saharan Africa, the panel reveals three distinct trajectories. A first group of convergers—including Ghana, Ethiopia, Rwanda, and Senegal—experienced sustained upward trends in lower-middle-class shares throughout the period, with annual gains of 0.3–0.5 percentage points per year, combining moderate-to-strong GDP growth with improvements in formal employment. A second group of resource-dependent economies—including Nigeria, Angola, and Equatorial Guinea—experienced middle-class shares that tracked commodity prices: rising during the 2003–2013 supercycle and contracting sharply thereafter. A third group of low-income agrarian economies—including Burkina Faso, Mali, Niger, and Chad—showed minimal middle-class expansion despite positive GDP growth.

### 1.3.3. Middle-class characteristics and social mobility indicators

Beyond aggregate shares, the characteristics of middle-class households provide insight into social mobility patterns. Employment patterns differ substantially from those of poor households. The majority of middle-class households do not rely primarily on agriculture; instead, they hold salaried positions or operate non-agricultural enterprises. However, formal sector employment remains a minority even among middle-class households in most Sub-Saharan countries. Education levels are substantially higher than among poor populations, but absolute attainment remains modest by global standards. Average years of schooling among middle-class household heads rose from 6.8 to 8.4 years across the sample between 2000 and 2020, indicating genuine human capital accumulation alongside income

growth. Urban concentration of middle-class households increased from approximately 62% to 71% of the lower-middle class over the panel period (IMF, 2021).

## 2. Data and methods

### 2.1. Panel data construction and sources

Our panel covered 44 African countries at five benchmark years: 2000, 2005, 2010, 2015, and 2020—a 20-year horizon at five-year intervals. The resulting dataset contained up to 220 country-year observations. After excluding country-year observations with missing data on one or more key variables, the estimation sample comprised approximately 196 country-year observations in an unbalanced panel.

Middle-class shares were computed from the World Bank PIP as the proportion of the national population with daily per capita consumption expenditure falling within the relevant thresholds, in 2011 Purchasing Power Parity dollars (Table 2). The PIP provides interpolated national estimates for country-years without direct household survey data, using growth rates from national accounts to align survey-based distributions with aggregate welfare trends (World Bank, 2022). This harmonized approach ensures cross-country and cross-time comparability, which is a prerequisite for the within-country panel identification strategy employed in this study.

### 2.2. Empirical strategy

Our empirical approach was designed around the panel structure. Unlike cross-sectional two-stage least squares, which exploits only variation across countries at a single point in time, our system GMM panel estimator exploits within-country variation over the 20-year period, absorbing all time-invariant country characteristics through country fixed effects. The dynamic specification additionally models the persistence of middle-class

**Table 2. Variables and panel descriptive statistics ( $N = 44$  countries,  $T = 5$  periods, ~196 observations)**

| Variable    | Description                                   | Mean | SD   | Min   | Max   | Source         |
|-------------|-----------------------------------------------|------|------|-------|-------|----------------|
| FloatMC     | Floating class (% pop, \$2–\$4/day, 2011 PPP) | 12.8 | 8.3  | 0.6   | 36.1  | World Bank PIP |
| LoMC        | Lower-middle class (% pop, \$4–\$10/day)      | 10.9 | 9.1  | 0.4   | 39.4  | World Bank PIP |
| UpMC        | Upper-middle class (% pop, \$10–\$20/day)     | 5.1  | 5.0  | 0.1   | 23.2  | World Bank PIP |
| LnGdpCap    | Log GDP per capita (constant 2015 US\$)       | 7.48 | 0.91 | 4.98  | 9.71  | WDI            |
| Gini        | Gini coefficient (0–100)                      | 41.8 | 8.4  | 27.1  | 63.5  | WDI / PIP      |
| MultPov     | Multidimensional Poverty Index                | 0.34 | 0.20 | 0.002 | 0.591 | UNDP HDR       |
| NorthAfrica | =1 if North African country                   | 0.14 | 0.34 | 0     | 1     | —              |

Notes: The panel is unbalanced due to missing MPI observations for some country-years. GDP per capita in constant 2015 USD from WDI; converted to 2011 PPP for comparability with PIP middle-class thresholds.

Abbreviations: GDP: Gross Domestic Product; MPI: Multidimensional Poverty Index; PIP: Poverty and Inequality Platform; PPP: Purchasing Power Parity; SD: Standard deviation; USD: United States Dollars; WDI: World Development Indicators.

formation, separating state dependence of middle-class shares from the causal contribution of contemporaneous development. The baseline panel model for middle-class category  $k$  in country  $i$  at time  $t$  is shown in **Equation 1**:

$$MC_{i,k,t} = \alpha_1 MC_{i,k,t-1} + \beta_1 \text{LnGdpCap}_{i,t} + \beta_2 \text{Gini}_{i,t} + \beta_3 \text{MultPov}_{i,t} + \beta_4 \text{NorthAfrica}_i + \mu_i + \lambda_t + \varepsilon_{i,k,t} \quad (1)$$

where  $MC_{i,k,t}$  is the one-period lagged dependent variable capturing persistence;  $\mu_i$  are country fixed effects;  $\lambda_t$  are time fixed effects capturing global shocks; and  $\varepsilon_{i,k,t}$  is the idiosyncratic error term. The coefficient  $\alpha_1$  is the persistence parameter;  $\beta_1$  captures the within-country causal effect of development on middle-class formation. The regional heterogeneity specification interacts GDP per capita with the North Africa indicator (**Equation 2**):

$$MC_{i,k,t} = \alpha_1 MC_{i,k,t-1} + \beta_1 \text{LnGdpCap}_{i,t} + \beta_2 (\text{LnGdpCap} * \text{NorthAfrica})_{it} + \beta_3 \text{NorthAfrica}_i + \gamma X_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,k,t} \quad (2)$$

In addition, a correlation analysis was required prior to estimation; in this context, the pooled Pearson correlation method is highly appropriate, as it aggregates group-specific bivariate correlation coefficients into a single summary estimate by weighting each group-level coefficient by its degrees of freedom. Following Fisher's transformation, each coefficient was converted to a z-score, averaged across groups, and back-transformed to the correlation metric, thereby stabilizing variance and correcting for bias that arises when correlations were computed on the collapsed dataset—a procedure that guards against spurious associations induced by between-group heterogeneity.

### 2.3. System generalized method of moments estimation (Blundell–Bond)

**Equation 1** presents two endogeneity challenges. First, the lagged dependent variable  $MC_{i,k,t-1}$  is correlated with the country fixed effect  $\mu_i$ , making standard fixed effects estimators inconsistent (Nickell bias). Second, the current GDP per capita is potentially endogenous to middle-class formation. The system GMM estimator of Blundell and Bond (1998) addresses both challenges simultaneously. System GMM estimates two equations jointly. The first-difference equation eliminates fixed effects (**Equation 3**):

$$\Delta MC_{i,k,t} = \alpha_1 \Delta MC_{i,k,t-1} + \beta_1 \Delta \text{LnGdpCap}_{i,t} + \beta_2 \Delta \text{Gini}_{i,t} + \beta_3 \Delta \text{MultPov}_{i,t} + \Delta \lambda_t + \Delta \varepsilon_{i,k,t} \quad (3)$$

Instruments for the differenced equation are lagged levels; instruments for the levels equation are lagged differences. We treated GDP per capita as endogenous (instrumented by its own lags 2 and 3); Gini and MultPov were treated as predetermined (instrumented by lag 1). Following Roodman (2009), we collapsed the instrument matrix to avoid instrument proliferation given our  $N = 44$ ,  $T = 5$  panel. Instrument count (32–38) remains safely below the group count (44).

Two-step estimation was used with Windmeijer's (2005) finite-sample corrected standard errors. Model validity was assessed through: (i) the Arellano–Bond (Arellano & Bond, 1991) AR(2) test—non-rejection validates lagged levels as instruments; (ii) the Hansen J-test of overidentifying restrictions; and (iii) instrument count relative to  $N$ . As a transparent static benchmark, we

also reported two-way fixed effects (TWFE) estimates with country-clustered standard errors.

### 3. Results

#### 3.1. Descriptive panel patterns and preliminary correlations

Table 3 presents the panel correlation matrix, pooling all 196 country-year observations. Within-country correlations (after demeaning by country means) are shown in parentheses.

Within-country correlations were systematically lower than pooled correlations for all variable pairs, confirming that part of the pooled association reflects time-invariant country heterogeneity. The within-country GDP–lower-middle-class correlation of 0.483—statistically strong—confirms that as countries grow within the panel, their lower-middle-class shares expand independently of cross-country structural differences.

#### 3.2. Two-way fixed effects baseline estimates

The TWFE estimates in Table 4 confirm positive and significant within-country GDP effects on the floating and lower-middle classes. A 10% increase in GDP per capita is associated with a 0.87 percentage-point increase in the floating-class share and a 1.03 percentage-point increase in the lower-middle-class share over time within countries. The inequality coefficient is negative and significant for the floating and lower-middle classes, confirming H5. The North Africa interaction is significant, confirming H4.

#### 3.3. System generalized method of moments dynamic panel estimates

Table 5 shows that three findings stand out. First, persistence coefficients were 0.451 (floating), 0.521 (lower-middle class), and 0.567 (upper-middle class)—all highly significant, confirming H3. A country that increased its lower-middle-class share by 1 percentage point retained 0.52 percentage points in the following period, independent of GDP growth. Second, the GDP coefficient was positive and significant for the floating class (9.37\*\*\*) and lower-middle class (12.14\*\*\*), but not for the upper-middle class (2.98,  $p > 0.10$ ), confirming H1 and H2. Third, multidimensional poverty was highly significant across all specifications, confirming that non-income deprivation robustly constrains middle-class formation within countries over time.

Diagnostic tests confirm model validity. AR(2) tests consistently failed to reject the null, validating lagged levels as instruments. Hansen J-tests failed to reject the instrument validity hypothesis. Instrument counts (34–38)

were below the group count (44), following Roodman's guideline.

#### 3.4. Regional heterogeneity

The interaction specifications confirm H4 in both TWFE and system GMM. The interaction coefficient between GDP per capita and the North Africa indicator was positive and significant in both TWFE (3.91\*\* and 4.72\*\*) and system GMM (3.74\* and 4.31\*\*) specifications. For the lower-middle class in the system GMM, the total GDP effect in North Africa was 15.13 percentage points per log unit of GDP, compared to 10.82 in Sub-Saharan Africa—a 40% differential consistent with Kumeka *et al.* (2024)'s finding that institutional quality amplifies the distributional benefits of growth. The 2020 panel benchmark showed the sharpest within-country declines in middle-class shares for resource-dependent economies, corroborating UNCTAD (2024).

#### 3.5. Long-run effects and convergence

The system GMM persistence parameters allow computation of long-run steady-state effects. The long-run effect of a permanent one-unit increase in log GDP per capita on the lower-middle class is 25.3 percentage points, while for the floating class it is 17.1 percentage points. These long-run estimates are approximately twice the short-run coefficients, reflecting that GDP growth compounds through the persistence mechanism. This compounding logic has direct policy implications: early investments in growth-enhancing reforms generate disproportionate long-run formation of the middle class.

#### 3.6. Robustness checks

We conducted four robustness checks. First, estimating separate system GMM models for Sub-Saharan Africa only ( $N = 38$ ) yielded GDP coefficients for the lower-middle class of 10.14\*\*\*—close to the pooled estimate of 12.14, confirming that North African observations did not drive the main result. Second, using 2017 Purchasing Power Parity thresholds produced qualitatively identical persistence patterns with slightly smaller magnitudes. Third, replacing the Multidimensional Poverty Index with the Human Development Index did not materially alter results. Fourth, restricting to the balanced panel of 36 countries (180 observations) confirmed all key results.

### 4. Discussion

#### 4.1. Within-country development effects: Confirmation and extension

Our panel finding that GDP per capita growth primarily drives floating and lower-middle-class expansion within

**Table 3. Pooled and within-country correlation matrix ( $N = 196$  country-year observations)**

| Variable | FloatMC               | LoMC                  | UpMC                  | LnGdpCap              | Gini          | MultPov |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|---------|
| FloatMC  | 1.000                 | —                     | —                     | —                     | —             | —       |
| LoMC     | 0.769*** (0.631***)   | 1.000                 | —                     | —                     | —             | —       |
| UpMC     | 0.641*** (0.512***)   | 0.752*** (0.614***)   | 1.000                 | —                     | —             | —       |
| LnGdpCap | 0.571*** (0.412***)   | 0.589*** (0.483***)   | 0.739*** (0.601***)   | 1.000                 | —             | —       |
| Gini     | -0.198** (-0.142*)    | -0.186** (-0.119*)    | -0.048 (-0.031)       | 0.211** (0.187**)     | 1.000         | —       |
| MultPov  | -0.638*** (-0.501***) | -0.631*** (-0.517***) | -0.408*** (-0.341***) | -0.419*** (-0.358***) | 0.074 (0.068) | 1.000   |

Notes: \* $p < 0.10$ , \*\* $p < 0.05$ , and \*\*\* $p < 0.01$  (Pooled Pearson correlations). Within-country (demeaned) correlations in parentheses. Abbreviations: FloatMC: Floating middle class; LnGdpCap: Log of Gross Domestic Product per capita; LoMC: Lower-middle class; MultPov: Multidimensional poverty; UpMC: Upper-middle class.

**Table 4. Two-way fixed effects panel estimates**

| Variable                      | FloatMC          | LoMC             | UpMC           | FloatMC interaction | LoMC interaction |
|-------------------------------|------------------|------------------|----------------|---------------------|------------------|
| LnGdpCap                      | 9.14*** (2.28)   | 10.87*** (2.61)  | 3.42* (1.76)   | 7.82*** (2.43)      | 9.14*** (2.87)   |
| Gini                          | -0.41** (0.17)   | -0.33** (0.15)   | -0.10 (0.09)   | -0.39** (0.16)      | -0.31** (0.15)   |
| MultPov                       | -23.41*** (5.84) | -30.12*** (7.18) | -9.88** (4.21) | -22.87*** (5.71)    | -29.43*** (7.04) |
| NorthAfrica $\times$ LnGdpCap | —                | —                | —              | 3.91** (1.87)       | 4.72** (2.14)    |
| Country FE                    | Yes              | Yes              | Yes            | Yes                 | Yes              |
| Year FE                       | Yes              | Yes              | Yes            | Yes                 | Yes              |
| Observations                  | 196              | 196              | 196            | 196                 | 196              |
| $R^2$ (within)                | 0.614            | 0.672            | 0.421          | 0.641               | 0.698            |

Notes: Country-clustered standard errors in parentheses. \* $p < 0.10$ , \*\* $p < 0.05$ , and \*\*\* $p < 0.01$ . Dependent variables are middle-class shares (%). Abbreviations: FE: Fixed effects; FloatMC: Floating middle class; LnGdpCap: Log of Gross Domestic Product per capita; LoMC: Lower-middle class; MultPov: Multidimensional poverty; UpMC: Upper-middle class.

**Table 5. Two-step system generalized method of moments estimates**

| Variable                       | FloatMC          | LoMC             | UpMC             | FloatMC interaction | LoMC interaction |
|--------------------------------|------------------|------------------|------------------|---------------------|------------------|
| L.MC (persistence $\alpha_1$ ) | 0.451*** (0.112) | 0.521*** (0.134) | 0.567*** (0.148) | 0.443*** (0.110)    | 0.514*** (0.131) |
| LnGdpCap ( $\beta_1$ )         | 9.37*** (2.81)   | 12.14*** (3.47)  | 2.98 (1.94)      | 8.11*** (2.98)      | 10.82*** (3.61)  |
| Gini ( $\beta_2$ )             | -0.31* (0.18)    | -0.26 (0.20)     | -0.08 (0.10)     | -0.29* (0.17)       | -0.24 (0.19)     |
| MultPov ( $\beta_3$ )          | -20.48*** (5.11) | -27.63*** (6.74) | -8.42** (3.91)   | -19.87*** (4.98)    | -26.91*** (6.58) |
| NorthAfrica $\times$ LnGdpCap  | —                | —                | —                | 3.74* (1.99)        | 4.31** (2.08)    |
| AR(1) $p$ -value               | 0.018            | 0.022            | 0.031            | 0.019               | 0.021            |
| AR(2) $p$ -value               | 0.341            | 0.298            | 0.412            | 0.337               | 0.302            |
| Hansen $J$ $p$ -value          | 0.218            | 0.267            | 0.304            | 0.241               | 0.271            |
| Instruments                    | 34               | 34               | 34               | 38                  | 38               |
| Countries                      | 44               | 44               | 44               | 44                  | 44               |
| Observations                   | 152              | 152              | 152              | 152                 | 152              |

Notes: Two-step system generalized method of moments with Windmeijer (2005) corrected standard errors in parentheses. \* $p < 0.10$ , \*\* $p < 0.05$ , and \*\*\* $p < 0.01$ . GDP per capita treated as endogenous (instruments: lags 2–3). Gini and MultPov are treated as predetermined (instrument: lag 1). Instrument matrix collapsed following Roodman (2009). AR(2):  $H_0$  = no second-order autocorrelation; non-rejection validates instruments. Hansen  $J$ :  $H_0$  = instruments are valid.

Abbreviations: FE: Fixed effects; FloatMC: Floating middle class; LnGdpCap: Log of Gross Domestic Product per capita; L.MC: Lagged dependent variable; LoMC: Lower-middle class; MultPov: Multidimensional poverty; UpMC: Upper-middle class.

African countries (H1 confirmed) confirms the directional conclusion of earlier cross-sectional studies (Ncube *et al.*, 2011; Shimeles & Ncube, 2015) while providing considerably stronger causal identification. The supply-side and demand-side transmission mechanisms outlined in the conceptual framework (Section 1.1)—formal employment creation, entrepreneurship facilitation, and human capital accumulation—are consistent with the panel evidence: within-country GDP growth generates middle-class gains that are independent of cross-country structural differences. The key novelty is that this relationship holds within countries over time, ruling out the alternative explanation that it reflects structural differences between rich and poor countries.

This within-country confirmation aligns with a previous study (Thorbecke *et al.*, 2024): Kenyan and Ghanaian panel case studies found that GDP per capita growth significantly predicts transitions out of poverty into lower-income groups over 5–10-year horizons, mediated by the creation of formal employment. Our system GMM coefficient of 12.14 for the lower-middle class is consistent with these micro-level transition probabilities when aggregated to the national level. Together, the macro-panel and micro-level evidence point to the creation of formal employment as the primary transmission channel through which GDP growth reaches lower-income households.

The non-significance of GDP for the upper-middle class (H2 confirmed: development effects differ across thresholds) is consistent with Melber (2022)'s critical reassessment: the upper-middle class in Africa remains relatively disconnected from aggregate GDP dynamics and is shaped more by inherited advantages, institutional proximity to state resources, and educational credentials. This threshold heterogeneity, theorized in Section 1.1.1 as reflecting differential access to formal credit and property rights, receives empirical confirmation in our panel. Gyamfi *et al.* (2022) reached a similar conclusion: financial development benefits upper-income groups disproportionately only when institutional quality is high—a condition met in few Sub-Saharan African countries.

## 4.2. Path dependence: A new finding with structural implications

The persistence coefficients (0.451–0.567) represent the most novel finding of this study relative to existing cross-sectional literature, which, by design, cannot estimate persistence (H3 confirmed: middle-class formation exhibits significant positive persistence). This finding directly validates the theoretical prediction in Section 1.1.2 that the sustainability of middle-class expansion

depends on whether growth generates genuine mobility opportunities or merely temporary formation. The moderate-to-high persistence—particularly for the upper-middle class (0.567)—implies that middle-class formation is a cumulative process: countries that achieve early gains through growth and institutional improvements experience compounding effects, while countries trapped at low levels face reinforcing disadvantages.

This path dependence resonates with Alesina *et al.* (2021), who documented that intergenerational mobility in Africa is strongly predicted by birth-cohort effects that persist across decades. The implication is sobering: structural barriers to middle-class formation in chronically low-mobility African countries cannot be overcome by growth alone and require sustained institutional interventions. Breaking this cycle demands policy continuity across political cycles—a governance challenge that is itself part of the institutional deficit that distinguishes low-persistence from high-persistence economies in our panel.

The persistence differential between the floating class (0.451) and the upper-middle class (0.567) warrants specific attention. Lower persistence for the floating class reflects vulnerability to downward mobility during crises—this was observed directly in our panel during the 2020 COVID shock. This asymmetry, not previously documented for Africa, has concrete policy implications: policies targeting the floating class must build asset buffers and social protection to prevent crisis-driven reversals.

## 4.3. Regional heterogeneity: Mechanisms and policy implications

The North Africa–Sub-Saharan Africa GDP effect differential (approximately 40% higher in North Africa) is consistent across TWFE and system GMM specifications (H4 confirmed: substantial regional heterogeneity exists). This regional gap, theorized in Section 1.1.3 as reflecting differences in formal employment rates, institutional quality, and economic structure, is quantified here at the panel level for the first time. Kumeka *et al.* (2024) provided direct evidence for the institutional mechanism: their 45-country African panel found that the distributional benefits of economic openness are amplified by institutional quality. Applied to our context, North African countries above an institutional quality threshold convert GDP growth into middle-class formation more efficiently—a differential persistent over the 20-year panel.

The resource-dependence mechanism is corroborated by outlier dynamics in Section 4.2. UNCTAD (2024) documented that over 60% of African nations depend on commodities for a majority of export earnings, generating

enclave growth that bypasses broad-based employment creation. Our panel captures the commodity cycle directly: the 2015 benchmark shows the sharpest within-country declines in middle-class shares for resource-dependent economies.

Finally, H5 is confirmed: income inequality (Gini coefficient) and multidimensional poverty exerted independent negative effects on middle-class formation within countries over time, even after controlling for GDP growth and fixed effects. The Gini coefficient was negative and significant for the floating and lower-middle classes in the TWFE estimates, while multidimensional poverty was highly significant across all specifications in both TWFE and system GMM. This finding aligns with the theoretical argument in Section 1.1.2: growth that concentrates income gains among existing middle- and upper-class households generates limited poverty-to-middle-class transitions. Mamman *et al.* (2023) provided a complementary mechanism—high inequality constrains fiscal capacity, reducing the social expenditure that sustains middle-class formation. Taken together, these results establish that the development–middle class relationship is conditioned on distributional outcomes: countries achieving equivalent GDP growth but with lower inequality generate substantially larger middle-class gains, consistent with the Thorbecke *et al.* (2024) synthesis across five African country cases.

#### 4.4. Measurement limitations and directions for future research

The absolute expenditure threshold approach, while essential for panel comparability, has the limitations documented by Němečková *et al.* (2020). Households classified as lower-middle class in the PIP may differ substantially in their asset endowments and subjective identification. The IMF (2021) found that intergenerational mobility is strongly influenced by access to electricity and water, suggesting that our panel estimates measure a necessary but not sufficient condition for genuine middle-class consolidation.

Three directions for future research follow from our findings. First, extending the panel to 30–50 years as data availability improves would allow estimation of true long-run persistence and identification of structural breaks. Second, country-specific panel studies for outlier economies would generate context-specific causal identification. Third, household-level longitudinal data from Kenya, Tanzania, Ethiopia, and South Africa would allow direct estimation of transition probabilities between income classes and would test the micro-foundations of our macro-panel results.

#### 4.5. Implications

The findings of this study carry several concrete policy implications for governments, development institutions, and researchers engaged with Africa's middle-class development trajectory. These implications flow directly from the five confirmed hypotheses and the panel evidence accumulated across 44 countries over 2000–2020. The following discussion organizes these implications by hypothesis, moving from macroeconomic growth policy to distributional and institutional dimensions, and then to targeted social protection.

The confirmation of H1—that economic development primarily drives middle-class expansion—implies that macroeconomic policies sustaining GDP per capita growth remain the primary lever for middle-class formation at the lower end of the income distribution. Policymakers should prioritize structural reforms that foster the creation of formal employment, manufacturing diversification, and productivity growth, rather than relying on commodity revenues alone. The commodity-cycle vulnerability documented in resource-dependent economies reinforces the case for economic diversification as a prerequisite for durable middle-class formation.

H2's confirmation—that development effects are strongest for the floating and lower-middle classes but non-significant for the upper-middle classes—highlights a stratified policy challenge. For households with daily expenditures in the \$10–\$20 range, aggregate growth policies are insufficient. Institutional reforms that improve access to financial services, property rights, and educational credentials are required to generate mobility into the upper-middle class. This differentiation has direct implications for the targeting of development programs.

The path dependence documented in H3 (persistence coefficients 0.451–0.567) has a crucial policy corollary: early and sustained investment in growth-enabling reforms generates disproportionate long-run returns through compounding. The long-run steady-state effects—approximately twice the short-run coefficients—imply that reforms generating even modest short-run growth gains yield substantially larger cumulative middle-class formation. This compounding logic makes the timing of reforms critical: delayed action forecloses long-run gains. Conversely, the lower persistence for the floating class signals that social protection mechanisms are essential to preventing crisis-driven reversals among the most vulnerable households.

The significant regional heterogeneity confirmed in H4 implies that a differentiated policy agenda is necessary. North African countries, which convert GDP growth

into middle-class formation approximately 40% more efficiently, offer institutional lessons for Sub-Saharan Africa. Specifically, reducing informality, strengthening contract enforcement, improving financial sector depth, and deepening regional trade integration are institutional reforms that could narrow this efficiency gap. The African Continental Free Trade Area protocol on investment, if effectively implemented, may progressively alter the structural constraints facing Sub-Saharan manufacturers and thereby improve the growth-to-middle-class conversion rate.

H5's confirmation—that income inequality and multidimensional poverty independently constrain middle-class formation—underscores that growth without redistribution fails to generate broad-based middle-class expansion. This implies a complementary role for redistributive fiscal policy: investments in human development (health, education, water, electricity) and targeted transfers to multidimensionally deprived households are not substitutes for growth but essential complements. Development partners should design conditional transfers and social protection floors that specifically target households near the \$2–\$4 threshold, where vulnerability to downward mobility is highest.

## 5. Conclusions

This study provides the first systematic dynamic panel evidence on the development–middle class relationship in Africa, covering 44 countries from 2000 to 2020. Using a two-step system GMM estimator that addresses endogeneity, controls for country and time fixed effects, and models the dynamic persistence of middle-class formation, we reached five principal conclusions. These conclusions extend and deepen the cross-sectional literature by establishing within-country temporal dynamics that cannot be identified from single-year or pooled analyses.

First, economic development within countries significantly drives floating and lower-middle-class expansion over time. A 10% increase in GDP per capita generated approximately 0.9–1.2 additional percentage points of lower-to-floating-class formation within countries. This causal effect is robust to endogeneity corrections, country fixed effects, and multiple robustness checks.

Second, middle-class formation exhibited substantial path dependence (persistence coefficients 0.451–0.567). Gains compound over time for countries that achieve early progress, while countries with a chronically low middle class face reinforcing disadvantages. This persistence is weakest for the floating class—the segment most vulnerable to crisis-driven downward mobility.

Third, upper-middle-class formation was not significantly driven by aggregate GDP growth, underscoring the importance of structural and institutional factors that operate independently of aggregate income.

Fourth, North African economies generated substantially more middle-class formation per unit of GDP growth than Sub-Saharan African economies, reflecting persistent institutional and structural advantages over the 20-year panel period.

Fifth, income inequality and multidimensional poverty exert independent negative effects on middle-class formation within countries, confirming that growth without redistribution fails to generate broad-based middle-class expansion.

Policy implications derived from these five findings are discussed in Section 4.5. In brief, they point to four priorities: sustaining GDP per capita growth as the primary lever for lower-income class formation; protecting the floating class through social protection and asset-building programs; investing in institutional reform to narrow the Sub-Saharan efficiency gap in converting growth into middle-class formation; and combining growth with redistributive fiscal policy to address inequality and multidimensional deprivation.

The long-run steady-state calculations—with lower-middle-class formation effects approximately twice those of the short run—emphasize that sustained reforms that generate even modest short-run growth gains have disproportionate long-run effects through the persistence mechanism, making early and sustained institutional investment the highest-return strategy for inclusive middle-class development in Africa.

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The authors declare they have no competing interests.

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## Ethics approval and consent to participate

Not applicable.

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## Availability of data

Data are available from the corresponding author upon reasonable request.

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