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MANY FACES OF OVEREDUCATION AND UNDEREDUCATION IN MOROCCO:

A Comparative Analysis Across Three Measures Using Microdata from the 2014 Census

AOMAR IBOURK & GHAZI TAYEB

POLICY CENTER FOR THE NEW SOUTH

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Since the early 2000s, the Moroccan labour market has experienced continuous educational expansion that has not been matched by an equivalent transformation of the economy's productive structure, giving rise to situations of vertical mismatch between employed workers' education levels and the requirements of the jobs they hold. This study analyzes the determinants of overeducation and undereducation using anonymized microdata from the 2014 General Population and Housing Census (RGPH 2014, HCP), on a sample of 945,866 employed workers. Three categorical measures of mismatch are constructed — a National Normative Approach (NNA), an International Normative Approach (INA) aligned with ILO standards, and a Statistical Approach (SA) based on the empirical distribution of years of schooling by occupation — with determinants estimated using Multinomial Logit models.

The descriptive results reveal a marked divergence depending on the measure used: the normative approaches conclude that undereducation is massive, at 62.7 percent (NNA) to 66.0 percent (INA), whereas the statistical approach establishes matching as the majority outcome (67.0 percent). This diagnosis is consistent, in its ranking, with that of the HCP (2018), which reports on exhaustive RGPH 2014 data a 45.7 percent matching rate, 46.7 percent undereducation, and 7.6 percent overeducation — the latter reaching 55.8 percent among specialized technicians and showing a threefold gap between urban (10.4 percent) and rural (3.2 percent) areas. Econometrically, overeducation disproportionately affects young workers, women, urban residents, public-sector employees, and individuals from the most affluent households (richest quintile: $\beta = 0.918$), while undereducation dominates among older workers, the self-employed, family helpers, and rural residents.

Growth and Jobs Report (2026) reveals a recent, well-documented worsening of overqualification among tertiary graduates, rising from 34 percent in 2019 to more than 43 percent in the most recent data, and reaching 70.7 percent among graduates of higher-level vocational training — a phenomenon that reduces earnings by 20 percent, and by an additional 10 percentage points in cases of simultaneous horizontal mismatch. On gender, national female labour-force participation fell from 28 percent in 2000 to 19 percent in 2024, while it rose among urban women aged 25-34, from 26.1 percent in 2016 to 34 percent in 2024 — a growing selectivity that explains the apparent paradox of employed women being better matched on average (59.2 percent matching versus 42.8 percent for men, per HCP) yet facing stronger barriers to formal-employment access.

These findings call for differentiated policies: tackling urban overeducation through an industrial policy that creates skilled jobs and through the recognition of prior learning; tackling rural undereducation through local economic diversification; and policies targeted at the barriers to formal-employment access facing educated women.

Keywords: *Skills mismatch, overeducation, undereducation, educational attainment, occupational mismatch, labour market, Morocco, Multinomial Logit, RGPH 2014.*

JEL Classification: *J24 (Human Capital; Skills; Occupational Choice; Labor Productivity), J62 (Job, Occupational, and Intergenerational Mobility), O15 (Human Resources; Human Development; Income Distribution; Migration), R23 (Regional Migration; Regional Labor Markets; Population).*

AOMAR IBOURK & GHAZI TAYEB

TABLE OF CONTENTS

1. INTRODUCTION

The mismatch between workers' skills and the requirements of the jobs they hold is a major issue for contemporary economies. This phenomenon, whether it manifests as overeducation or undereducation, has profound implications for labour productivity, economic growth, income inequality and individual satisfaction. In the Moroccan context, characterized by structural transformation and a large share of young people in the labour market, understanding the mechanisms of skills mismatch is essential for guiding education, training and employment policies.

This concern is all the more pressing given that Morocco has, over the past two decades, experienced rapid educational expansion at all levels, without the productive structure of the economy evolving at the same pace toward skill-intensive activities. The Haut-Commissariat au Plan (HCP) notes that, nationally, only 45.7 percent of employed workers recorded in the 2014 census held a job matching their qualification, against 46.7 percent in a situation of undereducation and 7.6 percent in a situation of overeducation — evidence of a structural imbalance between the supply of training and labour demand that forms the starting point of the present research. More recently, the World Bank's Morocco Country Growth and Jobs Report (2026) documents a worsening of overqualification among tertiary graduates, rising from 34 percent in 2019 to more than 43 percent in the most recent data, suggesting that the pace of skilled job creation has not kept up with educational progress.

The objective of this study is twofold. First, to analyze in depth the determinants of skills mismatch in the Moroccan labour market; second, to assess the robustness of these determinants across different measurement approaches. Building on the 2014 census microdata, we seek to answer a series of precise research questions:

- **Profiles and Trajectories :** Beyond static characteristics, how does the probability of mismatch evolve over the life cycle? Are there significant gender disparities, and if so, at which career stages are they most pronounced?
- **Labour Market Structure:** Which sectors of activity (NACE) and major occupational groups (ISCO) act as "pockets" of overeducation or, conversely, of undereducation?
- **Socio-economic and Geographic Context:** What is the impact of household background and living standards, measured by a composite socio-economic index, on individuals' occupational trajectories? Are territorial disparities — notably between regions and between urban and rural areas — structuring factors of mismatch?
- **Differentiated Logics of Mismatch:** Particular attention will be paid to distinguishing the factors associated with overeducation (a phenomenon of human-capital under-utilization) from those linked to undereducation (the potential valuation of experience over formal qualifications), as these two situations do not necessarily follow the same logic.
- **Positioning relative to existing institutional literature:** To what extent do the results obtained from RGPH 2014 microdata converge with, or diverge from, the diagnoses put forward by the HCP, based on the same census, and by the World Bank, based on more recent labour force surveys? What does this comparison tell us about the structural or conjunctural nature of the phenomenon?

To carry out this analysis, we draw on an exceptionally rich data source: the anonymized microdata from the 2014 General Population and Housing Census (RGPH 2014). In line with the methodological note published by the Haut-Commissariat au Plan (HCP), these data come from a representative 10 percent sample of the census population, comprising 3,341,426 individuals across 730,099 households.

The remainder of this paper is organized as follows. Section 2 reviews the theoretical and empirical literature on skills mismatch and positions our contribution relative to existing work, notably that of the HCP and the World Bank. Section 3 details the data, sample construction, the three measures of mismatch, and the econometric strategy. Section 4 presents the descriptive and econometric results. Section 5 discusses these results in light of the HCP's work and the Growth and Jobs Report, offers an economic interpretation of the mechanisms at play, examines the gender dimension in depth, and draws out public policy implications. Section 6 concludes.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

The analysis of the mismatch between education and employment draws on several complementary theoretical bodies of work, each shedding different light on the possible causes of overeducation and undereducation. This section presents in turn human capital theory, job competition theory, signalling theory, and labour market segmentation theories, before discussing approaches to measuring mismatch and reviewing the empirical determinants identified in the literature. It concludes by explicitly positioning the present study relative to the existing literature, in particular the work of the HCP and the World Bank's Growth and Jobs Report.

2.1. Human Capital and Returns to Education

Human capital theory, developed by Becker (1964) and Mincer (1974), is the standard framework for analyzing the relationship between education and earnings in the labour market. Under this approach, education is an investment that raises a worker's marginal productivity; in return for this investment, the individual expects a payoff in the form of higher wages and better access to employment. The Mincer model, which relates the logarithm of wages to years of schooling and work experience, was for several decades the dominant empirical tool for estimating this return.

This approach implicitly assumes a one-to-one correspondence between the level of education acquired and the skill level required by the job held. Yet this equilibrium assumption is precisely what is challenged by overeducation and undereducation, which reflect a gap between the human capital held and that which is actually valued in the job occupied: an overeducated worker experiences a lower return to education than their qualification would suggest, while an undereducated worker may, conversely, earn a wage higher than their formal education alone would justify, particularly when experience substitutes partly for a diploma. Human capital theory, although indispensable for understanding the incentives to invest in education, is therefore not sufficient on its own to explain why this return is not homogeneous within a given education level; it must be complemented by frameworks that explicitly incorporate the functioning of the labour market and the structure of labourdemand.

2.2. Job Competition Theory

Job competition theory, developed by Thurow (1975), offers a reversal of perspective: it is jobs themselves that determine productivity, with education serving mainly to rank candidates in a "job queue" for access to positions hierarchically ordered by their on-the-job training content. In this framework, educational expansion does not automatically create an equivalent demand for skilled labour: it merely shifts candidates' rank in the queue, pushing the less educated toward the bottom of the job hierarchy, including into positions for which their training exceeds the strict minimum required.

This theory directly illuminates the overeducation observed in Morocco: if the number of tertiary graduates grows faster than the number of high-skill positions created by the economy, a growing share of graduates is relegated to intermediate or low-skill jobs. The World Bank's Growth and Jobs Report (2026) documents precisely this mechanism for Morocco: employment growth remains concentrated in low- to medium-skill sectors, while the supply of tertiary graduates continues to expand, creating a structural imbalance between the queue of candidates and the structure of available jobs.

2.3. Signalling Theory

Signalling theory, formulated by Spence (1973), offers a third complementary lens. In a context of imperfect information where the employer cannot directly observe a candidate's true productivity before hiring, the diploma acts as a signal: it informs the employer about unobservable individual characteristics (work capacity, discipline, learning ability), without the content of the training itself necessarily being productive in the job held. This framework has an important implication for the analysis of mismatch: an individual may access a job that appears overeducated relative to their diploma if the diploma serves primarily as a sorting signal among a pool of candidates, independently of any strict correspondence between the content of the training and the tasks of the job.

Signalling theory also helps explain why, in a labour market marked by strong credential inflation, employers may progressively raise diploma requirements for hiring into a given position without the content of the work itself changing — a "credentialism" phenomenon that mechanically fuels the statistical overeducation observed in the data, even for jobs whose actual tasks have not changed.

2.4. Labour Market Segmentation and the Dual Economy

Labour market segmentation theories, whose foundations trace back to Lewis's (1954) work on dual economic development and the Harris-Todaro (1970) model, posit the existence of compartmentalized labour markets between which labour mobility is imperfect. Lewis's model distinguishes a low-productivity traditional sector with a quasi-unlimited labour supply from a higher-productivity modern sector, toward which labour is progressively transferred over the course of economic development. The Harris-Todaro model, originally designed to analyze rural-urban migration, shows how a wage differential between sectors can generate waiting unemployment or the acceptance of underemployment in the urban sector, even among skilled workers.

Applied to the Moroccan context, this segmentation framework helps interpret the coexistence, highlighted by our results, of a formal and public-sector market where the correspondence between diploma and job remains broadly respected, and less formal markets — self-employed, family helpers, agriculture, construction — where experience and informal skills largely substitute for formal education. The Growth and Jobs Report

notes in this respect that the Moroccan economy remains characterized by persistent duality between the formal and informal sectors, the latter employing a considerable share of the workforce, particularly young people and women, with very limited access to formal wage employment early in their careers.

2.5. Measuring Mismatch: Normative, Statistical and Subjective Approaches

The literature traditionally distinguishes three broad families of methods for measuring vertical skills mismatch.

The **normative approach** relies on an a priori correspondence, established by an expert or an official classification, between education levels and the skill levels required by occupations. It has the advantage of simplicity and reproducibility, and allows comparisons over time and across countries when international classifications (ISCED/ISCO) are used. This is the approach adopted by the HCP in its study on the alignment between education and employment, based on crossing three levels of education with three levels of occupation drawn from the 2014 national classifications. Its main limitation is the rigidity of the assumed correspondence: it ignores the possibility that the same job can be productively held by different training profiles, particularly when experience substitutes for formal education.

The **statistical approach**, known as the "mean and standard deviation" method, defines the qualification norm for each occupation not a priori, but from the empirically observed distribution of years of schooling among workers who actually hold that occupation. An individual is then considered matched if their education level falls within an interval (generally the mean plus or minus one standard deviation) around the observed mean for their occupation. This approach has the advantage of dynamically adapting to labour-market reality, but it is sensitive to credential inflation: if many overqualified workers are already concentrated in a given occupation, the observed mean rises artificially, which can lead to classifying as "matched" a situation that, from a normative standpoint, constitutes overeducation.

The **subjective approach**, not used in the present study owing to the limitations of the RGPH 2014, which contains no direct question on perceived match, relies on workers' own reports of whether their education matches their job's requirements. It has the merit of capturing individual perceptions of mismatch, which may influence job satisfaction and mobility decisions, but it is subject to rationalization and social-comparison biases, and does not allow for robust comparisons across individuals or studies.

A fourth approach, based on **skills** directly, measures the gap between assessed cognitive skills (for example via PIAAC-type surveys) and those required by the job. It remains difficult to mobilize in the Moroccan context in the absence of nationally representative skills surveys, but constitutes a promising avenue for research, as suggested by the PISA results cited in the Growth and Jobs Report regarding the limitations of the basic education system.

Given these methodological choices, and aware that no single measure is free of limitations, we mobilize three distinct measures in this study — two normative (national and international) and one statistical — to test the robustness of our results to the definition of mismatch adopted, an approach that remains rare in the Moroccan literature on the subject.

2.6. Empirical Determinants of Mismatch

The international and national empirical literature identifies a converging set of determinants of skills mismatch, which can be organized around the following axes.

- **Education level.** The probability of overeducation generally rises with the level of diploma under normative approaches, partly by mechanical construction, but also because the supply of tertiary graduates grows faster than demand for high-skill positions, a pattern documented for Morocco by both the HCP and the Growth and Jobs Report.
- **Age and experience.** Numerous studies, in line with signalling theory and human capital theory, show that overeducation is concentrated early in careers and declines with age, as accumulated experience allows for reallocation toward better-matched jobs or informal recognition of skills.
- **Gender.** The international literature documents a recurrent gender penalty in overeducation, generally attributed to a combination of hiring discrimination, women's sectoral concentration in industries with lower formal-qualification requirements, and geographic-mobility and work-family constraints that narrow the range of jobs accessible to educated women.
- **Sector of activity and employment status.** Employment status (public employee, private employee, self-employed, family helper) and sector of activity strongly structure the risk of mismatch, with highly formalized sectors (public administration, large firms) generally showing higher matching rates, while sectors with low barriers to entry (agriculture, retail trade, construction) concentrate undereducation.
- **Urban/rural setting.** Rural areas, whose economic structure is dominated by traditional agriculture and self-employment, structurally require fewer formal qualifications, resulting in higher undereducation rates than in urban areas, where the density of graduates and economic diversification generate more instances of overeducation.
- **Socio-economic origin and territory.** A growing body of work highlights the importance of household socio-economic background and region of residence, these variables reflecting both unequal access to quality education and the heterogeneity of regional labour markets, notably the concentration of skilled jobs in major urban centres.
- **Structure of labour demand.** Finally, part of the literature, of which the Growth and Jobs Report offers a recent illustration for Morocco, emphasizes the determining role of the structure of labour demand itself: in a context where the fastest-growing sectors continue to favour low- or medium-skill profiles, the rising mismatch among tertiary graduates would not stem from a shortfall in the supply of skills, but rather from a shortfall in skilled demand, linked to the pace of the Moroccan economy's structural transformation.

2.7. Positioning of the Present Study

The existing literature on the education-employment match in Morocco has so far relied mainly on descriptive normative approaches, exemplified by the HCP study based on the exhaustive RGPH 2014 data, which establishes a detailed diagnosis by diploma, occupation and sector of activity, but without a systematic multivariate model of the individual and contextual determinants of mismatch. The World Bank's Growth and Jobs Report, for its part, draws on more recent labour force survey data (through 2024) and a normative approach aligned with international ILO standards, with a particular focus on the time evolution of mismatch, its horizontal dimension (alignment between field of study and field of employment), and its links with the sectoral structure of job creation and female employment issues.

The present study distinguishes itself from these two bodies of work through three complementary contributions. First, it simultaneously mobilizes three measures of mismatch

— two normative and one statistical — on the same sample, allowing an explicit distinction between determinants that are robust to the definition of mismatch and those specific to a particular measurement convention, a methodological triangulation absent from the HCP and GJR studies taken individually. Second, it carries out a multivariate econometric modelling exercise (Multinomial Logit) that simultaneously incorporates individual, occupational, sectoral, geographic and socio-economic characteristics — including a household living-standard index built through Principal Component Analysis, absent from existing studies based on RGPH 2014 — allowing the isolation of each factor's own effect, all else equal, rather than relying solely on bivariate descriptive statistics. Third, by systematically confronting its results with those of the HCP and the GJR in Section 5, it offers an integrated reading that combines a fine-grained diagnosis, based on the most detailed microdata available (RGPH 2014), with a medium-term structural perspective, based on the recent evolution of the Moroccan economy as documented by the World Bank.

3. DATA AND METHODOLOGY

The methodological approach adopted in this study aims to identify the determinants of skills mismatch in the Moroccan labour market in a robust and comprehensive manner. It proceeds in two steps. First, we construct the dependent variable by operationalizing the concept of skills mismatch through three distinct measures, recognized in the international literature, to ensure the robustness of our conclusions: (i) a normative approach adapted to the national context, (ii) a normative approach based on international ILO standards, and (iii) a statistical approach based on the observed distribution of years of schooling within each occupation. Second, we model the probability that an individual belongs to one of the three categories (Matched, Overeducated, Undereducated) using a Multinomial Logit model.

3.1. Data Source

This analysis relies on anonymized microdata from the 2014 General Population and Housing Census (RGPH 2014), made available by the Haut-Commissariat au Plan (HCP). In accordance with the HCP's methodological note, these data come from a representative 10 percent sample, comprising **3,341,426 individuals** across **730,099 households.**

- **Primary source:** individual and household microdata from RGPH 2014, HCP.
- **Reference year/period:** population and housing census, September 2014.2014.
- **Population studied:** all individuals recorded in Morocco; the econometric analysis focuses on the sub-population of employed workers.
- **Unit of observation:** the individual (employed worker), linked to their household.
- **Geographic level:** national, with breakdowns by region (12 regions under the 2015 administrative division) and by area of residence (urban/rural).
- **Complementary sources mobilized for the discussion (Section 5):** the HCP study "L'Adéquation entre Formation et Emploi au Maroc" ("The Alignment between Education and Employment in Morocco"), based on the exhaustive RGPH 2014 (employed population of 9,627,341 individuals), and the World Bank's Morocco Growth and Jobs Report (2026), based notably on HCP's National Labour Force Survey (LFS/ENE) series through 2024, as well as CNSS administrative data.

Merging the "Individual" and "Household" files allowed us to build a complete database, linking each person to the characteristics of their household. The final sample used for our regressions consists of employed individuals for whom information on occupation and

education level is available, thus forming the relevant scope for studying labour market matching.

3.2. Sample Construction

Merging the databases. An essential preliminary step consisted of merging the "Individual"-level database with the "Household"-level database. This many-to-one (m:1) merge was carried out using a unique household identifier composed of the variables reg (region), pro (province) and MEN_PRO (household number within the province). This operation enriched each individual observation with contextual household information, such as housing characteristics, ownership of durable goods, and household demographic structure — elements crucial to our analysis of the socio-economic determinants of skills mismatch.

Inclusion/exclusion criteria. The scope of our econometric analysis focuses on the employed active population, the relevant frame for studying labour-market matching. The final sample was therefore defined by applying the following filtering criteria:

1. **Activity status:** only individuals recorded as "Employed" (TY_ACT == 0) are retained.
2. **Data availability:** individuals for whom key information needed to construct our dependent and independent variables was missing (notably occupation PROF_SGG, diploma EG_DIP_GG_DET / FP_DIP_GG, or education level NIV_ET) were excluded.

Final sample. The final sample resulting from these filters comprises **945,866 individuals**, for whom we have a complete set of individual, occupational and household characteristics. For comparison, the HCP's exhaustive study, based on the full census file rather than the 10 percent sample, covers an employed population of 9,627,341 individuals, after excluding 5,872 cases of undeclared diploma (6 per 10,000) and 186,190 cases of unclassified occupation (1.9 percent). The two scopes are therefore consistent, with the 10 percent sample used here constituting a representative subset.

3.3. Construction of the Dependent Variable: Measures of Mismatch

Measuring skills mismatch is a conceptual challenge. To ensure the robustness of our conclusions, we use not one but three distinct measures, each capturing a different facet of the phenomenon (see Section 2.5 for the theoretical discussion of these approaches). Each measure generates a three-category variable: **Matched (1), Overeducated (2), and Undereducated (3).**

3.3.1. Measure 1: National Normative Approach (NNA)

This first measure is based on a methodology specific to the Moroccan context, following the same logic as that adopted by the HCP in its study on the education-employment match (see correspondence table in Section 3.6). It consists of crossing a three-level classification of diplomas (low, intermediate, high) with a similar classification of occupations. Once these two hierarchies are established, an individual is classified by crossing their diploma level with the skill level required by their occupation, according to the correspondence matrix presented in Table 1.

Table 1

National Normative Approach (NNA) Correspondence Matrix

Diploma level \ Occupation level	Level 1 (Low)	Level 2 (Intermediate)	Level 3 (High)
Level 1 (Low)	Matched	Undereducated	Undereducated
Level 2 (Intermediate)	Overeducated	Matched	Undereducated
Level 3 (High)	Overeducated	Overeducated	Matched

Source: authors' construction, methodology aligned with HCP (2018).

The main advantage of this national measure is that it offers a first reading of mismatch potentially more aligned with the perceptions and realities of the Moroccan labour market. The broad definition of the "intermediate" education level, for instance, can be interpreted as a recognition that a lower-secondary (collégial) diploma constitutes a significant employability threshold for a large number of intermediate positions.

However, this approach also has limitations. By departing from international standards (notably by classifying the lower-secondary level as "intermediate"), it makes international comparisons more difficult. Moreover, like any normative method, it postulates a rigid relationship between diploma and occupation, ignoring the possible substitution between formal education and on-the-job experience. It is to address these limitations that we resort to two complementary measures in our analysis.

3.3.2. Measure 2: International Normative Approach (INA)

To ensure the comparability of our results with the international literature — notably with the methodology of the World Bank's Growth and Jobs Report, which adapts the same standards to the Moroccan context in collaboration with the HCP — and to provide an assessment of mismatch based on established standards, we constructed a second normative measure, which we call the "International Normative Approach" (INA). This measure, represented by the variable classification_norm, draws directly on the methodology proposed by the International Labour Organization (ILO), based on a correspondence between the International Standard Classification of Education (ISCED) and the International Standard Classification of Occupations (ISCO). The structure of this measure is similar to that of the national approach (NNA), but it applies a different, stricter mapping for the diploma hierarchy, in order to align with ISCED standards.

Table 2

Education/Occupation Correspondence, International Normative Approach (INA)

Level	Component	Detailed description	RGPH 2014 variables
Level 1 (Low)	Education	ISCED 0-2: no formal education, completed primary, or completed lower-secondary	No diploma; Primary; Lower-secondary
	Occupation	ISCO 9: elementary occupations requiring only basic skills	Armed forces; Elementary occupations
Level 2 (Intermediate)	Education	ISCED 3-4: upper-secondary graduates and intermediate-level vocational training	Upper-secondary (Baccalaureate); Vocational qualification/specialization
	Occupation	ISCO 3-8: intermediate occupations, clerks, skilled manual workers	Clerks; Skilled workers; Technicians
Level 3 (High)	Education	ISCED 5-8: higher education (1st, 2nd, 3rd cycles) and higher-level vocational training	BTS/CPGE, Bachelor's, Master's, Doctorate, Engineer; Specialized technician
	Occupation	ISCO 1-2: managers, professionals and scientific occupations	Senior executives; Liberal professions

Source: authors' construction, adapted from the ILO's (2012) ISCED-ISCO correspondence and the methodology jointly adopted by the World Bank and the HCP in the Growth and Jobs Report (2026).

This methodological duality (NNA/INA) is one of the strengths of our analysis: it will allow us not only to identify the determinants of mismatch, but also to assess the extent to which these determinants are sensitive to the definition of the "qualification" threshold itself, distinguishing robust conclusions from those that depend on a particular measurement convention.

3.3.3. Measure 3: Statistical Approach (SA)

The third measure of mismatch, which we call the "Statistical Approach" (SA), departs from normative frameworks to adopt a purely empirical perspective. Represented by the variable classification_stat_niv, this method does not assume a fixed relationship between diplomas and occupations, but instead defines the educational "norm" from the distribution actually observed in the labour market. This approach, often referred to in the literature as the "mean and standard deviation" method (see Section 2.5), captures the implicit human-capital requirements for each occupation at a given point in time.

Constructing this measure involves three distinct steps drawing on a finer granularity of the data:

1. **Quantifying human capital:** each individual's detailed education level (NIV_ET) is converted into a continuous variable of years of schooling (years_educ_niv).
2. **Calculating the occupational norm:** for each detailed occupation (at the sub-major-

group level, PROF_SGG), the mean and standard deviation of years of schooling of all workers in that group are calculated (59 occupational sub-major-groups present in our sample of employed workers).

3. **Classification:** an individual is considered matched if their years of schooling fall within the interval of the mean plus or minus one standard deviation for their occupation; they are overeducated if their years of schooling exceed this interval, and undereducated if they fall below it.

Table 3

Classification Rules of the Statistical Approach (SA)

Status	Condition	Formula
Matched	Years of schooling fall within the interval mean ± one standard deviation	$\bar{X}_{pi} - \sigma_{pi} \leq X_i \leq \bar{X}_{pi} + \sigma_{pi}$
Overeducated	Years of schooling significantly above the occupational norm	$X_i > \bar{X}_{pi} + \sigma_{pi}$
Undereducated	Years of schooling significantly below the occupational norm	$X_i < \bar{X}_{pi} - \sigma_{pi}$

Source: authors' construction. X_i :years of schooling of individual i; $\bar{X}_{pi}$ *et* σ_{pi} mean and standard deviation of years of schooling in the occupation p of individual i.

The major asset of the statistical approach is its flexibility and realism. It adapts dynamically to the actual structure of the labour market. For example, if an initially low-skill occupation sees its average education level rise over time owing to technology or the supply of graduates, the "norm" adjusts automatically. This method is therefore particularly well suited to capturing the valuation of experience, which can allow individuals with fewer years of schooling to be considered matched.

However, its main weakness is its sensitivity to credential inflation. In an economy where many graduates accept jobs below their qualifications, the average education level for those jobs can rise artificially. The statistical method might then classify as "matched" a situation that, from a normative standpoint, constitutes overeducation. It is precisely the confrontation of the results from this method with those of the normative approaches that will enrich our overall diagnosis of skills mismatch in Morocco.

3.4. Explanatory Variables

The vector of explanatory variables X_i was carefully selected to cover a broad spectrum of potential determinants, in line with the literature reviewed in Section 2.6. These variables are organized into five thematic groups, summarized in Table 4.

Table 4

Explanatory Variables of the Multinomial Logit Model

Variable	Definition	Measurement / coding	Source	Expected effect
Sex	Gender of the employed worker	Binary (Male = ref. / Female)	RGPH 2014	Ambiguous a priori; literature suggests a higher risk of overeducation for women
Age group	Age bracket of the employed worker	Categorical (15-24; 25-39 = ref.; 40-54; 55+)	RGPH 2014	Overeducation decreasing with age; undereducation increasing with age
Years of schooling	Formal human capital	Continuous (years of schooling, years_ educ_niv)	RGPH 2014 (recodage de NIV_ET)	+ on overeducation; − on undereducation (control variable)
Employment status	Position in employment	Categorical (Employer; Self-employed; Family helper/Apprentice; Public employee; Private employee = ref.; Other)	RGPH 2014	Public employment: + overeducation; Self-employed/Family helper: + undereducation
Major occupational group	Occupation skill level	Categorical (Managers & Professionals = ref.; Intermediate occupations; Elementary occupations), ISCO	RGPH 2014	Mechanical structuring of mismatch categories
Sector of activity	Economic activity branch of the employer	Categorical (Agriculture = ref.; Industry & Construction; Trade & Services; Administration & Social), NACE	RGPH 2014	Formal sectors: + matching/overeducation; informal sectors: + undereducation
Region	Region of residence	Categorical (12 regions, Casablanca-Settat = ref.)	RGPH 2014	Urbanized regions: + overeducation; rural regions: + undereducation
Area of residence	Urban/rural	Binary (Urban = ref. / Rural)	RGPH 2014	+ undereducation in rural areas
Household size	Number of household members	Continuous	RGPH 2014 (Household file)	+ undereducation (dilution of educational resources)

Household type	Family structure	Categorical (Nuclear = ref.; Extended; Other)	RGPH 2014 (Household file)	Extended households: + undereducation
ISE quintile	Household living standard (composite index, see Box 1)	Categorical (Q1 = ref. poorest to Q5 richest)	Authors' PCA construction from the RGPH 2014 Household file	Q5: + overeducation (normative); Q1: + undereducation (normative)

Source: authors' construction. Note: exact categories and coding are detailed in the text below; expected effects are based on the literature review (Section 2) and confirmed or nuanced by the results in Section 4.

Details on individual, employment, geographic and household variables. The variables are organized into five thematic groups:

1. **Individual characteristics:** sex (binary variable to test gender disparities); age group (categorical variable: 15-24, 25-39, 40-54, 55+ years, capturing life-cycle and experience effects non-linearly); years of schooling (continuous variable measuring formal human capital — its inclusion, although endogenous by construction in the measurement of mismatch, is essential as a control variable to isolate the effect of other characteristics at a given education level).
2. **Employment characteristics:** employment status (categorical variable distinguishing employers, self-employed workers, family helpers, and public and private employees); major occupational group (categorical variable based on ISCO, to control for occupation type); sector of activity (categorical variable based on NACE, to control for sectoral dynamics).
3. **Geographic characteristics:** region (categorical variable capturing spatial heterogeneity and regional labour-market specificities); area of residence (binary Urban/Rural variable to account for structural disparities between the two settings).
4. **Household characteristics:** household size (continuous variable); household type (categorical variable: nuclear, extended, etc., to control for the influence of family structure).
5. **Household living standard:** socio-economic index (ise_quintile), a categorical variable representing the quintiles of a wealth index built by the authors (see Box 1). This variable serves as a proxy for the household's economic and social capital.

Box 1 — Construction of the Socio-Economic Index (ISE) through Principal Component Analysis (PCA)

To measure household living standards — a potentially decisive factor in members' occupational integration — we constructed a composite Socio-Economic Index (ISE). In the absence of direct data on income or consumption in RGPH 2014, this index serves as a robust proxy, aggregating information on material assets and housing conditions. The method used is Principal Component Analysis (PCA), a standard statistical technique for this type of exercise (Filmer & Pritchett, 2001).

Logic of the method. PCA is a dimension-reduction method that transforms a set of correlated variables into a new set of uncorrelated variables called "principal components." Each component is a linear combination of the original variables. The first principal component captures the largest share of the variance common to all initial

variables. In the context of measuring well-being, this first component is interpreted as a wealth or living-standard index, as it represents the common latent dimension underlying asset ownership and access to services.

Variables included in the PCA. We selected a set of 14 dichotomous indicators (taking the value 1 in case of ownership or access, 0 otherwise) to reflect three dimensions of household material well-being. Missing values were imputed as 0, under the assumption that non-response is equivalent to non-ownership.

1. Ownership of durable goods (8 variables): television (tele), radio (radio), mobile phone (TEL_PORT), landline (TEL_FIXE), internet access (net), computer (pc), satellite dish (parab), refrigerator (frigo).

2. Housing quality (3 variables): walls made of durable materials (concrete, brick), roof made of durable materials (slab), floor made of modern materials (tile, marble).

3. Access to essential services (3 variables): access to electricity via the public grid (ECL_MODE), access to running water via the public network (EAU_MODE), wastewater disposal via the public sanitation network (EAUX_US).

Result and use. The PCA method was applied to these 14 variables. The first principal component, which alone explains **34 percent** of total variance, was extracted and saved as our **Socio-Economic Index (ISE)**. This continuous index was then standardized (mean 0, standard deviation 1) across all households. To facilitate its interpretation in the mlogit model and allow the detection of non-linear effects, the continuous index was transformed into a five-level categorical variable (ise_quintile), where each category represents 20 percent of the household population, from poorest (Quintile 1) to richest (Quintile 5). It is this quintile variable that is used as a covariate in our regressions.

Reference: Filmer, D., & Pritchett, L. (2001). Estimating wealth effects without expenditure data — or tears: an application to educational enrollments in states of India. Demography, 38(1), 115-132.

3.5. Descriptive Statistics

Table 5 presents the full descriptive statistics of the analysis sample (N = 945,866). Where these statistics were already available in the preparatory work for this study, they are reproduced as such rather than recalculated.

Table 5

Descriptive Statistics of the Analysis Sample (N = 945,866)

Category	Variable	Category	Frequency (%)
Individual	Sex	Male	81,8
		Female	18,2
	Age group	15-24 years	14,9
		25-39 years	41,0
		40-54 years	31,4
		55 years and +	12,7
	Years of schooling	Mean (Std. dev.)	5,80 (5,30)
Employment	Employment status	Employer	4,6
		Self-employed	30,9
		Family helper / Apprentice	7,6
		Public-sector employee	10,6
		Private-sector employee	45,9
	Major occupational group	Managers, professionals, etc. (Gr. 1-3)	22,7
		Intermediate occupations (Gr. 4-8)	58,4
		Elementary occupations (Gr. 0, 9)	18,8
	Sector of activity	Agriculture, fishing	24,6
		Industry, extraction, construction	27,0
		Trade, market services, transport	36,4
		Public administration, health, education	11,7
Geography	Area	Urban	61,2
		Rural	38,8
	Region	Casablanca-Settat	22,0
		Rabat-Salé-Kénitra	14,1
		Marrakech-Safi	13,6
		Fès-Meknès	12,3
		Tanger-Tétouan-Al Hoceima	11,5
		Souss-Massa	7,5
		Beni-Mellal-Khénifra	6,9
		Oriental	6,1
		Drâa-Tafilalet	3,8

		Southern regions (3)	2,2
Household	Size	Mean (Std. dev.)	5,53 (2,77)
	Type	Nuclear (Couple +/- children)	53,0
		Extended	34,2
		Single mother with children	5,1
		Single person / Composite / Other	7,7
	Socio-Economic Index	Quintile 1 (poorest)	20,4
		Quintile 2	21,4
		Quintile 3	24,2
		Quintile 4	13,9
		Quintile 5 (richest)	20,2

Source: Authors' calculations from RGPH 2014 (HCP) data. Percentages may not sum to 100 due to rounding and the grouping of small categories.

The sample's demographic profile reveals several notable features. First, there is a strong male predominance (81.8 percent), a figure that reflects the comparatively lower female labour-force participation rate at that time — a finding confirmed and further documented by the recent data analyzed in the Growth and Jobs Report (see Sections 5.2 and 5.4). Second, the age structure points to a relatively young workforce, with more than half of employed workers (55.9 percent) aged 15-39. Finally, the education variable is particularly telling. With an average of 5.8 years of schooling, the level of formal human capital in the workforce remains modest. However, the very high standard deviation (5.30), nearly equal to the mean, signals strong polarization of qualifications. This dispersion indicates the coexistence of a large base of poorly or un-educated workers alongside a segment of the population with longer schooling — foreshadowing a potentially dual labour market, a finding directly connected to the segmentation framework presented in Section 2.4.

The analysis of employment characteristics confirms the predominance of the private sector as the main source of jobs. Private wage employment (45.9 percent) and self-employment (30.9 percent) together account for more than three-quarters of the sample. The public sector, while significant, employs only one worker in ten (10.6 percent).

In terms of job skill levels, intermediate occupations (58.4 percent) form the backbone of the labour market. Nonetheless, the non-negligible share of elementary occupations (18.8 percent) corroborates the picture of an economy still heavily reliant on low-skill labour. Sectorally, the Moroccan economy appears diversified, with a predominance of the tertiary sector (trade and services, 36.4 percent), closely followed by the secondary sector (industry and construction, 27.0 percent), and an agricultural sector that remains a major employer (24.6 percent).

The geographic and household data reveal strong concentration and the persistence of traditional social structures. Nearly two-thirds of the employed population (61.2 percent) resides in urban areas. Economic concentration is also visible at the regional level, with more than a fifth of workers employed in the single region of Casablanca-Settat (22.0 percent) — a territorial concentration of skilled jobs that we also find in the Growth and Jobs Report data (Section 5.2).

At the household level, the large average size (5.53 persons) and the predominance of nuclear (53.0 percent) and extended (34.2 percent) family structures attest to the importance of family ties. Finally, the distribution across quintiles of the Socio-Economic Index, relatively balanced by construction, will serve as a solid basis for analyzing the influence of living standards on matching trajectories.

In summary, this descriptive portrait depicts a young, predominantly male workforce, characterized by strong heterogeneity in education levels and concentrated in private-sector jobs in urban areas.

3.6. Correspondence Table and Consistency of the Three Measures

To allow an outside reader to understand precisely how mismatch is constructed under each of the three measures, Table 6 summarizes, for each measure, the classification principle, the threshold used, and the source of the underlying classification.

Table 6

Comparative Summary of the Three Mismatch Measures

Measure	Principle	Classification threshold	Reference classification	Main advantage	Main limitation
NNA (National Normative Approach)	Crossing diploma (3 levels) × occupation (3 levels)	Fixed correspondence (Table 1)	2014 national classification of diplomas / occupations (HCP)	Aligned with Moroccan institutional realities	Limited international comparability
INA (International Normative Approach)	Crossing diploma (ISCED) × occupation (ISCO)	Fixed, stricter correspondence (Table 2)	ISCED / ISCO — ILO, adapted by the World Bank and HCP (GJR, 2026)	International comparability	Rigidity of the correspondence; ignores experience/ diploma substitution
SA (Statistical Approach)	Deviation from occupation's average years of schooling	Mean ± 1 standard deviation (Table 3)	Empirical RGPH 2014 distribution (59 occupational sub-major-groups)	Realism, dynamic adaptation	Sensitive to credential inflation

Source: authors' construction.

This methodological triangulation — whose joint implementation on the same sample is one of the contributions of this study — allows, in the following Section 4, for a distinction between results that are robust across all three measures and results specific to a particular measurement convention.

3.7. Stratégie de modélisation

3.7.1. The Multinomial Logit Model

The dependent variable in our study is an unordered categorical variable taking three distinct values: 1 (Matched), 2 (Overeducated) and 3 (Undereducated). There is no intrinsic hierarchy between "Overeducated" and "Undereducated" states; these are two qualitatively different forms of mismatch. The most appropriate modelling framework for this type of variable is **the Multinomial Logit model (mlogit).**

This model estimates the probability that an individual i belongs to category j, conditional on a vector of characteristics X_i. It does so by normalizing probabilities relative to a base (or reference) category. In our analysis, we choose the **"Matched" (j=1)** category as the reference, as it represents the equilibrium state against which we compare the two forms of mismatch.

The model estimates a set of coefficients (β_j) for each alternative category (j = 2 for Overeducated, j = 3 for Undereducated). Formally, it models the log-odds ratio as follows:

$$ln\left(\frac{P(y_i = j \mid X_i)}{P(y_i = 1 \mid X_i)}\right) = X_i'\beta_j \quad \text{pour } j \in \{2,3\}$$

The coefficients β_j measure the impact of a change in a variable of X_i on the log-odds of being in category j rather than in the reference category "Matched." As these coefficients are difficult to interpret directly, we rely primarily on **Average Marginal Effects (AMEs)** to present and discuss our results. The marginal effect of a variable x_k on the probability of being in category j represents the change in that probability induced by a one-unit change in x_k, holding all else equal.

We estimate three distinct mlogit models, one for each of our three measures of mismatch (NNA, INA and SA), to test the robustness of our results across different definitions of mismatch.

3.7.2. Model Specification

In line with Table 4 (Section 3.4), the vector X_i includes sex, age group, years of schooling, employment status, major occupational group, sector of activity, region, area of residence, household size and type, and the ISE quintile. All reference categories and the detailed coding of each variable are specified in Table 4; the full results, in the form of coefficients and standard errors, are presented in Table 8 (Section 4.2).

4. RÉSULTS

4.1. Descriptive Results

This section provides a statistical portrait of the population studied and explores raw correlations between socio-demographic characteristics and skills mismatch. We proceed in two steps: a univariate analysis to describe the overall prevalence of the three forms of mismatch, followed by a bivariate analysis to highlight initial heterogeneities.

4.1.1. Prevalence of the Forms of Mismatch

Table 7 presents the overall distribution of mismatch situations in our sample of employed workers, according to the three distinct methodologies mobilized in this study. The results reveal a striking divergence that underscores the crucial importance of the choice of measure for diagnosing the state of labour-market matching.

Table 7

Overall Distribution of Mismatch under the Three Measures (%)

Measure	Matched	Overeducated	Undereducated
1. National Normative (NNA)	31,8	5,5	62,7
2. International Normative (INA)	29,8	4,2	66,0
3. Statistical (SA)	67,0	17,6	15,4

Source: Authors' calculations from RGPH 2014 (HCP) data.

The first two measures, based on normative frameworks that assume a theoretical relationship between diplomas and occupations, paint a similar and unambiguous picture: undereducation appears as the most massive form of mismatch in the Moroccan labour market. Under the National Normative Approach (NNA), nearly two-thirds of workers (62.7 percent) would not hold the diploma level formally required for their job. This finding is even more pronounced under the stricter International Normative Approach (INA), which raises this figure to 66.0 percent.

In this paradigm, matching would concern only about 30 percent of the workforce, and overeducation would be a nearly marginal phenomenon, affecting barely 5.5 percent (NNA) to 4.2 percent (INA) of employed workers. Such a result suggests a labour market where access to many positions, including intermediate ones, is possible despite a formal education level deemed insufficient relative to theoretical standards. This may reflect a strong valuation of experience and skills acquired "on the job." It is worth noting that this figure (62.7-66.0 percent undereducation under our normative measures, calculated on 2014 data) is consistent with the 46.7 percent undereducation rate reported by the HCP on exhaustive data — the difference in level stemming from slightly different classification choices, but the order of magnitude of the phenomenon and its predominance over overeducation are confirmed (see discussion, Section 5.1).

The Statistical Approach (SA), which defines the "norm" from the actual distribution of years of schooling observed within each occupation, radically reverses this picture. Under this measure, matching becomes the majority situation, characterizing a large majority of 67.0 percent of workers.

Overeducation and undereducation, far from being asymmetric, become phenomena of more moderate and comparable magnitude, affecting respectively 15.4 percent and 17.6 percent of the workforce. The overeducation rate, in particular, is more than tripled relative to the normative measures.

This fundamental divergence between measures is not a contradiction, but rich analytical information. It highlights a significant disconnect between theoretical diploma requirements and the functional reality of the Moroccan labour market.

- The **normative measures** reveal what should be according to fixed standards, and highlight an apparent deficit of formal human capital within the workforce (two-thirds undereducated).
- The **statistical measure** reveals what is in practice. The fact that matching is the majority situation suggests that the market has developed its own equilibria: employers accept

(or value) profiles whose years of schooling correspond to the average of those already holding those jobs, even if this average falls below theoretical norms.

In conclusion, the univariate analysis demonstrates that there is no single mismatch rate, but several, each illuminating a facet of the phenomenon. The use of these three measures in our bivariate and multivariate analyses will make it possible to distinguish universal determinants of mismatch from those specific to a particular (theoretical vs. observed) definition of the phenomenon, offering a more complete and nuanced diagnosis.

4.1.2. Bivariate Analysis: A Systematic Exploration of Correlations

The bivariate analysis aims to explore the raw relationships between each explanatory variable and our three measures of mismatch. This approach makes it possible to identify the most salient correlations and to test the robustness of these relationships across different definitions of mismatch. Results are presented by thematic block, drawing on comparative graphical visualizations that break down each subgroup's situation into shares of matching, overeducation and undereducation.

a. Individual Characteristics

Figure 1 presents a comparative analysis of the structure of skills mismatch, broken down by gender and age group. By juxtaposing results from the three methodological frameworks mobilized — national normative (NNA), international normative (INA) and statistical (SA) — this visualization yields two sets of conclusions: on one hand, the sensitivity of the overall diagnosis to the choice of measurement instrument; on the other hand, the robustness of certain fundamental socio-demographic dynamics.

The most striking contrast emerges from the comparison between panels. The two normative approaches (1 and 2) converge on a similar diagnosis: a labour market structurally characterized by **massive undereducation.** In both frameworks, the share of undereducation is predominant across all demographic subgroups, suggesting an apparent deficit of formal human capital relative to the theoretical requirements of the jobs held. Overeducation, by contrast, appears as a residual phenomenon.

The statistical approach (panel 3) produces a complete reversal of this picture. Based on the observed distribution of years of schooling within each occupation, it establishes matching as the dominant modality. Overeducation and undereducation become phenomena of more symmetric and moderate magnitude. This fundamental divergence does not invalidate the normative approaches but rather underscores their prescriptive limitations. It suggests a significant disconnect between formal certification standards and the actual matching mechanisms of the Moroccan labour market, where experience and other competence signals plausibly play a leading role — a reality that only the statistical measure is able to capture.

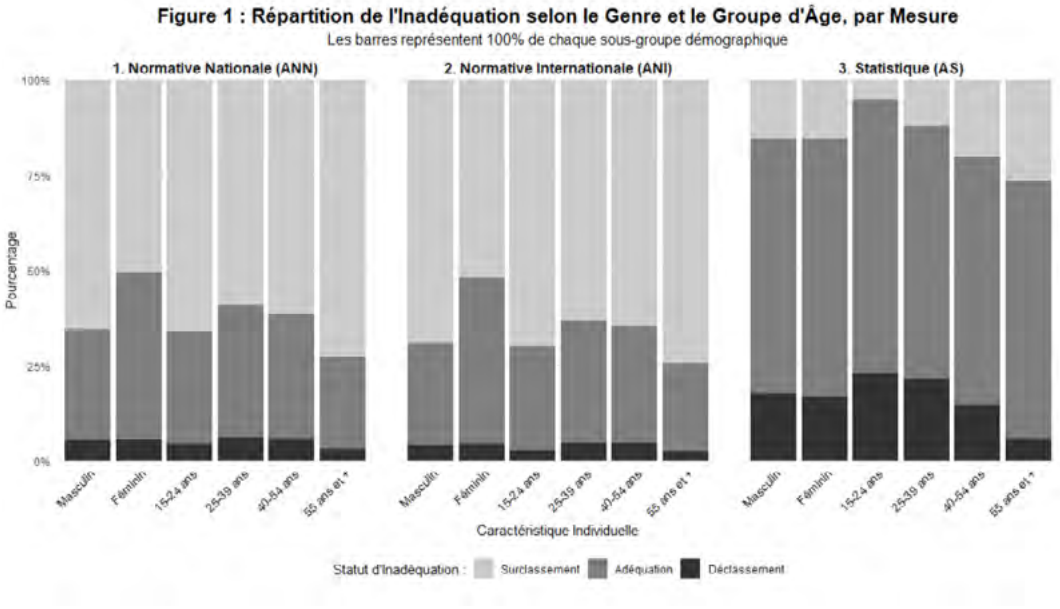

Figure 1 — Mismatch by Gender and Age Group under the Three Measures

Source: Authors' calculations from RGPH 2014 (HCP) data.

Beyond this divergence in levels, the bivariate analysis reveals relative trends whose stability across the three measures lends particular robustness to our findings.

First, a gender asymmetry manifests consistently. Whatever methodology is used, women exhibit a systematically higher incidence of overeducation than men. This penalty suggests the existence of structural barriers or discriminatory mechanisms that hinder the full valuation of female human capital — a finding we return to in detail in Section 5.4, in light of the Growth and Jobs Report's findings on hiring biases.

Second, the life-cycle effect is a powerful and invariant stylized fact. Overeducation is at its maximum early in careers (15-24 years) and declines monotonically with age. Conversely, undereducation is minimal among the young and reaches its peak among senior workers (55 years and older). This scissors-like relationship, perfectly visible in all three panels, corroborates matching theory and human capital theory presented in Section 2.1, which posit an initial adjustment phase in the labour market and a progressive substitution of experience for formal education over the course of a career.

b. Employment Characteristics

The bivariate analysis of employment characteristics confirms the existence of deep divides in the Moroccan labour market. Figure 2 details the distribution of mismatch by employment status, occupational group, and sector of activity, revealing highly heterogeneous logics of qualification and labour-market integration.

Employment status appears as a powerful segmenting factor, concretely illustrating the segmentation theories presented in Section 2.4. The normative approaches (national and international) paint an unambiguous picture: undereducation is massive among the self-employed (74.0 percent and 78.7 percent) and especially among family helpers (80.5 percent and 83.6 percent). These statuses clearly constitute privileged pathways into employment for a poorly educated workforce. By contrast, public-sector employment stands out with the lowest undereducation rate and the highest matching rate under these same norms (around 51 percent). This reflects formal recruitment processes based on diploma grids.

The statistical approach reverses the picture and nuances it. Matching becomes the majority outcome for all statuses, peaking among family helpers (78.5 percent). This counter-intuitive result at first glance means that the education level of family helpers is very homogeneous (and low), and therefore close to the average of their own group. More interestingly, this measure reveals that overeducation is a tangible phenomenon for all statuses, peaking among employers (20.6 percent) and private-sector employees (18.9 percent), suggesting that even in the private sector, a significant share of workers are overqualified relative to the empirical norm of their occupation.

The cross-tabulation with occupational group validates the construction of the normative measures. By definition, undereducation is impossible for "Elementary Occupations" and overeducation is absent from "Managers & Professionals" under these frameworks. They mainly show overwhelming undereducation (84.8 percent and 90.6 percent) for intermediate occupations, indicating that these jobs are massively held by individuals who do not have the theoretically required Baccalaureate level.

Once again, the statistical approach offers a more nuanced view. It shows that matching is the norm across all occupational categories, with rates ranging between 65 percent and 73 percent. Overeducation is present even among "Intermediate Occupations" (18.0 percent), and undereducation is lowest (8.3 percent) among "Elementary Occupations," confirming the educational homogeneity of this group.

The sectoral analysis is particularly illuminating. The Agriculture & Fishing and Construction sectors are characterized by near-total undereducation under the normative measures (over 93 percent and 54 percent respectively). These are clearly sectors with low barriers to entry in terms of formal diplomas.

The "Water, Gas, Electricity," "Other Market Services" and "Public Administration & Social" sectors show, under the norms, the highest matching rates, reflecting greater formalization of recruitment requirements.

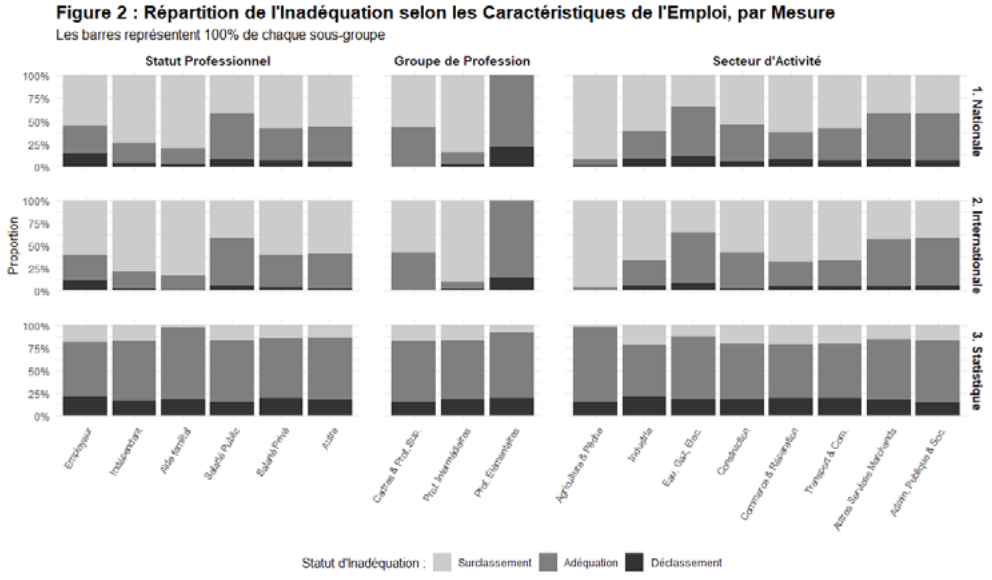

Figure 2 — Mismatch by Employment Status, Occupational Group and Sector of Activity

Source: Authors' calculations from RGPH 2014 (HCP) data.

The statistical approach confirms and refines these findings. It shows that Agriculture & Fishing has the highest matching rate (82.1 percent) and the lowest overeducation rate (2.4 percent), a sign of great homogeneity within the low-skill workforce. In contrast, Industry shows the highest overeducation rate (21.1 percent), followed by Trade & Repair (19.3 percent). These sectors appear to attract a more educated workforce than jobs require on average, potentially owing to a lack of opportunities in more skill-intensive sectors. The "Public Administration & Social" sector has the lowest overeducation rate (14.6 percent), suggesting a relatively efficient match between diplomas and jobs within the civil service, once the empirical norm is taken into account.

These analyses and results, robust in their trends but divergent in their magnitudes, highlight the coexistence of several labour markets in Morocco: a formal, public market where matching on diploma is the norm, and less formal markets (self-employed, agriculture, construction) where experience and other skills take precedence over academic certification.

c. Geographic and Social Context

The analysis of the geographic and socio-economic context, illustrated in Figure 3, reveals deep structural divides whose trends are remarkably consistent across our three measurement frameworks.

The urban-rural dichotomy is one of the most salient findings. The normative approaches depict a rural setting massively characterized by undereducation, reaching 81.9 percent under the international measure (INA), against 56.0 percent in urban areas. This situation reflects a rural labour market with lower formal-qualification requirements.

The statistical approach (SA) confirms this divide, but from a different angle. Overeducation is a markedly more urban phenomenon, with a rate of 20.4 percent against 13.2 percent in rural areas. Conversely, rural areas stand out with a significantly higher matching rate (74.3 percent against 62.3 percent in cities). This suggests greater homogeneity between (predominantly low) education levels and the types of jobs available in rural areas, leading to better statistical matching. Urban areas, concentrating both a more abundant supply of graduates and a more diversified labour market, logically generate more instances of mismatch.

The regional analysis confirms and refines this reading. The most urbanized and economically dynamic regions are those where overeducation is most prevalent. Under the statistical measure, the Casablanca-Settat region shows the highest overeducation rate (20.2 percent), closely followed by Rabat-Salé-Kénitra (18.8 percent) and Fès-Meknès (18.5 percent). Conversely, the regions with the highest undereducation (under the normative measures) are those with a rural or less diversified economy, such as Béni Mellal-Khénifra (70.5 percent). These findings underscore that skills mismatch is a spatially differentiated phenomenon, strongly correlated with each region's economic structure — a finding that Section 5.2 will juxtapose with the concentration of skilled jobs documented in the Growth and Jobs Report in Greater Casablanca.

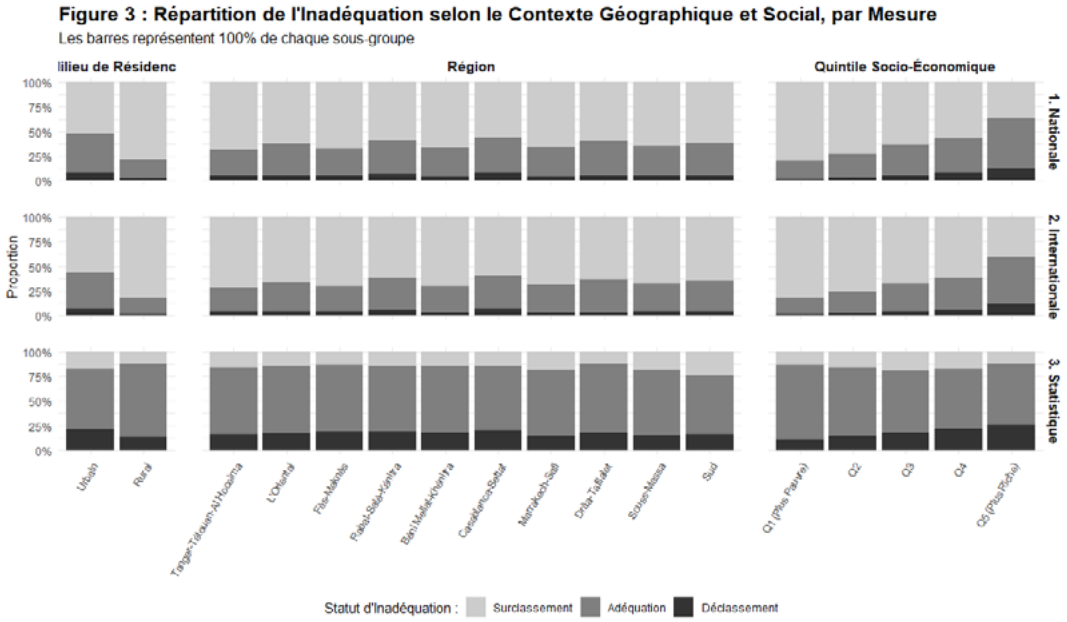

Figure 3 — Mismatch by Area of Residence, Region and ISE Quintile

Source: Authors' calculations from RGPH 2014 (HCP) data.

The right-hand panel, which details mismatch by quintile of the Socio-Economic Index (ISE), reveals the clearest and most robust gradient in our analysis.

A positive, near-monotonic relationship exists between household living standards and the probability of overeducation. Under the statistical approach, this rate rises from 10.5 percent for the poorest quintile (Q1) to 25.8 percent for the richest quintile (Q5), a ratio of more than 2 to 1. This trend is also visible, though attenuated, under the normative measures.

Conversely, undereducation is a phenomenon massively concentrated among the least well-off segments of the population. Under the INA measure, it affects 81.5 percent of individuals in the first quintile, against only 41.0 percent for the wealthiest quintile. The latter also stands out with the highest matching rate under the norms (50.2 percent under the NNA).

These results suggest a dual logic: on one hand, more affluent households invest more in their members' education, but the labour market does not always absorb these qualifications, leading to "luxury overeducation." On the other hand, individuals from modest backgrounds access employment through less formal channels, placing them massively in a situation of theoretical undereducation.

d. Household Characteristics

Figure 4 explores the influence of household structure on the matching situation of its active members. The analysis of household size and type reveals subtle but consistent trends, suggesting a link between family organization and human capital.

The first panel group shows a positive and robust correlation between household size and the probability of undereducation. This trend is particularly visible under the normative approaches. Under the international measure (INA), the undereducation rate increases monotonically, from 55.7 percent for small households (1-2 persons) to 74.5 percent for households of 7 persons or more. Simultaneously, the share of overeducation declines, from 5.8 percent to only 2.5 percent.

The statistical approach (SA) nuances this finding but confirms the underlying trend. While matching remains the majority outcome, the overeducation rate is highest in small households (19.3 percent) and lowest in the largest ones (16.2 percent). Conversely, the matching rate peaks in the largest households (69.9 percent). This result can be explained by a dual logic: on one hand, larger households, potentially having fewer resources per capita, may invest less in higher education, leading to lower formal education levels and therefore more normative undereducation. On the other hand, these households are often located in rural areas, where the homogeneity of jobs and qualifications favours statistical matching.

The analysis by household type reinforces this interpretation. Extended households, often associated with more traditional family structures and rural contexts, show the highest undereducation rate under the normative measures (70.8 percent under the INA) and, correspondingly, the lowest overeducation rate (3.3 percent).

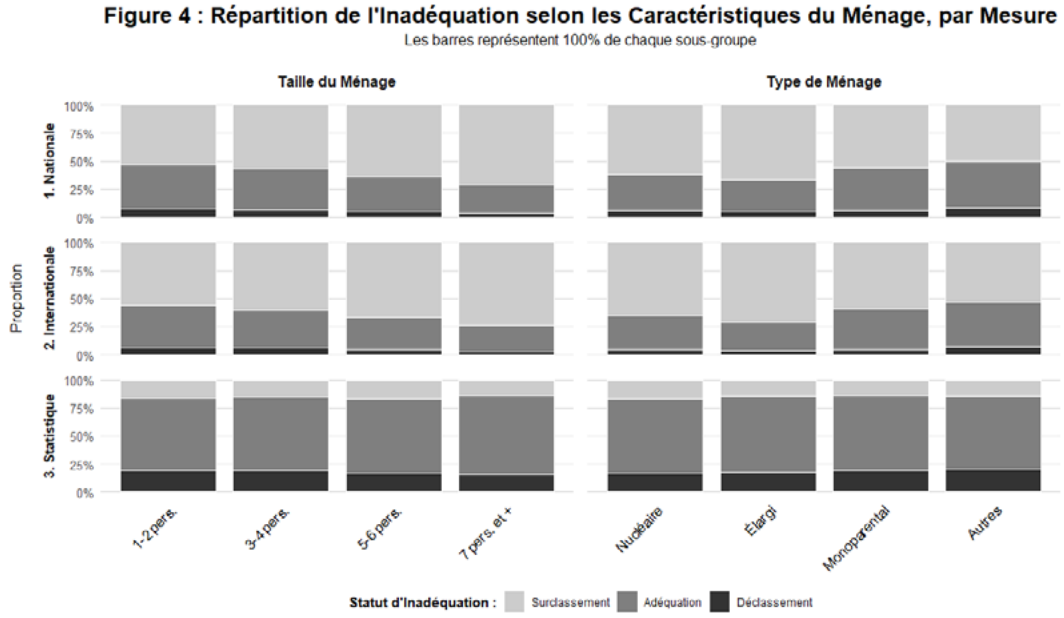

Figure 4 — Mismatch by Household Size and Type

Source: Authors' calculations from RGPH 2014 (HCP) data.

The statistical approach reveals that extended households also have the lowest empirical overeducation rate (14.1 percent), reinforcing the idea of strong homogeneity between educational profiles and jobs held within this group. By contrast, "Other" households, which include single individuals, show the highest overeducation rate under all measures (for example, 20.0 percent under the SA). This category, more urban and potentially more educated on average, is logically more exposed to the risk of under-utilizing its qualifications.

Thus, larger and extended family structures are associated with lower formal-qualification profiles, resulting in significant normative undereducation. Conversely, smaller, less traditional household structures, often more educated, are more exposed to overeducation.

4.2. Determinants of Mismatch: Modelling Results

a. Model 1: Mismatch under the National Normative Approach (NNA)

The first econometric model assesses the determinants of skills mismatch through the lens of a normative classification specifically adapted to the Moroccan context. This framework defines matching as a theoretical correspondence between hierarchical diploma and occupation levels. Analysis of the coefficients, expressed as log-odds relative to the "Matched" reference category, reveals a mismatch structure strongly correlated with existing social and educational hierarchies. The predominant phenomenon identified by this model is undereducation, which appears as the default status for a large share of the workforce, while overeducation is a more marginal and socially circumscribed phenomenon.

Determinants of undereducation: a feature of less formal and less advantaged segments

The results confirm that undereducation is structurally associated with the least formalized segments of the labour market and with populations least endowed with economic and educational capital. Employment status is a particularly powerful discriminant: relative to private-sector employees, being a family helper ($\beta = 0.286$, $p < 0.01$) or self-employed significantly increases the probability of undereducation. These statuses thus appear as vectors of occupational integration for which the formal diploma barrier is less binding.

The geographic and socio-economic context reinforces this finding. Residing in a rural area ($\beta = 0.146$, $p < 0.01$) is positively correlated with undereducation. Similarly, a very clear social gradient is observable: belonging to the highest socio-economic quintiles massively reduces the probability of undereducation ($\beta = -0.795$ for Q5 relative to Q1). Conversely, undereducation is the most likely outcome for individuals from the poorest households. Finally, a larger household size is also associated with a higher probability of undereducation ($\beta = 0.026$, $p < 0.01$), potentially reflecting a dilution of resources allocated to education per member.

Determinants of overeducation: the correlate of high social status

Symmetrically, overeducation proves to be a phenomenon concentrated within a relative elite. The most powerful determinant is unquestionably education level: each additional year of schooling increases the log-odds of overeducation by 1.088, underscoring the near-mechanical nature of this relationship in a normative framework.

Beyond education, employment status is a key factor. Public-sector employment ($\beta = 0.599$, $p < 0.01$) is strongly and positively associated with overeducation, which may reflect entry-level diploma requirements that sometimes exceed the skills actually needed for the job, or a form of "job queue" for internal promotions (cf. Section 2.2). Household living standards are also a major predictor: belonging to the wealthiest quintile (Q5) has the largest positive effect of all covariates ($\beta = 0.918$, $p < 0.01$).

Thus, the model based on the National Normative Approach depicts a strongly segmented Moroccan labour market. Undereducation appears as the modal condition, structurally linked to precarious statuses, rural areas and low socio-economic capital. Overeducation, meanwhile, is the corollary of high educational investment and integration into protected, advantaged segments of the economy, such as the public sector.

b. Model 2: Mismatch under the International Normative Approach (INA)

The second model adopts a comparative perspective by applying a normative reading grid aligned with the international standards of the International Labour Organization (ILO). This approach, stricter than the previous one — notably by classifying the lower-secondary diploma as a "low" education level — serves as a benchmark for assessing the position of the Moroccan labour market relative to global theoretical requirements, following the same

logic as that adopted by the World Bank's Growth and Jobs Report (see Section 5.1). The results of this model confirm and amplify the trends observed under the national approach, depicting an even more pronounced undereducation phenomenon and an even more marginal overeducation.

An amplification of undereducation

Applying a higher theoretical qualification threshold directly increases the magnitude of undereducation. The determinants identified in the previous model retain their sign and significance, but the magnitude of their coefficients is often reinforced. The effect of family-helper status on the probability of undereducation more than doubles relative to the national model (β = 0.605 vs 0.286), which is mechanically expected, as a larger number of individuals in this status now fall below the "intermediate" qualification threshold.

More subtly, the protective effect of being a woman against undereducation is also more pronounced (β = -0.485 vs -0.344). This result suggests that the female workforce, being on average more educated, more closely meets diploma requirements even when these are raised to international standards. Similarly, the negative correlation between socio-economic quintile and undereducation is even stronger (β = -0.903 for Q5), underscoring that household economic capital is an even more effective bulwark against under-qualification when normative requirements are higher.

Overeducation: an even more circumscribed elite phenomenon

Symmetrically, overeducation becomes an even rarer phenomenon. The main notable change concerns the effect of formal human capital: the coefficient for years of schooling (β = 0.630) is substantially lower than in the national model (β = 1.088). This indicates that, although education remains the main driver of overeducation, the marginal impact of each additional year of schooling is smaller, as the threshold beyond which one is considered "overqualified" has become harder to reach.

The other major determinants of overeducation, such as public-sector employment (β = 0.517) and belonging to the wealthiest quintile (β = 0.909), retain their predominant role with magnitudes similar to those in the previous model.

The model based on the International Normative Approach thus reinforces the diagnosis of a Moroccan labour market characterized by an apparent and massive deficit of formal human capital. When benchmarked internationally, undereducation appears as the near-structural condition of the majority of workers, particularly those from the least advantaged segments. This perspective highlights the Moroccan labour market's dependence on modes of qualification and integration that largely operate outside internationally recognized formal academic certification frameworks — a finding that converges with the Growth and Jobs Report's diagnosis of the mismatch between the structure of skills supply and that of labour demand (Section 5.1).

c. Model 3: Mismatch under the Statistical Approach (SA)

The third model marks a methodological break, abandoning normative frameworks in favour of an empirical approach. By defining mismatch as a deviation from the educational average observed within each detailed occupation, this model no longer measures a deficit relative to a theoretical norm, but rather individuals' relative position in the actual labour market. The results offer a radically different and more nuanced perspective, in which matching becomes the dominant modality and the logics of overeducation and undereducation are profoundly redefined.

Redefining the profile of the overeducated: the weight of self-employment and the private sector

Unlike the normative models, where overeducation was the preserve of public-sector employees, the statistical model reveals a different profile. Overeducation is now more strongly associated with statuses where diploma-based competition may be more intense within a given occupation. Relative to private-sector employees, being self-employed ($\beta = 0.127$, $p < 0.01$) now significantly increases the probability of overeducation. This a priori counter-intuitive result can be interpreted as a sign that many self-employed workers (consultants, skilled craftspeople, etc.) hold an education level above the average of their occupational group, placing them in a situation of relative overqualification.

The age effect is also much more pronounced and revealing in this framework. The probability of overeducation declines significantly with age, with a particularly high coefficient for those aged 55 and over ($\beta = -0.768$). This suggests that, relative to their occupation's average, older workers are less educated, their position being more justified by accumulated experience. Statistical overeducation thus appears as a feature of more recent career trajectories, marked by credential inflation.

Statistical undereducation: an indicator of atypical success

The profile of the undereducated is also transformed. Statistical undereducation is no longer synonymous with precariousness, but can instead signal an atypical success trajectory, where occupational position exceeds relative education level. Thus, being an employer ($\beta = 0.471$, $p < 0.01$) or a public-sector employee ($\beta = 0.503$, $p < 0.01$) strongly increases the probability of undereducation. This indicates that, for these prestigious statuses, a significant number of individuals hold these positions with an education level below the average of their peers, their success likely resting on other forms of capital (economic, social, experience).

The effect of the Socio-Economic Index (ISE) is particularly striking and reverses the trend observed previously. The wealthiest quintile (Q5) is now the most strongly associated with an increased probability of undereducation ($\beta = 0.929$). This result may capture the trajectories of entrepreneurs or heirs who have reached high positions without following as long an academic path as the average of their occupational group.

In this way, the statistical model offers a view of mismatch as a phenomenon of intra-occupational segmentation. It depicts a labour market where empirical matching is the norm, but where significant gaps persist. Statistical overeducation characterizes individuals relatively more educated than their peers (young people, the self-employed), while statistical undereducation can be interpreted as a marker of occupational success achieved through pathways alternative to the average educational path (employers, seniors, individuals from very affluent households).

d. Regional Heterogeneities

The analysis reveals significant spatial heterogeneity and strikingly illustrates the conceptual divergence between our measures. The normative models reveal that overeducation is a phenomenon mainly concentrated in the metropolitan region of Casablanca-Settat, where the abundance of graduates increases the theoretical probability of overqualification relative to other regions. The statistical model reverses this conclusion: regional coefficients for overeducation become positive, indicating that, for the same occupation, the local educational norm is lower outside the economic capital. Consequently, an educated individual has a higher probability of being relatively overqualified in other regions. These apparently contradictory results demonstrate that the Moroccan labour market is a set of segmented regional markets, where mismatch depends not only on absolute factors, but also on the equilibria and qualification norms specific to each territory.

Table 8

Comparison of Multinomial Logit Model Coefficients (log-odds vs. "Matched" reference category)

Variables	NNA — Overeducated	NNA — Undereducated	INA — Overeducated	INA — Undereducated	SA — Overeducated	SA — Undereducated
Sex: ref. = Male						
Female	-0,064** (0,025)	-0,344*** (0,013)	-0,017 (0,022)	-0,485*** (0,011)	-0,131*** (0,011)	0,384*** (0,012)
Age: ref. = 25-39						
15-24 years	-0,237*** (0,025)	0,168*** (0,015)	-0,195*** (0,025)	0,073*** (0,014)	0,104*** (0,011)	-0,478*** (0,018)
40-54 years	-0,123*** (0,022)	0,027** (0,012)	-0,176*** (0,02)	0,228*** (0,011)	-0,199*** (0,011)	0,179*** (0,01)
55 years and +	-0,041 (0,048)	-0,208*** (0,022)	-0,242*** (0,041)	0,165*** (0,019)	-0,768*** (0,021)	0,299*** (0,013)
Years of schooling	1,088*** (0,006)	-1,006*** (0,003)	0,63*** (0,004)	-0,537*** (0,002)	0,774*** (0,002)	-0,702*** (0,002)
Employment status: ref. = Private employee						
Employer	-0,124*** (0,039)	-0,328*** (0,029)	-0,092*** (0,031)	-0,128*** (0,024)	-0,983*** (0,021)	0,471*** (0,021)
Self-employed	-0,277*** (0,023)	0,018 (0,014)	-0,264*** (0,022)	0,026* (0,013)	0,127*** (0,011)	0,041*** (0,011)
Family helper	-0,21*** (0,041)	0,286*** (0,029)	-0,001 (0,042)	0,605*** (0,035)	-0,064*** (0,018)	-0,609*** (0,03)
Public employee	0,599*** (0,061)	-0,344*** (0,022)	0,517*** (0,049)	-0,398*** (0,019)	-0,743*** (0,022)	0,503*** (0,027)
Other	0,02 (0,139)	0,132 (0,088)	-0,315** (0,141)	0,014 (0,081)	0,092 (0,065)	-0,012 (0,068)
Occupational group: ref. = Managers & Professionals						
Intermediate occupations	33,617*** (0,04)	-3,834*** (0,02)	44,71*** (0,028)	-0,951*** (0,015)	3,534*** (0,017)	-1,623*** (0,017)
Elementary occupations	38,274*** (0,027)	-30,156*** (0)	46,017*** (0,025)	-24,235*** (0)	3,382*** (0,017)	-4,156*** (0,019)
Sector of activity: ref. = Agriculture						
Industry & Construction	0,103** (0,044)	-0,341*** (0,021)	-0,399*** (0,041)	-0,823*** (0,023)	-1,547*** (0,015)	4,159*** (0,018)
Trade & Services	-0,038 (0,044)	-0,153*** (0,021)	-0,46*** (0,041)	-0,464*** (0,023)	-1,916*** (0,016)	3,864*** (0,018)
Administration & Social	0,241*** (0,076)	0,032 (0,029)	-0,14** (0,063)	-0,454*** (0,028)	-3,371*** (0,027)	5,689*** (0,032)
Region: ref. = Casablanca-Settat						

Tanger-Tétouan-Al Hoceima	-0,269*** (0,033)	0,041** (0,019)	-0,172*** (0,03)	0,044** (0,017)	0,158*** (0,015)	-0,096*** (0,016)
Fès-Meknès	-0,375*** (0,032)	0,143*** (0,018)	-0,273*** (0,03)	0,13*** (0,016)	0,296*** (0,015)	-0,158*** (0,016)
Rabat-Salé-Kénitra	-0,081*** (0,029)	-0,028* (0,016)	0,023 (0,026)	-0,05*** (0,015)	0,163*** (0,014)	-0,098*** (0,015)
Marrakech-Safi	-0,193*** (0,032)	-0,066*** (0,018)	-0,122*** (0,03)	-0,074*** (0,017)	0,204*** (0,015)	0,131*** (0,015)
Other regions	-0,263*** (0,025)	-0,067*** (0,014)	-0,179*** (0,023)	-0,127*** (0,013)	0,202*** (0,012)	-0,004 (0,013)
Area: ref. = Urban						
Rural	-0,155*** (0,03)	0,146*** (0,018)	-0,198*** (0,03)	0,121*** (0,017)	-0,111*** (0,014)	-0,216*** (0,013)
Household type: ref. = Nuclear						
Extended	0,005 (0,023)	-0,001 (0,013)	0,005 (0,021)	-0,016 (0,012)	0,156*** (0,01)	-0,137*** (0,011)
Other	0,017 (0,027)	0,008 (0,016)	0,041* (0,025)	-0,022 (0,014)	0,036*** (0,013)	-0,27*** (0,015)
Household size	-0,034*** (0,004)	0,026*** (0,002)	-0,033*** (0,004)	0,036*** (0,002)	0,016*** (0,002)	-0,012*** (0,002)
ISE quintile: ref. = Q1						
Q2	0,147*** (0,041)	-0,085*** (0,023)	0,227*** (0,044)	-0,157*** (0,025)	0 (0,015)	0,094*** (0,014)
Q3	0,36*** (0,04)	-0,282*** (0,023)	0,392*** (0,043)	-0,358*** (0,025)	-0,017 (0,016)	0,098*** (0,015)
Q4	0,572*** (0,043)	-0,483*** (0,025)	0,605*** (0,044)	-0,548*** (0,026)	-0,092*** (0,019)	0,11*** (0,018)
Q5	0,918*** (0,043)	-0,795*** (0,025)	0,909*** (0,044)	-0,903*** (0,026)	-0,907*** (0,019)	0,929*** (0,019)

Source: Authors' calculations from RGPH 2014 (HCP) data. Standard errors in parentheses. Significance codes: '***' 0.001 '**' 0.01 '*' 0.05.5. Discussion

5. DISCUSSION

This section systematically confronts the results of our study with the two major institutional sources on the subject: the HCP study "L'Adéquation entre Formation et Emploi au Maroc," based on the exhaustive RGPH 2014, and the World Bank's Morocco Growth and Jobs Report (GJR, 2026), based on more recent labour force survey data. For each comparison, we follow the same logic: study result → institutional source result → convergence or divergence → interpretation. Where figures differ between sources, we present both with their origin rather than arbitrarily choosing one, as such discrepancies most often reflect differences in scope, classification, or period.

5.1. Comparison with the HCP's Results

Overall matching level. Our study, based on the 10 percent sample of RGPH 2014, yields an undereducation rate of 62.7 percent (NNA) to 66.0 percent (INA), well above the 46.7 percent reported by the HCP on the exhaustive census, with an overeducation rate of 7.6 percent and a matching rate of 45.7 percent. **Convergence/divergence:** the two sources converge on the ranking of the three situations (undereducation dominates by a wide margin, followed by matching, with overeducation remaining a minority), but diverge on the exact levels. **Interpretation:** this difference in level is mainly explained by classification differences — the HCP uses a three-category correspondence built specifically around the 2014 national classification of diplomas and occupations, with grouping thresholds specific to its study (Table 1 of the HCP report), whereas our NNA and INA measures rely on slightly different level groupings. This is not, therefore, a disagreement over the underlying diagnosis, but a further illustration — external to our own methodological triangulation (Section 3.6) — of the sensitivity of the undereducation rate to the precise choice of classification thresholds, which reinforces our recommendation that any mismatch rate should always be accompanied by an explicit description of its calculation method.

Overeducation by diploma level. The HCP shows that the overeducation rate rises with general-education diploma level (from 21.0 percent for lower-secondary to a local minimum before rising sharply again for higher-level vocational diplomas, which peak among specialized technicians at 55.8 percent overeducation), while doctoral degrees show the lowest overeducation rate (5.9 percent) and the most favourable marginal effect on matching in the HCP's logistic model (relative risk of 16.39 for the higher health diploma). Our NNA model confirms this positive relationship between years of schooling and the probability of overeducation ($\beta = 1.088$, $p < 0.01$, Table 8): the more educated an individual, the more mechanically exposed they are to the risk of overeducation in a normative framework. Interpretation: this result, robust across both sources, is explained by job competition theory (Section 2.2) — at the top of the educational hierarchy, there are necessarily fewer corresponding positions than graduates, which structurally lowers the matching rate for the highest levels, with the notable exception of professions with regulated access (health, doctorate) where job supply remains closely correlated with the supply of graduates.

Massive overeducation among technicians and mid-level managers. The HCP's most striking finding is the extremely high overeducation rate among graduates of higher-level vocational training: 55.8 percent for specialized technicians and 50.1 percent for technicians/mid-level managers, far higher than for general-education graduates of an equivalent level. The HCP further notes that, regardless of occupational group or sector of activity, the overeducation rate of vocational-training graduates systematically exceeds that of general-education graduates. **Interpretation:** this result, which our modelling cannot replicate identically owing to the absence of a sufficiently detailed general-education-vs-vocational-training variable in our specification, deserves emphasis in the discussion of policy

implications (Section 5.5): it suggests that the vocational training track, supposedly offering more direct labour-market entry, in fact suffers from a recognition deficit or a mismatch between content and employers' actual needs — a finding that directly echoes the Growth and Jobs Report's recommendations on the need to recalibrate vocational training provision (Section 5.2).

Gender. The HCP reports a higher overeducation rate among women than men (10.6 percent against 6.9 percent), but also a higher matching rate among women (59.2 percent against 42.8 percent) and a markedly lower undereducation rate (30.1 percent against 50.3 percent). Our NNA model yields an apparently contrasting result: women have a slightly lower log-odds of overeducation than men (β = -0.064, Table 8) but also a markedly lower log-odds of undereducation (β = -0.344), while the statistical approach (SA) reveals the opposite — a positive and significant effect of being a woman on the probability of undereducation (β = 0.384) and a negative effect on overeducation (β = -0.131). **Convergence/divergence:** the HCP results and our normative approach (NNA/INA) converge to indicate that employed women are, all else equal or on average, less often in a situation of undereducation than men — the apparent divergence with the statistical model (SA) illustrates precisely the value of our methodological triangulation. **Interpretation:** this result, far from being contradictory, reflects a well-documented selection effect at labour-market entry, strongly corroborated by the Growth and Jobs Report (Sections 5.2 and 5.4): given the low female labour-force participation rate in Morocco, employed women constitute a strongly selected population, on average more educated than the overall working-age female population, which explains both their higher normative matching rate and their greater exposure to statistical overeducation when compared, under the statistical approach, to the educational average of their own occupation rather than to the male population.

Urban/rural setting. The HCP reports an overeducation rate of 10.4 percent in urban areas against 3.2 percent in rural areas (a factor of more than three), with a nearly identical matching rate in both settings (around 45.7 percent) and a differential that falls entirely on undereducation (43.8 percent in urban areas against 51.1 percent in rural areas). Our model directly confirms this relationship: rural areas are associated with a negative and significant effect on overeducation in all three measures (β = -0.155 NNA; -0.198 INA; -0.111 SA, Table 8) and a positive effect on undereducation in the two normative measures. **Convergence:** this result is perfectly convergent across both sources and constitutes one of the most robust determinants in our study. **Interpretation:** the economic structure of rural Morocco, dominated by traditional agriculture and self-employment with low diploma barriers, mechanically explains this result, consistent with the labour-market segmentation framework (Section 2.4).

Sectors of activity. The HCP identifies the "other market services" sector and the public administration, education, health and social action sector as the main providers, in volume, of jobs for overeducated graduates, with particularly high sectoral overeducation rates in water and electricity (15.5 percent) and in public administration proper (18.5 percent), but a very low overeducation rate in education (3.1 percent). Our NNA model shows a positive and significant effect of the "Administration & Social" sector on overeducation (β = 0.241, Table 8), consistent with the HCP's finding of relatively high overeducation in public administration proper, although the grouped "Administration & Social" sector in our specification also includes education and health, where overeducation is lower according to the HCP, which may attenuate the estimated effect's magnitude. **Interpretation:** this result illustrates the "job queue for internal promotions" mechanism discussed in Section 2.2: in the civil service, recruitment and promotion grids may impose minimum diploma levels that sometimes exceed the skills strictly necessary to perform the job, particularly for non-specialized administrative positions, whereas the regulated professions of education and health, with certification-controlled access, remain better matched.

5.2. Comparison with the Morocco Growth and Jobs Report

Worsening overqualification among tertiary graduates. The Growth and Jobs Report documents that overqualification (overeducation, in our terminology) now affects more than 43 percent of tertiary graduates, up from 34 percent in 2019, and reaches 70.7 percent for graduates of higher-level vocational training — a figure that directly echoes the 55.8 percent overeducation rate the HCP reported, on 2014 data, for specialized technicians (Section 5.1). **Convergence:** this convergence across three independent sources (RGPH 2014 as exploited by our study, RGPH 2014 as exploited by the HCP, and 2019-2024 labour force surveys exploited by the World Bank) on the particularly high magnitude of overeducation among higher-level vocational-training graduates is one of the most robust findings in the entire Moroccan literature on the subject. **Interpretation:** the rise in the overqualification rate of tertiary graduates between 2019 and the most recent data suggests that the phenomenon documented by our study on 2014 data has not eased but has worsened over the following decade, confirming a structural rather than conjunctural diagnosis of mismatch in Morocco.

Structure of labour demand and employment growth. The Growth and Jobs Report establishes a positive and significant correlation between sectoral employment growth and the rise in mismatch (vertical and horizontal) among tertiary graduates, suggesting that rising mismatch stems less from a shortfall in the supply of educated workers than from the nature of job creation itself, oriented toward low- or medium-skill profiles in most dynamic sectors. Our NNA and INA models, which show a positive and significant effect of the "Industry & Construction" sector on overeducation ($\beta = 0.103$, NNA, Table 8) while this same sector shows a negative effect under the INA approach, and a massively positive effect of all non-agricultural sectors on undereducation under the statistical approach (SA), are consistent with this reading: most job creation, including in industry, continues to occur for profiles whose education level remains below the average of their reference occupation. **Interpretation:** this joint finding directly validates the theoretical framework of job competition theory (Section 2.2): it is not the "queue" of educated candidates that is lacking, but the number of positions at the front of that queue that remains structurally insufficient relative to the progress of educational attainment — a finding with major policy implications detailed in Section 5.5, oriented toward labour demand rather than training supply alone.

Horizontal mismatch. The Growth and Jobs Report also highlights the scale of horizontal mismatch (misalignment between field of study and field of employment), particularly high for engineering, manufacturing, construction, social sciences, business and law, and for nearly 30 percent of higher-level vocational-training graduates, while STEM fields show the lowest mismatch. **Interpretation:** this horizontal dimension of mismatch, not directly measured in our study, which focuses on vertical mismatch (Section 3.3), constitutes an explicit limitation of our analysis (see conclusion, Section 6) and a priority avenue for future research, insofar as it can coexist with apparent vertical matching: a graduate may hold a job at the qualification level corresponding to their diploma, while working outside their field of specialization — a configuration our three measures cannot detect.

Wage returns to mismatch. The Growth and Jobs Report quantifies, using a Mincerian regression carried out jointly by the World Bank and the HCP, the wage impact of mismatch: overqualification reduces earnings by 20 percent, and by an additional 10 percentage points in the presence of simultaneous horizontal mismatch; moreover, formality of employment is associated with a wage premium of more than 50 percent. **Interpretation:** our study, lacking a wage variable in RGPH 2014, cannot directly estimate this return, but this World Bank finding reinforces the economic and social importance of the phenomenon we document: overeducation is not merely a matter of subjective perception of mismatch, it translates into a substantial wage penalty, which fully justifies the policy recommendations aimed at reducing it (Section 5.5) and also constitutes a natural extension for future research (Section 6).

Formal/informal segmentation and self-employment. The Growth and Jobs Report documents that a considerable share of youth employment occurs in informal employment (informal wage work or informal self-employment), with a very low median entry wage and a formality wage premium above 50 percent. Our NNA model shows a negative and significant effect of self-employed status on overeducation (β = -0.277) and a positive effect on undereducation under both normative measures, while the statistical model (SA) reverses this result for overeducation (β = 0.127), a result discussed in Section 4.2.c. **Interpretation:** this dual reading well illustrates the structural duality of the Moroccan labour market identified by the segmentation framework (Section 2.4): self-employment and informality, massively represented by self-employed status in our data, constitute both a refuge for a poorly educated workforce (hence normative undereducation) and, for a minority of skilled self-employed workers (consultants, non-salaried liberal professions), a space where education exceeds the standards of the statistically observed occupation.

Casablanca-Settat and the concentration of skilled jobs. While the Growth and Jobs Report does not publish a statistic directly comparable at the level of the Casablanca-Settat region, the report documents a pronounced concentration of recent economic growth and formal job creation in a limited number of dynamic urban hubs, with the recent recovery remaining concentrated in a few employment basins while climate shocks continue to destroy jobs in rural areas. Our regional analysis (Sections 4.1.2.c and 4.2.d) shows that, under the statistical approach, the Casablanca-Settat region has the highest overeducation rate in the country (20.2 percent), while the normative models identify this same region as the one where theoretical overeducation is most concentrated owing to the abundance of graduates who settle there. **Interpretation:** these two findings reinforce each other: the Casablanca-Settat region concentrates both most of Morocco's skilled job creation and most of the supply of graduates, such that overeducation remains high there in absolute terms even though it reflects, conversely, a relatively better opportunity for graduates than in less dynamic regions, where the main risk is instead massive undereducation (Béni Mellal-Khénifra, 70.5 percent according to our results, Section 4.1.2.c).

5.3. Economic Interpretation

Beyond the empirical confrontation with the HCP and the GJR, several economic mechanisms help explain the full set of results presented in Section 4.

Educational investment exceeding the economy's absorptive capacity. The rapid expansion of schooling in Morocco over recent decades, documented by the GJR (the continuous rise in overqualification among tertiary graduates, Section 5.2), has not been matched by an equivalent transformation of the productive structure toward skill-intensive activities. This gap between the pace of graduate supply and that of demand for skilled positions is the first-order mechanism explaining rising overeducation among young graduates (Section 4.1.2.a, effect of the 15-24 age group).

Productive structure and rationing of skilled jobs. The sectoral structure of the Moroccan economy — a large share of traditional agriculture and low-barrier-to-entry sectors (Section 3.5, Table 5: 24.6 percent of employed workers in agriculture) — mechanically limits the number of high-skill positions available, a "rationing" that, within the framework of job competition theory (Section 2.2), explains why a growing share of graduates is relegated to intermediate or low-skill jobs, regardless of their individual productivity.

Labour market segmentation. The coexistence, evidenced in our bivariate and econometric results, of a formal segment (public employment, large firms) where the diploma-job match remains broadly respected, and less formal segments (self-employed, family helpers, agriculture) where experience largely substitutes for diplomas, empirically confirms the

labour-market segmentation framework presented in Section 2.4.

Imperfect information and signalling. The predominant role of the public sector in overeducation, identified by both our study and the HCP (Section 5.1), is partly explained by the role of the diploma as a signal (Section 2.3) in a context of competitive-exam-based recruitment, where the diploma grids required at entry can be disconnected from the actual content of positions, yet still serve as a simple and verifiable sorting mechanism for the administration.

Occupational mobility and the role of experience. The robust and powerful age effect, present across all three measures but with particularly strong intensity under the statistical approach (β = -0.768 for those aged 55 and over on overeducation, Table 8), confirms that experience accumulated over a career allows for progressive reallocation toward better-matched jobs, or at least an informal recognition of skills that compensates for a formal-diploma deficit — a central mechanism of human capital theory (Section 2.1) complemented by signalling theory (Section 2.3).

Territorial heterogeneity. The regional analysis (Sections 4.1.2.c and 4.2.d) confirms that the Moroccan labour market is not unified but territorially segmented, each region having its own implicit qualification norm, which explains why the same econometric models can produce divergent regional coefficient signs depending on the measure used (normative vs. statistical).

Gap between skills supply and demand. Finally, all these mechanisms converge toward a synthetic finding, also central to the GJR's diagnosis (Section 5.2): skills mismatch in Morocco reflects less an isolated problem of the quality or quantity of training supply than a structural imbalance between this rapidly expanding supply and a demand for skilled labour whose growth remains constrained by the pace of the Moroccan economy's structural transformation.

5.4. Gender

The gender dimension runs through all of our results and merits a synthetic discussion, bringing together our econometric findings, the HCP data, and the Growth and Jobs Report's evidence.

Our econometric results (Section 4.2) show that women are, under the normative approach (NNA and INA), less often in a situation of undereducation than men (β = -0.344 and -0.485 respectively, Table 8), a result directly corroborated by the HCP, which reports an undereducation rate of 30.1 percent for women against 50.3 percent for men, and a markedly higher matching rate among women (59.2 percent against 42.8 percent, Section 5.1). Conversely, the statistical approach (SA) reveals a positive and significant effect of being a woman on the probability of undereducation (β = 0.384) and a protective effect against overeducation (β= -0.131).

These apparently contradictory results are explained by the same selection mechanism at labour-market entry, extensively documented by the Growth and Jobs Report: national female labour-force participation has declined markedly (from 28 percent in 2000 to 19 percent in 2024), while encouraging signs are emerging in urban areas, where the activity rate of women aged 25-34 rose from 26.1 percent in 2016 to 34 percent in 2024, with education remaining a strong predictor of this rising urban activity. In other words, the women who manage to enter employment in Morocco constitute a strongly selected population, on average more educated than the overall working-age female population — which explains both their higher normative matching rate (they are, on average, more qualified relative to the theoretical requirements of their jobs) and their greater exposure to statistical overeducation (they are

also more educated than the average of all workers, men and women combined, in the same occupation).

This selectivity is accompanied by mechanisms of sectoral and occupational concentration documented by the GJR: just four sectors (manufacturing, public administration, social services and trade) absorb 63 percent of formal female employment, and within formal manufacturing itself, about 76 percent of female workers are concentrated in textiles and food processing. The report also documents, based on a randomized experiment among Moroccan manufacturing-sector employers, the existence of significant gender bias in hiring decisions: with equal qualifications, male candidates are significantly more often selected, and a less-qualified male candidate remains, on average, preferred to a female candidate — whereas the reverse (a more qualified woman preferred over a less qualified man) produces no significant effect. The report finally documents that the closing of the aggregate formal-sector wage gap in recent years owes mainly to this same positive-selection mechanism for women (concentration in more skilled positions within the sectors that employ them) rather than to genuine wage convergence: in manufacturing, where the wage gap still exceeds 25 percent, women represent only 16 percent of high-skill positions, whereas in construction, where women represent only 10 percent of the workforce, the wage gap favours them and 70 percent of them hold high-skill positions.

Synthetic interpretation. The combination of these elements sketches a coherent mechanism: the main obstacle to gender equality in the Moroccan labour market lies less in the diploma-job match for women already employed — where they appear, under the normative measures, relatively better matched than men — than in the barriers to entry themselves (access to formal employment, hiring bias, sectoral concentration, informal employment affecting 61 percent of active women according to the GJR) that heavily filter the female population even before it reaches the stage of education-employment matching measured by our study. This reading has specific policy implications, detailed in Section 5.5.

5.5. Policy Implications

In keeping with the requirement to link each recommendation to an empirical finding or an identified mechanism rather than stating generic recommendations, this section distinguishes six families of public policy.

1. Training and guidance policies. The robust finding of massive overeducation among graduates of higher-level vocational training (55.8 percent for specialized technicians according to the HCP, 70.7 percent for tertiary vocational-training graduates according to the GJR, Sections 5.1-5.2) calls for a priority recalibration of vocational-training curricula and tracks, to better align their content with employers' actual needs, as well as strengthened guidance for students toward fields and levels of training offering the best labour-market prospects — a recommendation directly derived from the diagnosis shared by our study and the GJR regarding the mismatch between vocational-training supply and labour demand.

2. Policies acting on labour demand. The finding that employment growth remains concentrated, even in dynamic sectors, on low- or medium-skill profiles (GJR, Section 5.2), and the structural rationing of skilled jobs highlighted by our economic interpretation (Section 5.3), imply that training policy alone will not suffice to reduce graduate overeducation: it must be complemented by an industrial and sectoral policy explicitly oriented toward creating higher-value-added, more skill-intensive jobs, particularly in higher-productivity manufacturing and services sectors.

3. Territorial policies. The finding of spatially differentiated mismatch — massive undereducation in rural and less dynamic regions (Béni Mellal-Khénifra, 70.5 percent

according to our results, Section 4.1.2.c), concentration of overeducation and skilled job creation in the Casablanca-Settat region (Section 5.2) — calls for policies of territorial economic diversification and skills upgrading in rural areas, to reduce both the qualification deficit observed in less dynamic regions and the overeducation pressure in urban hubs that concentrate most of the graduate supply.

4. Youth integration policies. The effect of the 15-24 age group, robust and consistently signed across the three measures (higher probability of overeducation early in careers, Sections 4.1.2.a and 4.2), combined with the GJR's finding that unemployment remains the predominant outcome one year after leaving the education system (48-49 percent of youth), justifies strengthening labour-market intermediation mechanisms (public employment services, work-study programmes) to reduce the school-to-work transition frictions identified as one of four priority channels by the GJR.

5. Policies for women's employment. The finding that the main obstacle to gender equality lies in barriers to labour-market entry rather than in the education-employment match of women already active (Section 5.4) calls for policies targeted at access to formal employment (tackling the hiring biases documented by the GJR's randomized experiment, developing safe childcare and transport options, supporting female entrepreneurship) rather than, or in addition to, training policies alone.

6. Better information on skills and jobs. The persistent divergence between the normative and statistical measures of mismatch (Sections 4.1.1 and 5.1) illustrates a shared information deficit between the education system, employers and job seekers regarding the skills actually required by available jobs; strengthening labour-market information systems, including better tracking of occupational outcomes by field of training, is a cross-cutting prerequisite for the five preceding policy families, consistent with the GJR's recommendation to strengthen intermediation services as the backbone of active labour market policies.

6. CONCLUSION

At the end of this analysis of the determinants of qualification mismatch in the Moroccan labour market, several major conclusions emerge, offering a nuanced picture of the dynamics of education-employment matching. By mobilizing three distinct methodological frameworks — two normative and one statistical — and systematically confronting them with the work of the Haut-Commissariat au Plan and the World Bank's Morocco Growth and Jobs Report, this study has sought to identify robust correlations while highlighting the crucial importance of the conceptual definition of "mismatch."

Methodological contribution. Our first fundamental contribution is methodological. We have shown that there is no single diagnosis of mismatch, but several, each revealing a different facet of reality. The normative approaches, based on theoretical standards, depict a labour market massively characterized by undereducation, suggesting an apparent deficit of formal human capital — a diagnosis shared, at different levels, by the HCP study on exhaustive data. Conversely, the statistical approach, grounded in observed reality, establishes matching as the most common situation and redefines overeducation and undereducation as phenomena of relative positioning within each occupation.

Empirical contribution. The second contribution lies in identifying structural determinants whose influence is robust across the different measures, and whose confrontation with the HCP and the GJR (Section 5) confirms their durable rather than conjunctural nature. Our econometric models confirm that skills mismatch is not a random phenomenon, but is profoundly structured by social and spatial divides:

1. Gender and the life cycle are major individual determinants. Employed women appear, under the normative measures, to be relatively better matched than men, a result that, once set against the GJR data on the selectivity of women's entry into the labour market, reveals that the real obstacle lies upstream, in access to employment itself (Section 5.4). Young workers face massive initial overeducation, which turns into more pronounced undereducation later in their careers, attesting to the role of experience as a substitute for the diploma.

2. The geographic and socio-economic context exerts a predominant influence. Overeducation is a massively urban phenomenon concentrated in more affluent households, while undereducation is the hallmark of rural areas and less well-off social strata — a result confirmed almost identically by the HCP (a factor of more than three between urban and rural areas, Section 5.1).

3. The structure of the labour market reveals strong segmentation. The public sector and salaried statuses are more frequent sites of overeducation under the normative approaches, while self-employment and sectors with low formal requirements (agriculture, construction) are pockets of normative undereducation — a result the GJR explicitly links to the nature of job creation in Morocco, structurally oriented toward low- or medium-skill profiles (Sections 5.2-5.3).

4. Overqualification among tertiary and vocational-training graduates has worsened in the recent period, rising from 34 percent to more than 43 percent for tertiary graduates between 2019 and the most recent data according to the GJR, confirming that the phenomenon documented on 2014 data reflects a medium-term structural trend rather than a one-off occurrence.

Discussion and implications. These results call for a two-fold discussion. On one hand, the predominance of undereducation in the normative models questions the relevance of theoretical reading grids in the face of a labour market where practical skills and experience appear to take precedence over academic certification. This does not mean that the diploma is useless, but that its valuation is neither automatic nor uniform. Public policies should therefore strengthen mechanisms for the recognition of prior learning (RPL) and promote continuing-education pathways that formalize skills acquired "on the job."

On the other hand, the concentration of overeducation among young people and among individuals from affluent urban backgrounds signals a worrying under-utilization of human capital, compounded by a wage penalty documented by the GJR (a 20 percent earnings loss in cases of overqualification, Section 5.2). This phenomenon represents not only a waste of resources for the national economy, but also a source of individual frustration and potential precarity for graduates. This calls for better articulation between the higher-education system, vocational training and the economy's actual needs, as well as policies acting on labour demand itself (Section 5.5).

Finally, the strong spatial and social dimension of mismatch underscores that employment policies "blind" to these divides risk being ineffective. Tackling rural undereducation requires diversifying the local economic fabric and upgrading qualification levels, while tackling urban overeducation requires an industrial policy capable of creating high-value-added jobs. The specific issue of women's employment, for its part, calls for policies targeted at barriers to formal-employment access rather than solely at the education-employment match of women already active.

Limitations. Our study, despite the richness of the RGPH 2014 data and its comparison with the work of the HCP and the World Bank, has certain limitations. First, census data are cross-sectional and do not allow for the analysis of individual trajectories over time. A

longitudinal analysis, based on panel data — such as that mobilized by the GJR using CNSS administrative data — would be needed to distinguish temporary mismatch situations (early career) from structural ones. Second, our skills measures are based on diploma and years of schooling, which are imperfect proxies for actual human capital. Incorporating data on cognitive and non-cognitive skills, such as those from PIAAC-type surveys or international assessments (PISA, TIMSS) mentioned by the GJR, would considerably sharpen the diagnosis. Third, our analysis is descriptive and correlational; identifying causal effects would require more advanced econometric strategies. Fourth, unlike the GJR, our study measures only the vertical dimension of mismatch and cannot capture horizontal mismatch (misalignment between field of study and field of employment), which the GJR documents as substantial and growing, particularly among higher-level vocational-training graduates (Section 5.2). Finally, for lack of a wage variable in RGPH 2014, our study cannot directly estimate the economic return to mismatch, unlike the Mincerian regression carried out by the World Bank and the HCP as part of the GJR.

Future research avenues. These limitations open promising avenues for future research. Analyzing the impact of mismatch on wages, job satisfaction or occupational mobility, following the World Bank's work using CNSS data, is a natural first extension. Studying mismatch by field of study (horizontal mismatch), not addressed in the present study but documented by the GJR, also represents a crucial dimension of the phenomenon that would merit dedicated exploitation of RGPH microdata. Finally, replicating this analysis on more recent data — the 2024 census or updated labour force surveys — will be essential to assess how these dynamics evolve over time and to verify whether the worsening overqualification trend among graduates, already documented by the GJR between 2019 and 2024, continues.

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ABOUT THE AUTHORS

AOMAR IBOURK

Aomar Ibourk, is a professor of quantitative methods and social economics at the Cadi Ayyad University in Marrakech, an economist, as well as Senior Fellow at the Policy Center for the New South, who focuses on Applied econometrics, labor market, economics of education and development economics. He is also the director of GRES (Economic and Social Research Group) at the same university. His research focuses on econometric methodologies applied to social sciences (labor economics, economics of education and Development).

TAYEB GHAZI

Tayeb Ghazi is Senior Economist at the Policy Center for the New South (PCNS). He is also a member of the Social and Solidarity Economy Research Group at Cadi Ayyad University and holds a master's degree in applied finance from the same university. He is currently working on topics related to labour market, education, migration and some aspects of international trade in developing countries.

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Policy Center for the New South

Rabat Campus of Mohammed VI Polytechnic University,
Rocade Rabat Salé - 11103
Email : contact@policycenter.ma
Phone : +212 (0) 537 54 04 04
Fax : +212 (0) 537 71 31 54

www.policycenter.ma

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