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Impact of the local labor market on the pathways of early school dropout in Morocco: the case of working children: a spatial analysis

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Abstract

This study analyzes the influence of local labor market characteristics on student dropout pathways in Morocco. Beyond individual determinants, early school leaving may depend on dropouts' local environment. This study mobilized original empirical material that combines individual and spatial data from Morocco's 75 provinces. First, we conducted a cartographic analysis of 10- to 14-year-old children who left the education system and were employed in the Moroccan space. Second, we analyzed the spatial impact of risks related to local labor market specificities on early school leaving. The results revealed a local labor market impact on the decision to drop out of school children who left school to enter the labor market early. Therefore, the spatial transmission cut-off of intergenerational school failure requires multidimensional action in areas with a high risk of dropping out. Our findings indicate a need for coherent and transversal public action (education/employment) and improved social and spatial targeting of social protection to improve local labor market functioning and secure educational and professional trajectories of pupils in compulsory education.

Keywords: education, child labor, pathways, school dropout, spatial disparities

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Introduction

Today, more than ever, students' educational trajectories are strongly influenced by local societies' functioning. A large body of research suggests that spatial dimensions and local dynamics are central functions of students' pathways (Ibourk and Raoui, 2021, 2022; 2023; 2024). Thus, this work focuses on the notion of socio-spatial belonging. At the territorial level, education is supposed to contribute to intergenerational social advancement (Jaquet, 2014). However, most research has found that students' academic success is not equal, because it is affected by their social and spatial origins (Peugnay, 2013). Furthermore, the probability of pupils dropping out of school shows inequalities between geographical areas. Beyond individual factors, reproducing school failure and social immobility depends on local specificities (labor market, economic activities, standard of living, etc.).

The Moroccan education system struggles to provide all students with the same opportunities for perseverance and academic success, regardless of their background (CSEFRS, 2015). Morocco has a labor code that prohibits the employment of children under the age of 15 and under the age of 18 for the worst forms of labor (Moroccan law prohibits the employment of minors under the age of fifteen). Since 2000, there has also been a law on compulsory schooling (law 04-00).

In this regard, Morocco had adopted a law on compulsory schooling up to the age of 15, which has not yet been fully implemented. Even today, the school system does not always manage to ensure full access and retention of children enrolled in school. Many children and youth in Morocco are forced to leave school and abruptly enter the adult world. According to the latest report of the Higher Council for Education, Training, and Scientific Research (CSEFRS, 2018), in 2018, 431,876 students dropped out of public-school education without certification, 78% of whom were in the primary and middle school cycle, which is supposed to keep children in class until age 15. Of those exiting without a diploma, 69,000 children aged 10 to 14 entered early work. Of note, 80.9% of working children left school, and 4% never attended school (CSEFRS, 2018). Child labor is still prevalent in some sectors of the economy and differs depending on where the children live. In rural areas, 82.2% work in agriculture, forestry, and fishing, while in urban areas, 58.4% work in the service sector, with 27.5% apprentices and 20.5% family assistants.

The National Evaluation Body estimated the dropout rate's economic impact at Dirhams (official monetary of Morocco) 2.1 billion for the three cycles (primary, secondary, and qualifying)

(CSEFRS, 2016). The economic effects are multiple and include budgetary losses and a poorly qualified workforce. Based on these worrisome findings, a survey report on intergenerational social mobility indicated that children in Morocco without qualifications have a less than 1.6% chance of occupying a social position more rewarding than that of their fathers. These children remain in poverty and academic failure for generations (HCP, 2013).

The geographical distribution of these children is typically in rugged, landlocked mountainous areas that are difficult to access. Hence, despite efforts to generalize compulsory education, available education services are insufficient, especially in rural areas. The multidimensional reality of school dropout and child labor is often related to individual determinants external to the educational system—poverty, parental unemployment, social and cultural beliefs, gender inequality—but it is strongly linked to a poorly adapted educational system. This study aimed to identify the impact of living conditions at the territorial level, especially the labor market's role in school dropout risk and the resulting social immobility of children in less developed areas in Morocco. To the best of our knowledge, no previous research has employed an applied econometric methodology to examine individual and spatial quantitative data to explain early age dropout risk within Morocco's local economic context. We endeavored to examine how the local labor market structure may constitute an insurmountable obstacle for Moroccan children's schooling. To answer underlying questions, we investigated local labor market characteristics to identify factors that may lead to early drop out (pull factors), factors that may keep children engaged with school (push factors), and economic sector factors that draw early school leavers into premature labor market entry. What type of policy would effectively stop the intergenerational transmission of school failure in some Morocco territories? How can the next generation be saved from this pattern, especially in areas with high dropout risks?

Study data were compiled from the 2014 general population census survey, aggregated for Morocco's 75 provinces. The study methods elaborated an analysis map of 10- to 14-year-old children who left the educational system and are working in the Moroccan space. Then we analyzed the spatial impact of living conditions and local labor markets on the dropout rate.

Literature review

School dropout and child labor are jointly complex issues comprising two interdependent social phenomena that affect many parts of society (P. Denieuil & H. Laaroussi, 2012, Zermatten, 2010,

Schlemmer, 2006). First, dropping out of school is a complex process with multiple causes, and can occur as early as middle school (Ibourk and Raoui, 2024). Child labor involves the participation of minors in activities with economic purposes similar to adult occupations. Child labor deprives children of their childhood, their potential, and their dignity, impairing their physical and mental development (Ali et al., 2017; Biswajit & Runa, 2019; Basu & Van, 1998; Fafchamps & Wahba, 2006; Schultz, 1961). Human capital theories have examined the choice of investing in education or leaving school early. Becker, Schultz, and Mincer's work in the 1960s provides a reference for current theoretical models. These authors asserted that educational choices are investments in human capital, potentially leading to a qualifying job (Schultz, 1961; Mincer, 1962; Becker, 1964).

Previous research on school dropout causes indicates that children from working-class socio-cultural backgrounds, and those whose parents have little schooling, are predisposed to dropping out of school (Bourdieu & Passeron, 1970, C. Forquin 1983, Di Méo, 1998, H. Panabiere, 2011). Family poverty has emerged as a barrier to children's schooling. In addition, absence of a local school pushes these children into early labor (C. Lo & P. Mendy, 2021).

Moroccan studies confirm that early dropout is related to educational system and individual student factors (Alaoui, 2022; Biouda, 2021; Amina Benbiga, Saïd Hanchane, Nisrine Idir, & Tarek Mostafa, 2013; Aomar Ibourk, 2012; Fouzi Mourji & Abdelilah Abbaia, 2013; P. Denieuil & H. Laaroussi, 2012). Graduate unemployment in Morocco is also a high predictor of school dropout. The unemployment rate of young people aged 15 to 24 with a higher education qualification is 61.2%. This pushes a large portion of children and young people into leaving the education system early. (El Aynaoui & Ibourk, 2018).

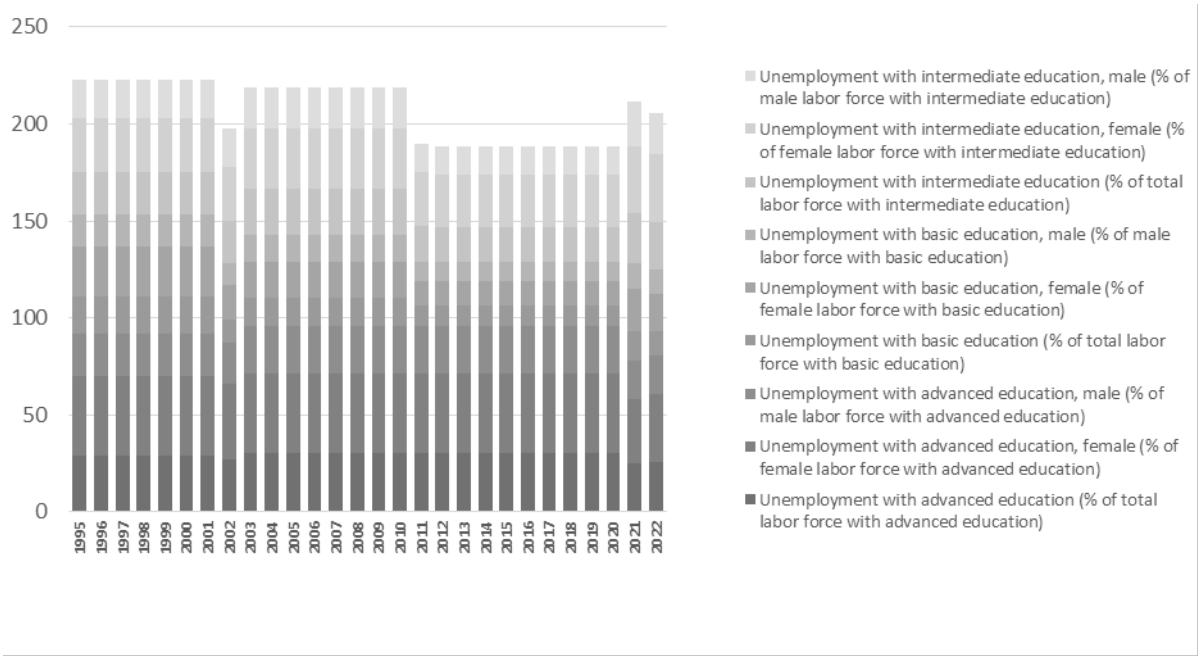
As described earlier in the Introduction section, our theoretical analysis aimed to shed light on the territorial factors associated with school dropout. School perseverance inequalities have also been linked to living conditions within the territories (Miconnet, 2016; Bell & Bernard, 2016), and the local labor market structure. This is especially relevant when the training levels of individuals are low. Lower-skilled job opportunities at the local level can lead children to drop out of the educational system to snag an early-age job (di Paola, 2018). A significant share of students leave school because of their perceived chances of finding a less skilled but more locally available job

(Bernard & Michaut, 2016). Based on these observations, preventing child labor involves preventing school dropouts in compulsory cycles.

School dropout and labor market issues in Morocco: Labor market landscape in Morocco

Unemployment in Morocco is an urban phenomenon that primarily affects young higher education graduates and women (Figure 1). The unemployment rate fell from 13.8% in 1999 to 9.4% in 2016 to 11.9 in 2020. Rural areas tend to have higher employment than urban areas (Figure 2). Regional disparities are an important aspect of Morocco's labor market. Morocco has 12 regions, two of which—Casablanca-Settat and Rabat-Sale-Kenitra—account for more than 40% of the country's GDP and one-third of the total population. For example, the growth rate in the Rabat region is driven by continued productivity gains in high-value-added services and public administration. Conversely, the size of the manufacturing sector in the Casablanca region has made it more capital-intensive, increasing labor territorial curricula productivity while developing low value added and labor-intensive services. The Moroccan labor market's precariousness is also reflected in the employment status. In 2015, almost 22% of the Moroccan workforce (40.8% in rural areas) were unpaid family helpers or apprentices, almost exclusively in the agricultural sector, and 27.4% were self-employed. The unemployment rate in Morocco remains an urban issue, however, the share of the unemployed in urban areas fell from 22% in 1999 to 15.8% in 2020 (Acevedo, et al,2021).

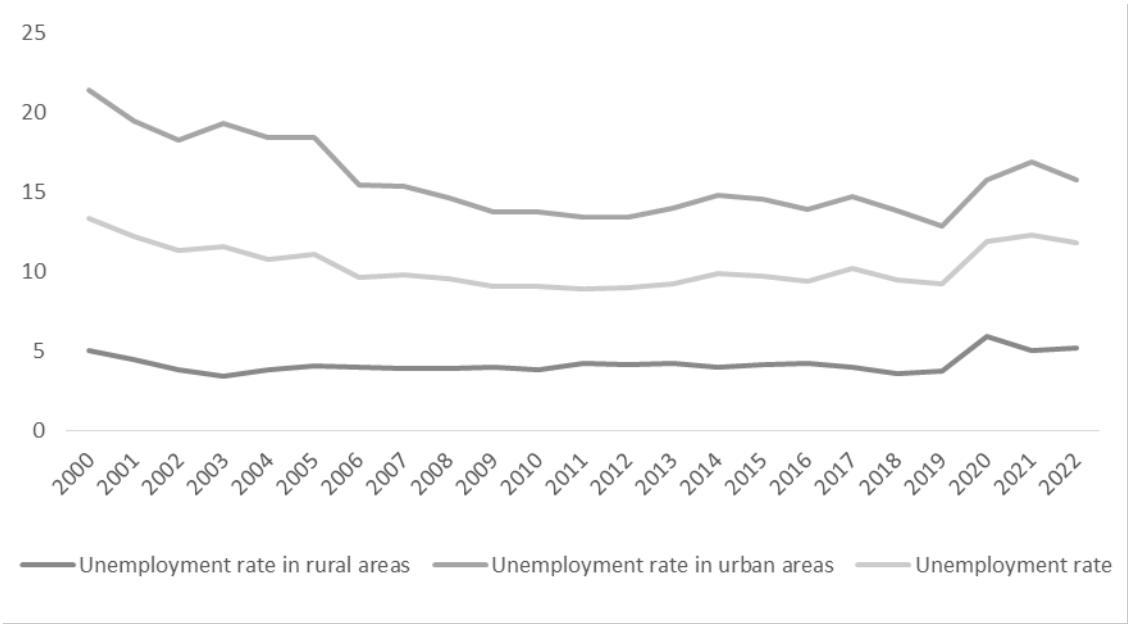
Figure. 1: Unemployment rate by degree of education.



Source: (HCP, 2022)

The agriculture, forestry, and fishing sector is the main sector for rural worker employment, accounting for almost three-quarters of youth employment in rural areas in 2014, compared to only 4.6% in urban areas. By contrast, the service sector employs 59.4% of the urban workforce, followed by industry, including handicrafts (22.6%) and construction (13.4%). Nine of ten young rural women work in agriculture, forestry, and fishing; active urban women are more present in the service (63.1%) and industry/crafts (31.9%) sectors. This duality results from the geographical environment: the unemployment rate in rural areas is lower, but the jobs offered are precarious and often in the informal sector (Acevedo et al, 2021). Unemployment remains an essentially urban phenomenon. There is also a gender disparity, the unemployment rate decreases for women was lower than that for men, at 25% and 31%, respectively. Consequently, inequality between men and women has increased, with the unemployment rate differential increasing from 0.3% to 1%.

Figure. 2: Unemployment rate by area. Source: (HCP, 2020)



Despite a significant fall in graduates' unemployment rate, the graduate unemployment rate is well above the overall rate. Unskilled workers' unemployment rates are low; however, highly skilled workers are in the most protected jobs. Young people have the highest unemployment rates, particularly in the 15–24 age group, which experienced the smallest decline in unemployment over the period when its participation rate fell sharply (-25%). Although the 25–34 age group continues to experience significantly higher unemployment than the overall rate, this age group saw a significant improvement over the period, with the rate dropping to 34%.

The Moroccan labor market's contribution to the social reproduction of dropouts

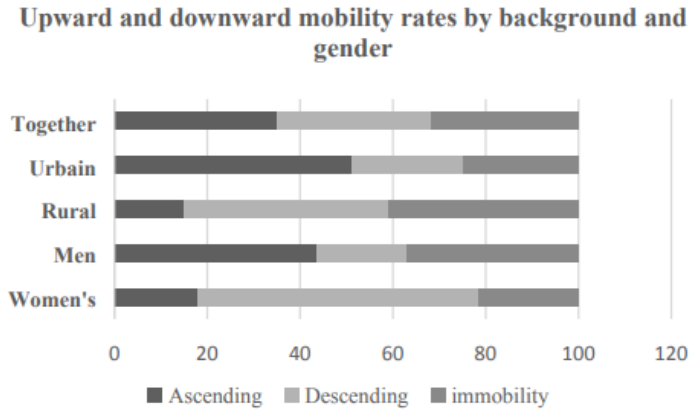
The volume and nature of jobs offered to young people depend on the local labor market's dynamism. In addition, the way companies use the youth labor supply differs according to size and activity sector (Lochet, 2003).

A territory's socio-productive structure first shapes school curricula, then integration paths. The territory is thus the substratum social reproduction mechanism and the movements that affect it. We examined, in their context, links between parents' socio-professional situation and the pathways of children who drop out at an early age.

Comparing the areas most affected by school dropouts (Figure 3) confirms that rural areas have unskilled job opportunities, which leads to recycling school dropouts in time and in the same

spaces where job demands do not impose a required qualification. In some sectors, social immobility remains "such son, such father."

Figure 3



Source: authors, DB (HCP, 2014)

Upward social mobility 'social advancement' is observed in 35.1% of cases at the national level. Urban dwellers and men are more likely to experience upward social mobility than rural dwellers and women. The urban population upward social mobility rate is 51.1%, compared to 14.8% for the rural population, and upward mobility is higher among men (43.7%) than women (17.9%). Conversely, women and rural people, despite the importance of their structural mobility, have much higher r rates of downward social mobility (61% and 44%, respectively) compared with men (24.1%) and urban people (19.3%).

An analysis of upward mobility determinants shows that workers with a primary education are 1.6 times more likely than their less educated counterparts to occupy a more rewarding social position than their fathers. This ratio rises to 4.6 times for workers with secondary education and 16.2 times for those with higher education. One additional year of schooling improves the odds of upward mobility by 13.7% (HCP, 2013).

Methodology

To explore the child labor determinants, we mobilized Morocco individual survey data from the last general population and housing census (HCP, 2014). The study variables appear in Table 1.

We conducted a multivariate spatial analysis of different components of the territory that are suspected to be associated with school dropout. The distribution of each of the independent variables explored was conducted using spatial econometric methods. The analysis carried out in

this study is interesting for several reasons. First, few studies have focused on the geographic distribution of wealth within the provinces of Morocco. Indeed, it allows us to emphasize the links between the risks of children in work relate to their geographic location. Conversely, it makes it possible to empirically evaluate the determinants of stopping the studies of children and follow their labor market experiences from an early age.

Spatial econometrics is known as a field whose analytical techniques are designed to incorporate dependence among observations (regions or points in space) that are in close geographical proximity. Extending the standard linear regression model, spatial methods identify cohorts of 'nearest neighbors' and allow for dependence between these 'regions/ observations'. Reference is often made to geographic entities when considering the use of spatial econometrics. In fact, the spillover effects seem easily understandable when we talk about departments, regions or even states. However, Elhorst (2014, p. 1) explains that 'spatial econometrics models can also be used to explain the behavior of economic agents

To fully visualize the child labor and early school dropout determinants, we mobilized Morocco individual survey data from the general population and housing census (HCP, 2014). The legal population encompasses all individuals residing within the national territory on the census reference date, including foreign nationals, but excludes Moroccans living abroad. The census is a comprehensive operation conducted nationwide, covering the entire population and all households within the country. In summary, the census aims to be thorough by accounting for individuals and households, and it incorporates other interconnected entities like individuals, companies, or government bodies, making it more complete than a standard population count.

Spatial econometrics as a discipline appeared in the 1960s and early 1970s (see Cliff & Ord [1973] for a summary of the first works) and expanded with the development of the theory of estimations and tests (Anselin, 1980; Ord, 1975; Paelinck & Klaassen, 1979). Certain works have become references in the subject; these include Cliff and Ord (1981), Anselin (1998), Cressie (1993), Anselin and Florax (1995), and more recently, LeSage and Pace (2009). The spatial study involved the exploratory analysis of spatial autocorrelation (Anselin, 1998; Ertur & Koch, 2004; Gatrell & Bailey, 1995; Haining, 1990; Le Gallo, 2004), using Moran's statistics:

Table 1. Study variables

Variable nature	Description	Source
Dependent variable	The proportion of children at work	HCP 2014
Independent variables: Standard of living indicators	Income poverty rate, multidimensional poverty rate, vulnerability rate, labor force participation rate, employment rate, employers, self-employed, public employee, homemaker, apprentice, associate partner, other.	HCP 2014
Independent variables: Labor market indicators	Senior managers and professionals; technicians and intermediate occupations; clerks, traders, and commercial and financial intermediaries; farmers fishers, craftsmen, and skilled workers; agricultural workers and laborers, fishing including skilled workers, plant and machine operators, and assembly workers; nonagricultural laborers, small trades	HCP 2014

Source: authors

The spatial study involved the exploratory analysis of spatial autocorrelation (Haining, 1990; Bailey & Gatrell, 1995; Anselin, 1998; Le Gallo, 2002; Ertur & Koch, 2004), using Moran's statistics:

$$\boldsymbol{I\ de\ Moran} = \frac{\boldsymbol{n}}{\boldsymbol{\Sigma_i \Sigma_j w_{ij}}} \times \frac{\boldsymbol{\Sigma_i \Sigma_j w_{ij}(zi - \overline{Z})(zj - \overline{Z})}}{\boldsymbol{\Sigma_i (zi - \overline{Z})^2}} \textbf{ (1)}$$

Moran's I-statistic is a global statistic and does not assess the local regional structure of spatial autocorrelation. The formula is written as follows:

$$\boldsymbol{\Gamma_i = \sum_j w_{ij} v_{ij}} \textbf{ (2)} \qquad \textbf{Where} \qquad \boldsymbol{v_{ij}} = \frac{(z_i - \overline{Z})(z_j - \overline{Z})}{\boldsymbol{\Sigma_i (z_i - \overline{Z})^2}} \textbf{ (3)}$$

The global index is the sum of all local indices:

$$\boldsymbol{\Gamma = \sum_i \Gamma_i \sum_i \sum_j w_{ij} v_{ij}} \qquad \textbf{(4)}$$

The two main properties that local indices must fulfill to be considered local indicators of spatial association (LISA), as defined by Anselin1998, are as follows: (i) for each observation, they provide indications of a possible clustering of similar values (or opposite trends) in the vicinity, and (ii) the sum of the local indices over all observations is proportional to the corresponding global index.

The Moran diagram allows us to appreciate local spatial instability and highlight spatial grouping patterns. By applying this procedure to our variable, we can define the spatial clusters in Morocco, which include regions, provinces, and communes with similar characteristics.

Each territory estimates its similarity to its neighbors relative to the whole sample. This comparison can take the form of a scatterplot with the values of the variable for the territories on the x-axis and the average values of the variable for the neighboring territories on the y-axis. This "Moran scatterplot," which, according to the terminology of Luc Anselin, offers a quick reading of the spatial structure, is composed of four quadrants: quadrants 1 and 3 indicate positive spatial autocorrelation (neighbors are similar), and quadrants 2 and 4 indicate negative spatial autocorrelation (neighbors are dissimilar):

1. HH: The high-high situation occurs when the variable of interest demonstrates a strong value in a neighborhood that is similar (positive spatial autocorrelation and high index value);
2. LH: The low-high situation occurs when the variable under study demonstrates a low value in a neighborhood that is not similar (negative spatial autocorrelation and low index value);
3. LL: The low-low situation occurs when the studied variable demonstrates a low value in a neighborhood that is similar (positive spatial autocorrelation and low index value); and

4. HL: The high-low situation occurs when the studied variable demonstrates a high value in a neighborhood that is not similar (negative spatial autocorrelation and high index value).

Spatial model analysis

Given that the economic behaviors of working children phenomena are not the same in the center of a city and its periphery or in urban and rural spaces, the aforementioned phenomenon was considered unstable in the space of economic relations at several different scales (Le Gallo, 2004). The specifications of the model are as follows:

$$\textbf{Rate of children on work} = \boldsymbol{\alpha}\ 0 + \boldsymbol{X}\ 1\ \boldsymbol{\beta}\ 1 + \boldsymbol{X}\ 2\ \boldsymbol{\beta}\ 2 + \boldsymbol{X}\ 3\ \boldsymbol{\beta}\ 3 + \boldsymbol{X}\ 4\ \boldsymbol{\beta}\ 4\ \boldsymbol{\varepsilon} \quad (5)$$

In the presence of spatial autocorrelation, the estimation of the equation by OLS (ordinary least square) provides biased coefficients. The first diagnosis is to test for the presence of spatial effects. By lagging spatial variables (Case et al, 1993; Brueckner, 1998), the model becomes a SAR Model.

Rate of children on work: represent the endogenous variable.

X 1, X2, X3: represents the set of explanatory variables used**, β** is the vector of estimators **and** $\boldsymbol{\varepsilon}$ represents the error term**.** In the presence of spatial autocorrelation, the estimation of the equation by OLS (ordinary least square) provides biased coefficients. The first diagnosis is to test for the presence of spatial effects. By lagging spatial variables (Case et al, 1993; Brueckner, 1998), the model becomes a SAR Model.

$$\textbf{Rate of children on work} = \boldsymbol{\rho}\textbf{WRate of children on work} + \mathbf{X}\ 1\ \boldsymbol{\beta}\ 1 + \mathbf{X}\ 2\ \boldsymbol{\beta}\ 2 + \mathbf{X}\ 3\ \boldsymbol{\beta}\ 3 + \mathbf{X}\ 4\ \boldsymbol{\beta}\ 4 + \boldsymbol{\varepsilon} \quad (6)$$

Where $\boldsymbol{\rho}$ and $\boldsymbol{\lambda}$ unknown self-regression coefficients; $\boldsymbol{Wy}$ and is the known neighborhood matrices; X matrix of explanatory variables; and β is a vector of unknown parameters. Through a spatial autocorrelation of errors (Rey & Montouri, 1999; Baumont et al., 2004), the equation becomes an SEM model:

$$\textbf{Rate of children on work} = \boldsymbol{\lambda W}\textbf{Rate of children on work} + \boldsymbol{X}\ 1\ \boldsymbol{\beta}\ 1 + \boldsymbol{X}\ 2\ \boldsymbol{\beta}\ 2 + \boldsymbol{X}\ 3\ \boldsymbol{\beta}\ 3 + \boldsymbol{X}\ 4\ \boldsymbol{\beta}\ 4 + \boldsymbol{\varepsilon} \quad (7)$$

The parameter $\boldsymbol{\lambda}$ reflects the strength of the interdependence between the regression residuals.

Results

Descriptive analysis of school dropout and child labor in Morocco:

In 2014, Morocco recorded 59,477 households with at least one working child, corresponding to 0.8% of all Moroccan households, 53,441 residing in rural areas and 6,036 in urban areas. This proportion rises from 0.2% among households of three people to 2.3% among households of 6 people or more (Table 2).

Among households where the head has a higher level of education, this proportion is almost zero, and stands at 1.2% among those where the head has no education at all. Depending on the type of activity of the head of household, this proportion rises from 0.2% for those who are inactive to 0.3% for the unemployed, reaching 1.1% for those in employment.

Finally, it should be noted that 67% of working children come from agricultural backgrounds, 13% from blue-collar and labour backgrounds, 11.8% from backgrounds of employees, shopkeepers and commercial intermediaries, plant and machine operators and craftsmen and skilled workers, and 1.2% from backgrounds of senior executives and members of the professions and middle managers.

Descriptive analysis of child labor from the individual data:

Table 2: Descriptive analysis

Indicators	**1999**			**2014**		
	Urban	Rural	National	Urban	Rural	National
Working children (in thousands)	65 (2.5%)	452 (16.2%)	517 (9.7%)	7 (0.3%)	62 (3%)	69 (1.5%)
Female employment rate (%)	**32.5**	**49.1**	**47.0**	**10**	**43.3**	**40**
Employment structure by employment status (%):						
Salaried employees	33.5	5.3	8.8	17.5	1.8	3.4
Self-employed	3.0	0.7	1.0	4.2	4.7	4.6
Family assistance	17.5	92.2	82.9	30.9	90.5	84.5
Apprentices	45.6	1.6	7.0	47.4	2.7	7.2
Others	0.4	0.2	0.3	0.0	0.3	0.3
Total	**100**	**100**	**100**	**100**	**100**	**100**
Structure (%) of employment by occupation :						
Employees	2.3	0.1	0.4	1.7	0.4	0.6
Tradesmen, artisans, and skilled craft workers	39.9	2.6	7.3	31.0	6.1	8.6

Farmers, fishermen, foresters, hunters and agricultural workers	7.6	94.8	83.8	13.9	94.2	82.5
Non-agricultural workers and laborers	49.7	2.4	8.4	53.4	3.3	8.3
Not declared	0.5	0.1	0.1	0.0	0.0	0.0
Total	**100**	**100**	**100**	**100**	**100**	**100**
Structure (in %) of employment by sector of economic activity:						
Agriculture, forestry and fisheries	7.8	94.8	83.9	6.9	90.2	82.5
Industry (including crafts)	41.9	3.1	8.0	26.8	6.6	8.6
Public works buildings	1.2	0.2	0.3	1.2	0.2	0.3
Services	48.6	1.8	7.7	65.1	3.0	8.6
Others	0.5	0.1	0.1	0.0	0.0	0.0
Total	**100**	**100**	**100**	**100**	**100**	**100**

Source: HCP, 2014

Child laborers in Morocco included 600,000 children in 2004, 11% of this age group. The rate was 16% in 1998 and 39.8% in 1994. The number fell by 28.8% between 1994 and 2004, from 965,000 to 600,000 children. In 2018, 69,000 children aged 10 to 14 years were at work. As mentioned earlier, 80.9% of working children left school, and 4% never attended school (CSEFRS, 2018).

Figure 4: Analysis of school dropout by area and gender

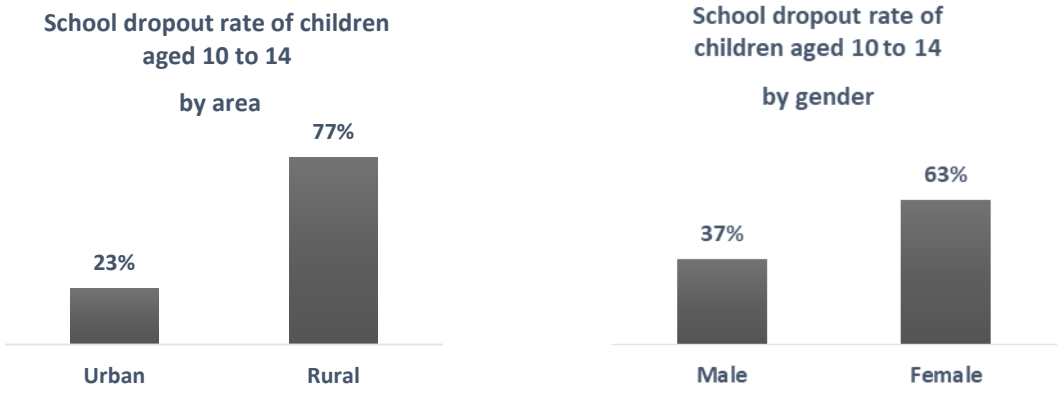
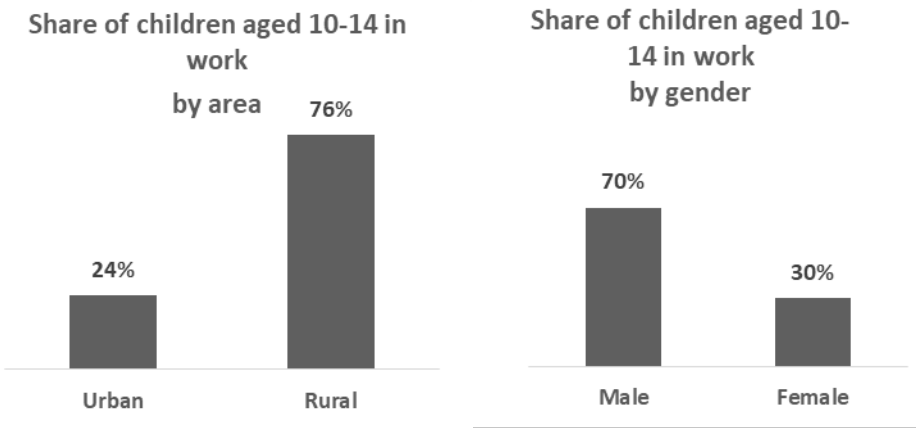


Figure 5: Analysis of child labor by area and gender



Action on child labor has involved efforts to combat school dropouts, resulting in a decreased dropout rate for the primary cycle, which fell from 5.2% to 1.1% between 2000 and 2020. Middle and high school cycle dropout rates showed less improvement, with the middle school dropout rate decreasing from 14% to 12%, and the high school rate decreasing from 12.4% to 10.1% between 2000 and 2020 (MEN 2000, 2020).

The analysis of dropout rates by educational level showed that they reach maximum levels in the upper grades. For example, the 2018 sixth grade dropout rate was 12.4%; in the third collegiate and second baccalaureate years, it was 19.3% and 17.1%, respectively, reflecting students' difficult transition from primary to collegiate and from collegiate to qualifying. Except for the Oued Eddahab-Lagouira, Guelmim-Es-smara, Laâyoune Boujdour-Sakia Lhamra, and Taza-Taounate-El Hoceima regions, territories have almost succeeded in universal primary education. Dropout rates declined between 2007–08 and 2013–14 for three regions, Oued Eddahab-Lagouira, Guelmim-Es-smara and Laâyoune Boujdour-Sakia Lhamra.

The province map shows that dropout rates for 10- to 14-year-old children varies between 1.1% and 25.2%(Figure 4), and the proportion of working children varies between 0% and 5.30%(Figure 5). The lowest school dropout and working children rates were recorded in the southern provinces: (Boujdour, Es-semara, Tan-Tan, Assa-zag, Guelmim, etc.), and in the economic and administrative capital, Casablanca, Rabat. Provinces with the highest school dropout and working children's rates are Al Hoceima, Chefchaouen, Figuig, Guercif, Taounate, Moulay Yacoub, Azilal, Settat, Sidi Bennour, Chichaoua, Essaouira, Rehamna, and Youssoufia.

We observed that school dropout affected rural areas first, with a 77% rate, compared to 23% for urban areas. The analysis also showed a higher dropout rate for girls than for boys, at 63% and 37%, respectively. The proportion of working children was 76% in rural areas, compared with 24% in urban areas, with a higher proportion of boys working than girls. Dropping out of school and child labor in children younger than 15 are similar in that both affect rural areas more than urban areas. Additionally, although more girls than boys drop out of school, more boys than girls are involved in child labor. Girls who drop out of school generally opt for early marriage, while a small proportion decide to work as maids.

Child labor characteristics mapped according to typology of socio-territorial contexts.

The Moroccan socio-territorial context involves four types of territories that concern child labor.

Type 1: Mountainous and landlocked areas. With a high proportion of child laborers and school dropouts in mountain areas, agriculture is the primary sector employing working children in Morocco. Scattered agropastoral areas with no nearby schools and poor infrastructure facilitate child labor. This environment is also characterized by men's domination over women. When a woman's financial autonomy is limited, conditions tend to encourage child labor. Although daughters typically remain at home to help with household chores, girls who have dropped out of school are more likely to work as housemaids and are mostly recruited to work in the city.

Type 2: Large cities, center of crafts and apprenticeships. Forty-two percent of children under age 15 work in manufacturing and crafts (excluding the carpet sector). In this context, child labor is perceived less as a constraint than as a culture of the city where one should not leave a child hanging around in the street. In addition, this occupation is considered socially useful; parents who want their child to learn a trade make strong demands for this type of free vocational training.

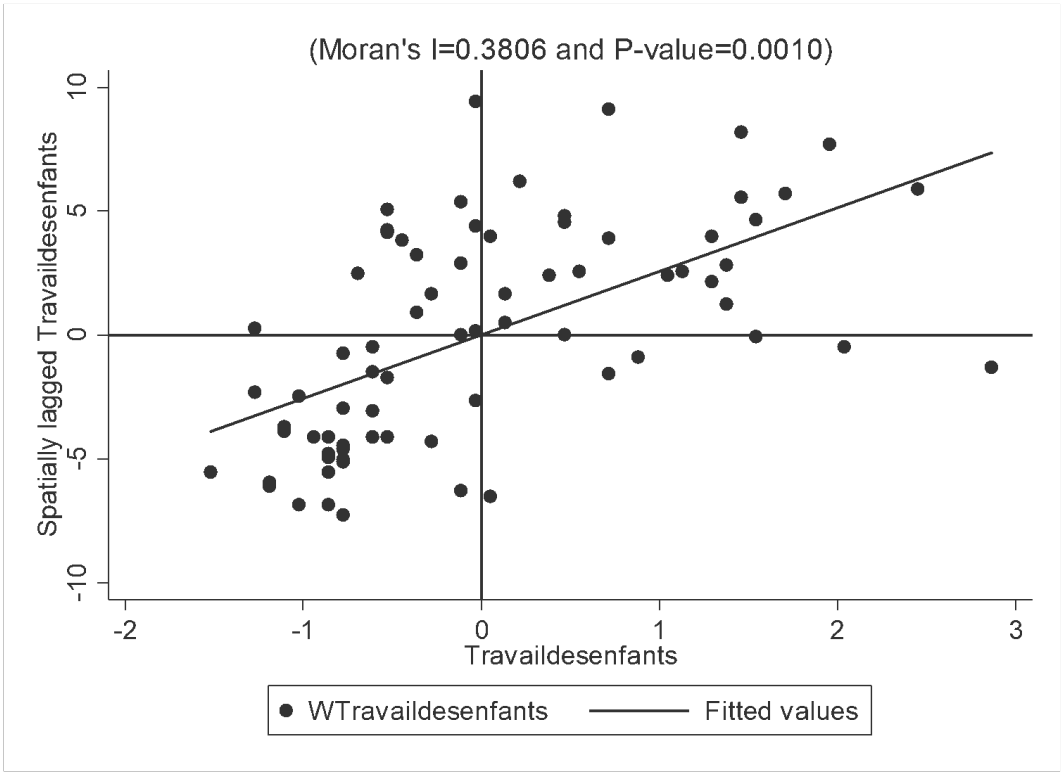
Type 3: Affluent urban peripheries of tourist cities. Children drop out of school to engage in illicit work. For example, parents' high occupation, an international lifestyle, and the multiplication of needs lead the children to forms of delinquency and illegal work where school is not regarded as a necessity. In this context (areas of Marrakech, Agadir, Fez), child labor is no longer just a problem of poverty, "It is a problem of the well-to-do where all desires are satisfied. It is the addiction to drugs, money, and cigarettes. Parents in these international areas are very busy with their work and leave their children to this addiction".

Type 4: Small towns with migratory economies. Dropping out of school in these areas is linked to the children's goal of emigration, which pushes them to leave school. When they reach the age of 18, these young people follow in the footsteps of family members who have already left and join them in Italy or Spain. Some of these young people master a trade, while others prefer to earn easy money through drugs. Those who can't leave turn to vocational training or work in workshops.

Analysis of spatial autocorrelation

First, we tested the independence of the variables. Spatial autocorrelation verification implies similar values for neighboring provinces. The spatial association results of school dropouts and their neighborhoods revealed spatial autocorrelation, verifying a positive and significant coefficient of Moran's index (IMoran) of 0.381 ($p<0.001$) (Appendix1).

Figure 6: spatial autocorrelation



According to the significance of the dropout rate in the Moran diagram in 2014(Figure 6), overall, the provincial map shows high stability, with the High High (HH) position in areas with a high dropout risk, including Al Hoceima, Chefchaouen, Laarache, Figuig, Sidi Bennour, El Jadida,

Taounate Rehamna, Safi, andYoussoufia. Some provinces with Low Low (LL) position, such as Rabat, Casablanca, Assa-Zag, Boujdour, Es-Semara, Tata, Laâyoune, and Tarfaya, have low rates of child labor and are surrounded by areas with the same trend, whereas provinces with a Low High (LH) position represent provinces that have a low child labor rate but are surrounded by areas with a high child labor rate, such as Figuig Province.

Spatial heterogeneity analysis: Empirical results of explanatory factors

Based on the explanatory text (Table 3), the model data explain the proportion of child laborers in Morocco with a score of 0.82. The variables retained for significance are discussed below. Multidimensional poverty presents a positive and significant coefficient (β= 0.11). Beyond monetary poverty, working children gather in areas with a high multidimensional poverty rate. The living conditions component includes homemakers (β = 0.16) and apprentices (β = 0.66). The areas that combine workers (caregivers and apprentices) are the most exposed to school dropout and early child labor. Two variables were retained for the socio-professional categories, the share of the population working as farmers and fishers (β = 0.09) and the proportion of people working as skilled handicraftsmen (β = 0.01), which confirms our theoretical analysis of dropout risk in areas where employment is less skilled. These children prefer to follow the socio-professional trend of their birth territories, generally working in agriculture or crafts sectors.

Table 3: Choice of the estimator model

Critères	**Models**		
	MCO	Spatial	Erreurs
Log Likelihood		-54.20	-55.48
Akaike	144.41	143.01	146.97
Schwarz	186.12	180.09	188.68
R2	0.82	-	-
P	-	0.027	-
Λ	-	-	-0.07
Constante	-10.60	-7.88	-12.06

Standards of living variables:			
Income poverty rate	0.213(0.265)	0.213(0.265)	0.213(0.265)
Multidimensional poverty rate	0.11(0.000)	0.11(0.000)	0.11(0.000)
Vulnerability rate	-0.01(0.662)	-0.01(0.662)	-0.01(0.662)
Labor force	0.0432(0.531)	0.0432 (0.531)	0.0432(0.531)
Participation rate	0.086(0.531)	0.086(0.531)	0.086(0.531)
Employment rate	0.0282(0.853)	0.0282(0.853)	0.0282(0.853)
Employers	-0.0484(0.569)	-0.0484(0.569)	-0.0484(0.569)
Self-employed	0.0458(0.798)	0.0458(0.798)	0.0458(0.798)
Public employee	-0.0389(0.7231)	-0.0389(0.7231)	-0.0389(0.7231)
Homemaker	0.0525(241)	0.0525(241)	0.0525(241)
Apprenticeship	0.66(0.000)	0.67(0.000)	0.67(0.000)
Associate partner	0.36361(0.5424)	0.36361(0.5424)	0.36361(0.5424)
Family assistance	0.16(0.000)	0.14(0.000)	0.2(0.000)
Labor market indicators			
Senior managers and professionals	0.03455(0.9162)	0.03455(0.9162)	0.03455(0.9162)
technicians and intermediate occupations	0.5543(0.8475)	0.5543(0.8475)	0.5543(0.8475)
Clerks, traders, and commercial and financial intermediaries	0.00050 (0.995)	0.00050 (0.995)	0.00050 (0.995)
Farmers fishers	-0.1358109(0.003)	-0.1358109(0.003)	-0.1358109(0.003)
Craftsmen. and skilled workers	0.0014607(0.953)	0.0014607(0.953)	0.0014607(0.953)
Agricultural workers and laborers	-0.135810(0.003)	-0.1358109(0.003)	-0.1358109(0.003)

Fishing including skilled workers	0.00146 (0.953)	0.00146 (0.953)	0.00146 (0.953)
Plant and machine operators. and assembly workers	-0.04991 (0.046)	-0.04991 (0.046)	-0.04991 (0.046)
Nonagricultural laborers	-0.0499162(0.953)	-0.0499162(0.953)	-0.0499162(0.953)
Fishmen and farmers	0.09	0.10	0.09
Artisans. and skilled workers	0.01	0.01	0.01
Lagrange Multiplier	-	2.45	1.021
Heteroscedasticity	0.29	-	-
Spatial dependence	-	2.65	0.036

Source: authors

Following the Lagrange Multiplier test (Appendix2), the spatial models recorded significant values. The criterion information for model validation showed the lowest values for the spatial model, at the expense of the ordinary least square model and the error model. The Breusch-Pagan test showed significant heteroscedasticity; therefore, the independent variables' (multidimensional poverty rate, family assistance, apprenticeship, fishmen and farmers, artisans, and skilled workers) power to explain the dependent variable (percentage of children in work) was related to the value of these variables for the contiguous provinces. However, there was no autocorrelation in the dependent variable because of missing variables in the model; autocorrelation did not detect f in the regression, which allows the null hypothesis to be rejected. The most appropriate estimator is the spatial model; the autocorrelation did not detect any term error in the regression, which allows the null hypothesis to be rejected. The most appropriate estimator is the spatial model.

Discussion

The findings show that, beyond individual characteristics, labor market dynamics have effects that interact with social background effects. Testing the labor market's role in the immobility risk of children from working-class backgrounds revealed region and birth province differences.

Analysis of explanatory factors for dropping out and child labor showed a spatial effect on child labor of the standard of living and labor market territorial components.

Our findings shed light on the impact of multidimensional poverty on employment in rural Moroccan areas. These results highlight the importance of instituting mechanisms to reduce poverty and vulnerability in high-risk Moroccan areas, particularly in rural areas. Geographic factors contribute to a crisis that must be resolved for balanced development among Moroccan regions.

Our findings also shed light on the decisive role of local labor markets in school retention disparities and the risk of early child labor. Disparities arising from labor market changes polarize high-skilled and low-skilled jobs. The divide between skilled and unskilled employment is supplanting the divide between blue-collar and white-collar workers.

In rural areas with an average supply of training, unfinished schooling is more connected to local labor markets, living conditions, and a living environment perceived by dropout children, rightly or wrongly, as less selective than elsewhere. For example, the labor markets offer mostly skilled jobs in the urban area.

Based on our findings, we advocate the need for coherent and cross-cutting public action in education, employment, and social protection.

- To improve labor market functioning, secure educational and professional trajectories, and remove obstacles to accessing quality education and employment. The findings underlined that public interventions should coherently act on four factors: the demand for work, the supply of work, the intermediation between supply and demand for work, and the labor market's legal and institutional environment. Currently, some sectors (i.e., agricultural) welcome young school-age workers, who remain in the informal sphere and are less protected. To combat child labor, especially in the agricultural sector, we must implement legal and institutional measures that protect children from this environment.
- The links between household poverty, access to education, and completion of studies should also be noted. Living in a poor household increases the risk of never attending school or leaving school before the end of the primary cycle. Therefore, we recommend improving the targeting process for social protection. Social protection through universal family allowances or cash transfers offers a powerful solution. Providing regular transfers to all families with children is a simple and proven way to protect

children and their families from poverty and improve access to education and other services. Payments can be used to encourage school attendance and help offset school fees. Solutions may be needed for informal working families, who may be excluded from social protection payments, making them doubly vulnerable. Socio-spatial targeting remains a problem in Morocco, despite the progress made against child labor through social programs to combat school dropouts. Therefore, it is necessary to improve the performance of social programs for needy households and geographical areas at high risk of dropping out.

Conclusion

Early school leaving has long been of interest to researchers. The economic and social consequences of early dropouts are significant. By measuring the local risks of dropping out of school, and the intergenerational immobility of children from working-class backgrounds, this study revealed significant differences between the Moroccan provinces regarding the likelihood of staying in school. Poverty and standard of living are still factors in the discrimination of certain disadvantaged areas. The spatial associations of child labor impact the same provinces and their surrounding areas over time and impact the children belonging to these territories from one generation to another. Eliminating child labor requires upstream action to curb school dropouts. A child who drops out of school is a good citizen who fails. To avoid the continuity of this endemic over time and between future generations, we recommend acting on two main axes: converging public actions for a transversal policy (education/employment) and strengthening social protection policies. Therefore, it is necessary to:

- Reduce the mismatch between job seekers' skills and the local labor market job requirements to encourage children to stay in school and potentially qualify for a skilled job.
- Improve the overall quality of education to increase the likelihood of students staying in school and succeeding in their educational careers.
- Enforce access to schooling for children under 15 years of age with legal restrictions, especially for households receiving cash transfers to keep their children in school.

- Implement additional efforts through multidimensional actions to improve school infrastructure, including roads, water, and sanitation, to facilitate a successful transition from primary to secondary school in remote areas of Morocco.

- Improve targeting of universal family allowances within the social protection system and other policy instruments according to the logic of socio-spatial equity, which could sustainably promote more equitable access to education for areas with high dropout risk.

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Appendices

A1: Spatial autocorrelation

Variables	I	E(I)	Sd(I)	Z	Pvalue
Share of children in work	0.3086	-0.014	0.074	3.693	0.0010

Source: Author's calculations

A2: Lagrange multiplier diagnostic test

Test	Statistic	df	p-value
Spatial error:			
Moran's I	0.890	1	0.373
Lagrange multiplier	0.264	1	0.607
Robust Lagrange multiplier	1.037	1	0.308
Spatial lag :			
Lagrange multiplier	1.344	1	0.024
Robust Lagrange multiplier	2.117	1	0.014

Source: Author's calculations