The Impact of Women's Participation in the Labour Market on the Academic Performance of Children in Senegal

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The Impact of Women's Participation in the Labour Market on the Academic Performance of Children in Senegal

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Abstract

This study sought a better understanding of the impact of a mother's participation in the labour market, on the academic performance of children in their primary school certificate examinations. The study used a recursive bivariate probit model in order to treat the endogeneity of the variable "mother's participation in the labour market". The data used in the study were drawn from the Integrated Regional Survey on Employment and the Informal Sector (ERI-ESI-2018). The results demonstrated that a mother's participation in the labour market has a negative impact on the academic performance of children in their primary school years. These results inform us of the need to address the challenges faced by working mothers by providing them with the support they need to establish a balance between their professional and maternal responsibilities.

Key words: Labour market, academic performance, Senegal

1. Introduction

The academic performance of children has in the recent past become a major social concern and has thus been the focus of several research studies (Hill et al., 2005; Tong et al., 2009; Tulk, 2013; Dunifon et al., 2013; Tulk et al., 2016; Kasiwa, 2018). Most of these studies have argued that other than the discipline-specific skills related to cognitive development through the subjects taught in schools (Tulk, 2013; Tulk et al, 2016), the family unit remains the cornerstone in the development of youth and their academic success (Belsky, 2005). Nevertheless, the breakdown in marital unions, the diversification of family structures and the active participation of mothers in the labour market are all contributing factors that increase the complexity of family units and , as a result, the role of parents in the education of their children (Parent and Brousseau, 2008; Tulk, 2013). In this study, we focussed on the impact of the mother's participation in the labour market on the education of children within a context whereby women are more actively engaged in the labour market and are faced with serious difficulties in trying to reconcile their professional roles and their maternal responsibilities.

According to research in the field of economics, a mother's participation in the labour market is a factor that contributes directly to the academic achievements of children that has not been addressed adequately. Yet, according to Afridi et al. (2016), there are three main channels through which a mother's participation in the labour market has an impact on the education of children. First, the overall income of the household is likely to increase when the mother starts earning an income. This could lead to more significant investments in the human capital of the children. Second, when the mother works outside the homestead, the children may have to participate in tasks related to managing a household, including carrying out the domestic chores, which could have a deleterious impact on their academic achievements. Third, earning an income could afford the mother decision-making powers in regard to the allocation of resources within the household. This higher-level decision-making power for a woman has a positive impact of the human capital of children in the household.

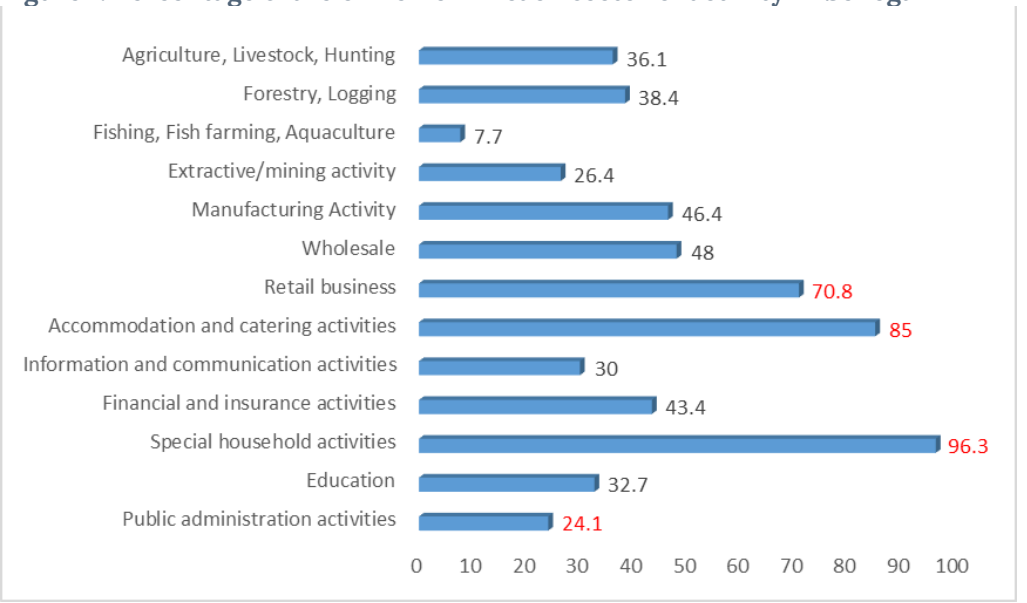
These three facets could all come into play, which would then render the direction of the impact resulting from the mother's participation in the labour market on the human capital of children ambiguous. Indeed, if the mother's participation in the labour market is due to exogenous shocks that place the household in a precarious position, it would not have an impact on the human capital of the children. Equally,

in the absence of a high level of decision-making power for a woman within the household, an increase in household income as a result of her participation in the labour market would probably not contribute to an improvement in the human capital of the children. One could therefore deduce that according more value to the preferences of mothers who participate in the labour market in terms of decision making would be one of the major factors in regard to improving the level of the academic achievements of their children.

In Senegal, more and more women are active in the labour market. A significant improvement in the rate of participation in the labour market was observed between 2005 and 2020. It increased from 36.9% to 48.6% (ANSD, 2021). The employment rate has also greatly evolved over the same period, increasing from 25.5% in 2005 to 31.1% in 2020 (ANSD, 2021).

Although women are economically active, they mainly operate within the subsistence agriculture sector and in the marginal activities of the parallel economy, with low value add and insufficient economic profitability (BIT, 2007). Productivity and the economic potential of women (including their capacity to invest in profitable activities) are thus hampered by deeply seated discrimination (FAO, 2011). Overall, 45.3% of formal employment is practised by women. They are mostly found in formal employment in sectors such as “special household activities” (96.3%); “accommodation and food” (85%); and “retail trade” (70.8%)

Figure 1: Percentage share of women in each sector of activity in Senegal



Source: ANSD and AFRISTAT (2019)

At the same time, Senegal has been engaged in a bold policy targeting universal school enrolment over close to two decades, with noteworthy results in terms of access to schools and the reduction of gender inequalities at the preliminary levels of schooling, whereby enrolment is compulsory. An examination of the educational progress[1] of primary school pupils indicates that the country had a transition rate of more than 94% for pupils moving to higher grades for each class between 2016 and 2017 (table 1) A gender analysis demonstrated that the percentage share of girls moving to a higher grade was generally higher than that of boys except in classes at the end of the primary school level, and secondary school years 1 and 2. Indeed, in those classes, boys were more likely to pass and move on to a higher grade (89.2% for boys and 86% for girls who transition from primary school to move on to secondary school year 1).

Table 1: Primary school survival rate according to the area of residence and the gender of the pupils

	Percentage of children that were in their first year in 2016 and are in their second year in 2017 (%)	Percentage of children that were in their second year in 2016 and are in their third year in 2017 (%)	Percentage of children that were in their third year in 2016 and are in their fourth year in 2017 (%)	Percentage of children that were in their fourth year in 2016 and are in fifth year in 2017 (%)	Percentage of children that were in their fifth year in 2016 and are in their sixth year in 2017 (%)	Percentage of children that were in their seventh year in 2016 and are in their seventh year in 2017 (%)
Area of residence						
Dakar	**95.5**	98.9	94.6	96.6	92.4	77.6
Other towns	95.8	97	94.9	96.3	96.3	92.7
Rural	96.5	96.9	95.3	96.3	95.6	91.4
Sex						
Boys	95.7	97.3	95	96	94.6	89.2
Girls	96.5	97.3	95	96.6	95.2	86
Senegal	**96.1**	**97.3**	**95**	**96.3**	**94.9**	**87.5**

Source: ANSD and AFRISTAT (2019)

These statistics raise a significant question: What is the potential impact of the participation of mothers in the labour market on the primary school survival rate of pupils in Senegal?

Using data from the regional integrated survey on employment and the informal sector, this study's overall objective was to examine the impact of the mother's participation in the labour market on children in Senegal.

More specifically, the study:

- Identified the determinants of participation of mothers in the labour market.
- Examined the impact of the mother's participation in the labour market on

the academic achievements of children at the end of their primary school cycle.

This study responded to a question of international interest. From this point of view, it becomes relevant also, where appropriate, whether from the perspective of scientific research or from the policy-making perspective. From the point of view of research, to the best of our knowledge, there is no study focusing on West Africa, particularly on Senegal, that has examined the results of the participation of mothers in the labour market on the academic achievement of their children. Our study intended to fill this gap. In regard to policy, this study targeted inclusive growth and perfectly fits in with the Sustainable Development Goals, notably, quality education, decent employment, economic growth and gender equality.

2. Literature review

Relatively few empirical studies have focussed on the impact of the participation of mothers in the labour market on the well-being of their children in general, and on the children's human capital in particular, especially in reference to developing countries. Results of studies undertaken by Luke and Munshi (2011), focusing on plantations in the south of India where women are employed on a permanent basis, demonstrated that a relative increase in the income of women has a positive impact on the education of their children. Using data from the Young Lives Study (YLS) in India, Afridi et al. (2016), observe that a higher participation of mothers in the labour market was associated with more time spent in school by children from their households. Furthermore, they found that the impact was more evident in the poorer households. Indeed, close to a half of the increase in time spent in school by pupils could be explained through an increase in the probability that a child is attending school while the mother is at work. Moreover, this increase in school attendance translates into higher educational outcomes among the pupils.

A study undertaken in Canada demonstrated that the professional occupation of a woman has a positive impact on the academic achievements and the well-being of their child (Tulk et al., 2016. Indeed, the more a mother is engaged in her work, the higher the chances that her child will get good grades in school. Nevertheless, changes in professional orientation, job promotions or irregular working hours could have repercussions on family life and cause anguish among children. This would no doubt deprive them of precious time, which could have been dedicated to playing together, reading, doing homework and going on outings (Tulk et al., 2016). These results agree with those of Marchant et al. (2001) that have demonstrated that the relationship between pupils and their parents and the support that they receive from their parents significantly contributes to academic success. Cawley and Liu (2012), in a study conducted in the United States found that working away from the household is related to less time spent with children in order to provide them with cognitive stimulation, but the degree of the impact remains low. Mothers who work away from the household spent only 12 minutes less per day with their children and 37 minutes less taking direct care of their children than mothers that did not work away from their households

Ruhm (2004) demonstrated that maternal employment during the first three years of the child's life has a small deleterious effect on estimated verbal ability of

three-year-olds and a larger negative impact on reading and achievement of five- and six-year-olds. Nelen et al., (2013) find that there is no negative relationship between maternal working hours and child outcomes, as is often found for pre-school aged children. Instead, they find that children's sorting test scores are higher when their mother works part-time (girls) or full-time (boys). At the same time, working might benefit children through, for example, greater family income.

Hoop et al. (2017) stated that the participation of women in the labour market could increase household income and generate an increased demand for education and the children's hobbies and therefore a reduction in the labour supply of the children. This result agrees with those from previous studies that have demonstrated that an increase in the income activity of the mother which translates into higher investment in the healthcare of their children leads to an improvement in the human capital of children Haddad et al.,1997; Moore and Schmidt, 2004).

Debela et al. (2019) used panel data, estimated using the fixed effects model on a study carried out in Tanzania. They concluded that a mother's employment has a non-linear effect on children's weight-for-age z-scores. Moore and Schmidt (2004) use the instrumental variables (IV) method and observed that the employment of mothers has a negative impact in the first year of the lives of children and a potentially positive and definite impact on the second year. The net impact over the course of the first three or four years is significant.

Hill et al. (2005) estimated the impact of the employment of the mother on the cognitive results of children (measured for children aged between 3 and 8 years). They found that the estimation of the real impact of a woman's participation in the labour market on the development of children is made difficult due to selection bias and due to the endemic lack of data for most studies on such policies. In order to resolve these problems, the researchers resorted to the used of the propensity score matching method and the multiple imputation method. Hill et al. (2005) compared the results of four methods of mother's occupational status: not worked over the first 3 years following childbirth; worked only after the first year, worked part-time over the first year; and worked full-time over the first year. The results highlighted the low and negative, but significant impacts of a mother's participation in the labour market to the cognitive results of the children in cases of working full-time over the first year following childbirth, as compared to delaying working until the end of the first year after childbirth. Multiple imputation gave estimations that are markedly different from a case-by-case approach for the various measurements. These researchers also found that the differences between the results of the propensity score matching and regression modelling were often minimal.

There is therefore no consensus in the literature in regard to the impact of participation by women in the labour market and the well-being of children in general, and on human capital in particular. The impact of the employment of women on the well-being of children is usually arrived at by the socio-economic status of the household, which in turn operates through a set of "immediate determinants" of health and education of the child. In this context, the results of the health and

education of children depends on a combination of social, economic, biological and environmental forces. The participation of women in labour market activities contributes to household income, generally giving access to more food of better quality, housing, protection against always being sent away from school and an improvement in academic achievements.

3. Methodology and data

The potentially contradictory effects of a mother's employment on the education of their children could technically be understood as a production function. Indeed, the income generated by a woman's job promotes investment in the education of her children, but also the consumption of inputs such as food and medical care which would improve the cognitive skills of the child. Furthermore, a decrease in the quantity and quality of the time spent by the mother with the child could have a harmful effect on the nutritional status of the child and on their academic support, as compared to those children whose mothers are not working.

An examination of the impact of the mother's participation in the labour market to the academic achievements of their child calls for a recourse to specific statistical methods that would allow for the isolation of effects that are specific to various explanatory variables. Bivariate models allow us to correct such effects (Madala, 1983; Greene, 2008). The objective in this case is to explain the impact of the participation of the mother in the labour market on primary school survival in Senegal. Indeed, the correlations that are evident between the academic achievements of the child and the mother's participation in the labour market cannot be seen as being caused by other factors but rather as being the consequence of other factors that are at the same time determinants of those two variables (endogeneity problems). This could be the case if an unobserved variable (for example the mother's talent) provokes both a job promotion for the mother in the labour market and an improvement in the academic achievements of the child. Another example could be that there are tensions at home that affect the mother's work to the extent that she becomes unemployed, and that the same tensions at home also have a harmful impact on the academic achievements of the child (Duée, 2005). In order to treat such a difficulty, we estimate a recursive bivariate probit model comprising two equations, one that explains the participation of the mother in the labour market, and the other the school survival of the child. It is written as:

- y_1 The mother's participation in the labour market, indicated here by her occupying any employment position. This variable is the fulfilment of an unobserved variable y_1^*

$$y_1 = 1(y_1^* > 0) \quad (1)$$

- y_2 The school survival of the child (transition to a higher grade in two consecutive years). This variable is the fulfilment of an unobserved variable y_2^*

$$y_2 = 1(y_2^* > 0) \quad (2)$$

The model is therefore written as:

$$y_{1i}^* = X_{1i}\alpha + \varepsilon_{1i} \quad (3)$$

$$y_{2i}^* = X_{2i}\beta + \delta y_{1i} + \varepsilon_{2i} y_{2i}^* = X_{2i}\beta + \delta y_{1i} + \varepsilon_{2i}$$

Where: X_{1i} and X_{2i} are the individual characteristics of the mothers and their pupils. The explanatory variables used in the model are associated with the socio-demographic characteristics of the pupils (sex, area of residence); to the characteristics of the mother (age, certificate, type of training, type of employment, social background); and to the household characteristics (area of residence). Error terms ε_1 ε_1 and ε_2 ε_2 follow a standard bivariate normal distribution with correlation coefficient ρ such as:

$$\begin{pmatrix} \varepsilon_{1i} \\ \varepsilon_{2i} \end{pmatrix} \sim \mathrm{N}\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}\right]$$

The assumptions of the recursive bivariate probit model are:

1. $E[\varepsilon_{1i}|X_{1i}, X_{2i}] = E[\varepsilon_{2i}|X_{1i}, X_{2i}] = 0$
2. $Var[\varepsilon_{1i}|X_{1i}, X_{2i}] = Var[\varepsilon_{2i}|X_{1i}, X_{2i}]$
3. $Cov[\varepsilon_{1i}\varepsilon_{2i}|X_{1i}, X_{2i}] = \rho$

According to Madala (1983) and Greene (2008), recursive bivariate probit models are specific models. They are models of recursive simultaneous equations, since the variable y_1 appears in the equation y_2 whereas the endogenous variable (y_2) only appears in the equation y_1 (Maddala, 1983; Greene, 2008). Thus, the probability of the mother participating in the labour market and having an impact on the academic achievements of her child is equal to the cumulative distribution function of the bivariate normal distribution written as Φ, whereby:

$$P(y_1 = 1; y_2 = 1) = \Phi(\alpha X_{1i}, \beta X_{2i} + \delta, \rho)$$
$$P(y_1 = 1; y_2 = 0) = \Phi(-\alpha X_{1i}, \beta X_{2i}, -\rho)$$
$$P(y_1 = 0; y_2 = 1) = \Phi(\alpha X_{1i}, -\beta X_{2i} - \delta, -\rho)$$
$$P(y_1 = 0; y_2 = 0) = \Phi(-\alpha X_{1i}, -\beta X_{2i}, -\rho)$$

Consequently, the expected value of $y_2 y_2$ given by the vectors X_{1i} and X_{2i} is as follows:

$$E[y_2|X_{1i}, X_{2i}] = P[y_1 = 1]E[y_1|y_2 = 1, X_{1i}, X_{2i}] + P[y_2 = 0]E[y_1|y_2 = 0, X_{1i}, X_{2i}]$$
$$= P[y_2 = 1]P[y_1 = 1|y_2 = 1, X_{1i}, X_{2i}] + P[y_2 = 0]P[y_1 = 1|y_2 = 0, X_{1i}, X_{2i}]$$
$$= P[y_1 = 1, y_2 = 1] + P[y_1 = 1, y_2 = 0]$$
$$= P[y_1 = 1, y_2 = 1] + P[y_1 = 1, y_2 = 0]$$
$$= \Phi(\alpha X_{1i}, \beta X_{2i} + \delta, \rho) + \Phi(-\alpha X_{1i}, \beta X_{2i}, -\rho)$$
$$= \Phi(\alpha X_{1i}, \beta X_{2i} + \delta, \rho) + \Phi(-\alpha X_{1i}, \beta X_{2i}, -\rho)$$

In order to determine the optimal values of the parameters α, β and ρ, the model is estimated using the maximum likelihood method.

The variables used in the various models are presented in Table 2.

Table 2: Presentation of the variables of the model

Number	Variables	Explanations	Categories
1	Y_1	Participation of women in labour market	0= do not participate 1= Participate
2	Y_2	Academic achievements of children	0= Was not promoted to the next grade 1= Promoted to the next grade
3	x_1	Sexe of the child	0= Boys 1= Girls
4	x_2	Mother's age (Ref: 15-24years)	1= 25-34 years 2= 35-64 years
5	x_3	Area of residence (Ref: Dakar)	1= Other urban areas 2= rural
6	x_4	Degree mother (Ref: No degree)	1=CFE 2= BFEM 3= CAP 4= BEP 5=BAC 6=DEUG, DUT, BTS 7= Undergraduate degree 8=Masters 9=Master, DESS, DEA, Bsc Engineering

7	x_5	Marital status (Ref: Single)	1=Married 2= Divorced 3=Widow
8	x_6	Household size (Ref: 1-6 people)	1=7-10 people 2=11-15 people 3=16 and more
9	x_7	Type of apprenticeship (Ref: academic training)	1= Simple (praticals with no theory) 2=Dual (theory and practice)
10	x_8	Social category of the parents (Ref: Children of managers)	1=Children of the employees 2=Children of self-employed worker 3=Children of another social category of parents
	x_9	Group job mother (Ref: highly qualified**)**	1= Low skills workers 2= Qualified employee 3= Unqualified employment

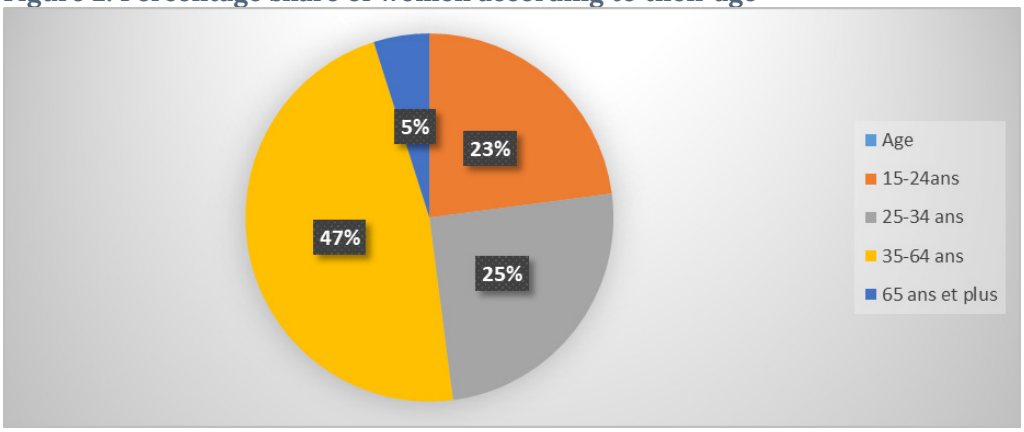
Source: Authors

The study used a recursive bivariate probit model to treat the endogeneity of the variable "mother's participation in the labour market". The other variables in our model (control variables) could also be suspected of being endogenous. our study, we started from the strong hypothesis in which the control variables used are exogenous or that their eventual endogeneity will not significantly bias the estimation of the impact of the participation of the mother in the labour market on the academic achievements of pupils in primary school.

The data used was derived from the regional integrated survey on employment and the informal sector which covered two phases: the first collected data on the socio-demographic characteristics of the population (education, health care, employment, demography, etc.) and the second phase was related to data collection from informal non-agricultural production units identified in the first phase. We were mainly interested in the first phase during which two questionnaires were used: a household questionnaire which collected information on all members of the household, the household and the home, and a questionnaire on employment administered in each household to all individual aged 10 years and more.

We conducted a descriptive analysis of the data based on various characteristics of the mothers (Figure 2). The statistics revealed that most of the women (47%) in our sample were adults aged between 35 and 64 years. They were followed by young women in the age group of 25–34 years (25%) and 15–24 years (23%) respectively. The older mothers were represented in lower numbers (5%).

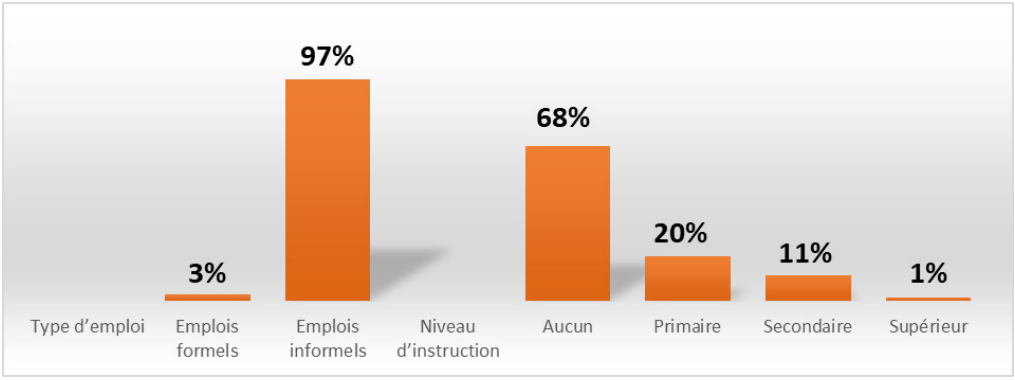
Figure 2: Percentage share of women according to their age



Source: Authors using data from the regional integrated survey on employment and the informal sector, 2018

An analysis of the type of employment and the level of education showed that most of the women were in informal employment (97%) and were illiterate (68%) (Figure 3). A small percentage worked in the informal sector (3%) and a few of them had been promoted to the highest level (1%). Those with a primary and secondary school level of education were 20% and 11% respectively. These statistics demonstrate once more the urgency of investing more in human capital, especially in girls in Senegal, but also to reduce the increasing informality of our economies.

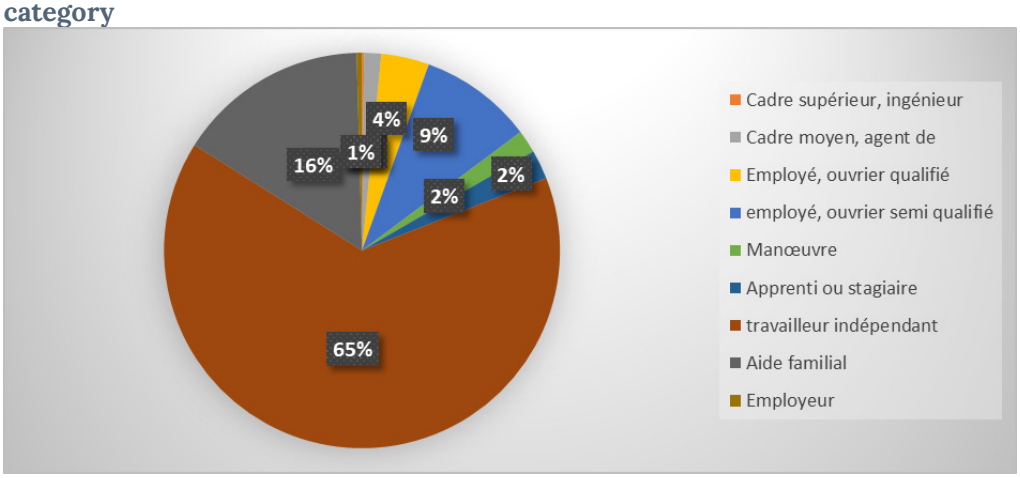
Figure 3: Distribution of women according to the type of employment and the level of education



Source: Authors using data from the regional integrated survey on employment and the informal sector, 2018

Focussing on the socio-professional category of the women, the results demonstrated that many of them were self-employed (close to 65%), stay-at-home spouses (16%) and semi-qualified employees and workers (9%) (Figure 4). These data strengthen the argument on the predominance of the informal sector in Senegal. Women are also self-employed which leads them to be absent from home and leave the responsibility for childcare in the hands of other people.

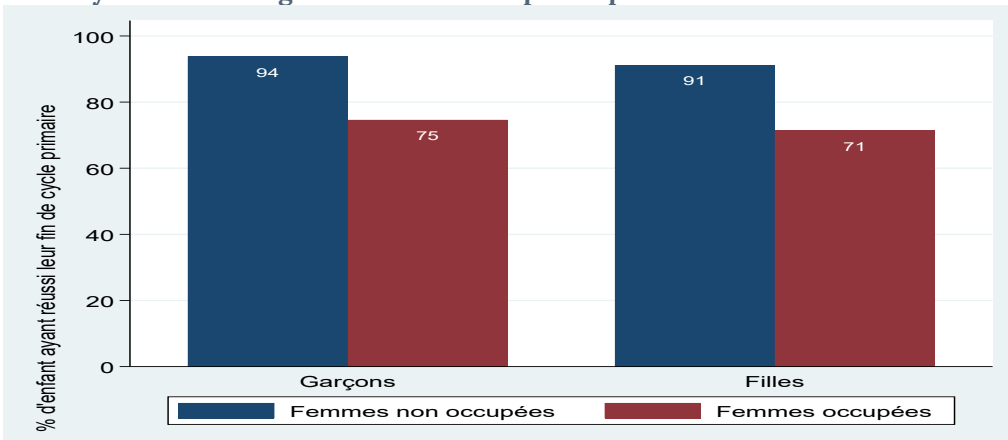
Figure 4: Percentage share of women according to the socio-professional category



Source: Authors using data from the regional integrated survey on employment and the informal sector, 2018

By focusing on the probability of school survival of children according to whether their mother participates or does not participate in the labour market, the statistics revealed that children whose mothers do not participate in the labour market are more likely to succeed in their primary school exit examinations. More specifically, the rate of academic achievements for boys whose mothers do not work was 94% against 75% for those with working mothers (Figure 5). The same thing is evident among girls with a higher gap (91% against 71%). This gap between the results for boys and girls could be explained through the fact that women who remain at home undertake the domestic chores reserved for girls after school. This allows them to spend more time studying. Further, since mothers are often at home, this gives them more quality time with their children.

Figure 5: Probability of school survival for children at the end of their primary school years according to their mother's participation in the labour market



Source: Authors using data from the regional integrated survey on employment and the informal sector, 2018

4. Results

Table 3 presents the results of the estimation of the recursive bivariate probit model on participation of mothers in the labour market and the academic achievements of their children. The coefficient of the correlation between the errors of the equation of participation in the labour market and the academic achievement of children is positive and significant, confirming the hypothesis that those two variables are related and justifying the need to use the bivariate model.

- Determinants of the participation of women in the labour market

Age has a significant impact on the probability of obtaining employment among women. At a threshold of 1%, the probability of women in the 25–34 years and 35–64 years age groups being employed increases by 6% and 7% respectively as compared to young women in the age group 15–24 years who are considered fresh entries into the labour market. These results could be explained through the fact that in Senegal, the youth leave the education system relatively late and thus have problems obtaining professional experience that would allow them to gain the confidence of potential employers. The employers thus prefer older, more responsible women to young girls, less experienced. In the context of our sample, where the descriptive statistics reveal the predominance of informal employment, this result is correct in the sense that adult women are more likely to be self-employed in order to contribute to the income of their households. However, young girls in the age-group 15–24 years have a higher probability of being employed than those aged 65 years and above.

In regard to degree holders, the results revealed that apart from an undergraduate degree, a tertiary level of education does not have a significant impact on holding a post, although people with a primary school certificate and a secondary school certificate have a higher probability of working than women who are not degree holders. This result suggests a higher involvement in the labour market by the women who have lower levels of education in Senegal, which may be related to a lack of jobs that match with the qualifications of the more educated workers. Indeed, the holders of higher certificates are unwilling to accept jobs that are beneath their level of education, because they consider them degrading given the number of years they dedicated to their studies. Thus, the predominance of the informal sector in Senegal could explain why women who are more educated are not in demand in the informal

labour market given its characteristics and the salary that they would demand as corresponding to their qualifications. This result goes against those arrived at by Lopez-Acevedo et al. (2021) who demonstrated that obtaining a university degree plays a significant role in the participation of women in the labour market in Morocco.

The type of apprenticeship has a significant impact to a threshold of 1% on the possibility of participating in the labour market. As compared to women that only followed theoretical studies, those with practical training and the women that combine theory and practice have a higher probability of participating in the labour market.

Marital status had a significant impact on the possibility of obtaining a job. Indeed, compared to single women, married women, divorcees and widows have a higher probability of participating in the labour market. This implies that the social norms, such as taking care of one's spouse, child care or household responsibilities, do not prevent participation in the labour market in Senegal. These results are contrary to those arrived at by Spierings et al, (2010), which demonstrated that the absence of a partner, a husband or any other male adult has a positive impact on the employment of women. They are also in opposition to the results given by Killingsworth and Heckman (1986) who examined the determinants of supply of female labour and their impact on the fertility rates, marriage and decisions to divorce in the United States, Canada, Great Britain and Germany. They found that single women are always more likely to work than married women.

The number of children in a household has a negative and significant threshold to 1% on the participation of women in the labour market. The results demonstrate that as the size of the household increases so does the probability of participating in the labour market diminish. More specifically, the probability that women from a household of more than 16 people will hold a job diminishes by 7% as compared to those from a household of more than 6 people. This probability is at 5% and 3% for women from a household with more than 15 people and one with more than 10 people respectively.

The social origins of the parents is a determinant for obtaining a job for women in Senegal. Indeed, women that have a parent who is a manager have a higher probability to be active in the labour market than women whose parents are employees. This observation is in agreement with those from several studies that bring out the importance of social capital in accessing jobs in Senegal (Kane et al., 2020; Kane et al., 2021). The result is nonetheless contrary to those arrived at by Ningaye and Njong (2015) in their study on Cameroon. These authors found that women from poor households or living in poverty had a higher probability of accessing the labour market than women from rich backgrounds.

- Impact of the mother's participation in the labour market on the academic achievements of pupils in their final primary school certificate examinations

The results in Table 3 reveal that a mother's participation in the labour market has a negative and statistically significant impact on a threshold of 1% on the academic achievements of pupils in their final primary school certificate examinations. In other words, the participation of mothers in the labour market reduces the probability of the academic success for pupils in their final primary school examinations. This result agrees with those arrived at in countries such as Senegal, where fathers are considered less readily available due to their professional activities and especially because of gender roles in society. Mothers are generally in charge of education, the care of relatives and taking care of children. When they actively participate in the labour market, this no doubt denies their children precious time that could be dedicated to their playing together, reading or doing homework. Moreover, the professional occupation of their mothers could drive the children, especially girls, to take responsibility for household chores and other domestic duties such as shopping at the local grocery store or at the market. This leads to a reduction in time spent revising and a deterioration in their school performance.

Table 3: Impact of the participation of mothers in the labour market on the academic achievements of their children

	Recursive bivariate probit regression			
VARIABLES	*Determinants of the participation of women in the labour market*		*Academic achievements of children*	
	Coef.	*Std. error*	*Coef.*	*Std. error*
~~Determinants of the~~ participation of women in the labour market			-2.147***	0.170
Gender of the child (Ref. Boy)				
Girls			-0.045	0.081
Age of the mother (Ref: 15–24 years)				
25–34 years	0.601***	0.066	0.386***	0.121
35–64 years	0.679***	0.067	0.485***	0.135
65 years and above	-1.017***	0.159	-0.515	0.321
Area of residence (ref: Dakar)				
Other urban areas			0.257	0.183
Rural			0.333*	0.184
Mother's certificate (Ref: no certificate)				
CFEE	0.476***	0.066	1.463***	0.148
BFEM	0.788***	0.099	1.240***	0.165
CAP	0.597**	0.260	2.258***	0.315
BEP	0.548***	0.196	1.237***	0.267
BAC	0.588**	0.228	-3.592	0.720

DEUG, DUT, BTS	5.582	0.190	-3.482	0.150
Undergraduate degree	-0.791***	0.481	-3.467	0.220
Masters	5.678	0.577	-3.344	0.850
Masters, DESS, DEA, Bsc Engineering	0.618	0.546	-3.484	0.080
Marital Status (Ref: Single)				
Married	(0.893)	0.105	-0.046	0.255
Divorced	0.675***	0.233	-4.763	0.586
Widow	0.461**	0.206	-4.654	0.079
Household size (Ref: 1–6 people)				
7-10 people	-0.333***	0.086	0.070	0.143
11-15 people	-0.514***	0.088	-0.171	0.153
16 and above	-0.713***	0.087	-0.290**	0.144
Types of training (Ref: classroom teaching)				
Simple (practice with no classroom learning)	1.830***	0.064		
Dual (theory and practice)	1.839***	0.101		
Social background of parents: (Ref: Children of executives				
Children of the employees	-0.069			
Children of self-employed workers	-0.146			
Children of workers in any other social category	-0.136			
Mother's job group (ref: Highly qualified)				
Qualified employee			0.089	0.119
Low skilled worker			-0.520**	0.197
Unqualified employment			-0.052	0.142
Constant	-0.049	0.169	-0.985**	0.417
/atanrho	1.967***	0.691		
rho	0.961	0.052		
Observations	***4,794***			
Wald chi²(54)	***2,316.01***			
Prob. > chi²	***0.0000***			
Log likelihood	***-1,800.244***			
Wald test of rho=0: chi²(1)	***8.113***			
Prob > chi²	***0.004***			

*** p < 0.05, ** p < 0.01, * p < 0.001

Notes

1. The endogenous variables represent the participation of women in the labour market (holding any employment position) and the academic achievements of children at primary school level.

2. The signs (***) and (**) and (*) indicate the significance of variables to their respective thresholds of 1%, 5% and 10%.

Another explanation could be related to the fact that the income derived from profits from the professional activity of the mother do not contribute to the probability of the academic success of the children. Indeed, the configuration of Senegalese families is such that it is the man who is in charge of all the domestic expenditure. Such observations led us to conclude that the impact of the woman's income does not counterbalance the impact of time within the household, especially when most of the jobs occupied by the women in our sample are precarious jobs that require much time spent at work, but do not pay well. This result agrees with those arrived

at by Dunifon et al. (2013) in Cambridge and Lei et al. (2018) in China who found that the participation of mothers in the labour market diminishes the results in tests in academic examinations and leads to a lowering of academic and non-academic achievements of children.

When academic qualifications were considered, the results indicated that the fact that the mother has a certificate (primary school or O level of the secondary school certificate holders as compared to those who hold no certificate) has a positive and significant impact on the probability of academic success for their child in their primary school certificate examinations. This result agrees with those arrived at by Duée (2005) and is explained by the fact that mothers with a primary or secondary school level of education have better knowledge of the education system and are capable of supporting their children and helping them out their children. Tertiary level certificates have a negative sign, but their impact is not significant.

The other characteristics with a positive impact on obtaining a primary school education certificate are the area of residence of the child, the age of the mother, the number of siblings and the mother's occupation. Indeed, children living in a rural area are more likely to succeed in their primary school education certificate examinations than those living in the capital city of Dakar. In relation to mother's age, the results demonstrated that children with mothers aged between 25 and 64 years have a higher probability of moving to a higher grade than children with mothers aged between 15 and 24 years of age. The larger the household size, the lower the chances the pupils have of passing their primary school certificate examinations. This result agrees with those arrived at by Maurin (2002) and Goux and Maurin (2005) who used a housing conditions approach and concluded that overcrowding in a house has a net impact on risks of lag in schooling for children.

Finally, compared to children whose mother's job requires little skill, those with a mother that occupies a highly qualified position have a higher possibility of succeeding in their primary school certificate examination. This result agrees with those of Menahem (1988) using data from France. This researcher demonstrated that the socio-professional status of mothers who have higher salary expectations is positively related to the academic achievements of their children.

5. Conclusion

Indicators of development that are generally related to the inclusion of women in the labour market have experienced significant improvement in Senegal. These are, among others, a decrease in the fertility rate; an improvement in access to education, especially for girls; and an increase in the empowerment of women. Nevertheless, the increase in the supply of female labour observed in recent times is not without consequences for the structure of families, especially in relation to the education of children, since women who were previously at home and were in charge of raising children are now absent from their homes. The main objective of this study was to examine the impact of the mother's participation in the labour market on the academic achievements of children at the end of their primary school cycle. Using primary data from the Integrated Regional Survey on Employment and the Informal Sector}, we estimated a recursive bivariate probit model so as to treat the endogeneity of the variable "participation of the mother in the labour market". Indeed, the correlations that are evident between the academic achievements of the child and the mother's participation in the labour market cannot be seen as being a causality, but rather as being the consequence of other factors that are at the same time determinants of those two variables.

The results allowed us to first of all identify the determinants of the participation of mothers in the labour market before seeing how this participation impacts upon the academic achievements of the children. First, we observed that some individual characteristics (age, certificates, marital status) and household characteristics (size of household, social background of parents) contribute to keeping women in the labour market. Second, we concluded that the participation of mothers in the labour market reduces the probability of success for children in their final primary school certificate examinations. Indeed, working away from the household allows women to earn an income and to participate in household expenditure, but their absence from the household is not without consequences for their children (domestic chores, idleness, television, etc.). By including control variables, we observed that children of older mothers, who are thus more experienced and holding more qualified positions, who have a basic education (primary and O level secondary school certificate), living in the rural area and in a small size household have a higher probability of succeeding in their final primary school certificate examination.

These results indicate the need to address the challenges faced by working mothers by providing them with the support they need in order to establish a balance between their professional and maternal responsibilities. The first challenge is related to increasing investment in the public education sector so as to improve the quality of teaching for pupils in their final year whose mothers are often absent from home. The government needs to use a grassroots approach through local authorities in order to reach out to pupils in their final year of primary school and offer them tuition in their local communities. Such classes will be undertaken by the students who live in those neighbourhoods. Their local government authorities would provide the necessary pedagogical resources and the monthly salaries for the youth in charge of teaching the tuition classes. The second challenge is related to identifying mothers who are in this situation and offer them programmes of education and training in order to improve their parenting skills and support the education of their children. Finally, policy makers must reduce the impact of overcrowded housing on the academic achievements of children by putting in place birth control policies.

Notes

1 Academic progression allows us to measure the level of transition of pupils from one year of study to another. It is calculated through the school survival rate which gives the percentage number of children that moved from one year of study to the next in the course of two consecutive academic years.

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