



Horticultural exports, female wage employment and primary school enrolment: Theory and evidence from Senegal



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ARTICLE INFO

Article history:

Received 29 July 2012

Received in revised form 4 June 2013

Accepted 27 July 2013

Keywords:

Globalisation

Female labour market participation

Female empowerment

Collective household model

Primary school enrolment

Gender disparity in schooling

ABSTRACT

In this paper we analyse the indirect effects of the boom in horticultural exports in Senegal on child schooling. The export boom has caused a dramatic increase in female off-farm wage employment, which led to increased female bargaining power in the household. We investigate the causal effect of female wage income on primary school enrolment. We develop a collective household model with endogenous bargaining power to show that, if women have higher preferences for schooling than men, the impact of female wage income on school enrolment will be the result of a positive income effect, a negative labour substitution effect and a positive empowerment effect. We address the question empirically using original household survey data from Senegal. We use different econometric techniques and show that female off-farm wage income has a positive effect on primary school enrolment for both boys and girls, and that female empowerment is specifically important for the schooling of girls. Our results imply that the horticultural export boom in Senegal has indirectly contributed to the second and third Millennium Development Goals of universal primary education and elimination of gender disparities in primary education.

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Introduction

The recent horticultural export boom in developing countries is a much debated issue. It is recognised that horticultural exports entail the potential to raise rural incomes and alleviate poverty because of the high intrinsic value of produce and the labour-intensive production systems (Maertens et al., 2012). There is a growing body of empirical literature that analyses the welfare effects of horticultural exports (Mithoefer and Waibel, 2011). Most studies point to positive effects through product markets. Smallholder contract-farming with horticultural export companies has been found to positively affect farm productivity, rural incomes, poverty reduction and farmer wellbeing (Minten et al., 2009; Asfaw et al., 2010; Maertens and Swinnen, 2009; Dedehouanou et al., 2013). Some studies emphasize the exclusion of poorer farmers and women from contracting in horticultural export chains (e.g. Dolan and Humphrey, 2000; Dolan, 2001; McCulloch and Ota, 2002; Singh, 2002). A few studies emphasize that important effects emerge through labour markets as well and showed that horticultural exports importantly contribute to poverty reduction through the creation of rural employment (e.g. Barron and Rello, 2000;

Maertens and Swinnen, 2009; Maertens et al., 2011; Colen et al., 2012).

Yet, very few studies have looked beyond direct income and poverty effects. Exceptions include Minten et al. (2007) who find that smallholder contract-farming with horticultural export companies in Madagascar led to increased rice yields through technology spillover effects. Asfaw et al. (2009) find that there are managerial spillover effects from contracting with certified horticultural exporters in Kenya, leading to less hazardous pesticide use and improved health conditions of farmers. Maertens (2009) finds that wage employment in the horticultural export industries in Senegal creates investment spillovers and leads to higher input use and improved productivity in smallholder production for the local market.

In this paper we address a completely unexplored issue and analyse the indirect effects of the boom in horticultural exports in Senegal on child schooling. Previous studies showed that this export boom has been associated with a sharp increase in rural employment, especially female employment, and that this employment importantly contributes to poverty reduction and female empowerment¹ (Maertens and Swinnen, 2009, 2012; Maertens et al., 2011). In this paper we analyse whether female wage employment in the horticultural export sector and associated female

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¹ Other studies however have pointed towards existing gender discrimination in wages and employment conditions in horticultural export sectors (e.g. Barrientos et al., 2003; Barrientos and Kritzing, 2004).

empowerment has resulted in better outcomes for children, with a focus on primary school enrolment of boys and girls.

This is an important question because education is a critical asset for rural people and an important determinant of agricultural growth and rural development in the long run (World Bank, 2008). As with many other assets, nowhere is the lack of education as large as in Sub-Saharan Africa (SSA). Adult literacy is only 62% in SSA – compared to more than 90% in East Asia and Latin America (World Bank, 2010). More anxiously, progress in education is slow. Primary school enrolment is only 76% in SSA while close to 100% in East Asia and Latin America (World Bank, 2010). Currently still 69 million of primary school-age children are not in school worldwide, about half of them in SSA (United Nations, 2010). In Senegal, primary school enrolment is even below the SSA average with huge disparities between rural and urban areas and between boys and girls (Bennell, 2002). Primary school enrolment is estimated at 78% for boys and 73% for girls in urban areas versus 62% for boys and 51% for girls in rural areas (Montgomery and Hewett, 2005).

In 2001 Senegal adopted a change in the constitution that stipulates the responsibility of the state to provide adequate public institutions to guarantee primary education for all children, and that all children, boys and girls, have the right to go to school (République du Sénégal, 2003). After this, in 2003, the government of Senegal embarked on a ‘Primary education for all – *Education première pour tous*’ program under the auspices of the United Nations and with the support of several donors such as the World Bank, USAID and the French Development Agency. The program has mainly focussed on the supply side of schooling; on increasing the number and the quality of classrooms, the quality of teachers, and the availability of textbooks. As a result, net primary school enrolment in Senegal increased from 62% in 2003, when the program started, to 73% in 2009 (World Bank, 2010). This progress is important but not sufficient to guarantee primary education for all by 2015.

Education programs that focus on the supply side of schooling are necessary but they do not suffice to reach the second Millennium Development Goal of universal primary school enrolment. A low demand for primary education among poor and rural households has been argued to be the most critical factor in low primary school enrolment rates in SSA (Bennell, 2002). Empirical evidence from several developing countries has shown that household income and wealth are the main factors determining schooling (e.g. Tansel, 1997; Behrman and Knowles, 1999; Rosati and Rossi, 2003; Gitter and Barham, 2008; Lincove, 2009; Zhao and Glewwe, 2010). Also the sources of household income and parental occupation matter, with evidence pointing to children from self-employed parents being less likely to be in school than children from employees (e.g. Grootaert and Kanbur, 1995; Parikh, 2005). It has been argued that in addition to the level of income, intra-household control over income and resources matters for school enrolment. Some studies have empirically documented that increased bargaining power for women increases school enrolment or school expenditures (or decreases child labour) (e.g. Thomas, 1994; Reggio, 2011; Gitter and Barham, 2008; Lancaster et al., 2006). Our study will contribute to this literature by focussing on female off-farm wage income and its effect on child school enrolment.

To analyze the effect of female wage employment in the export agro-industry on primary school enrolment, we first develop an analytical framework based on a household bargaining model in which the bargaining power of women is a function of their off-farm wage income. Our model is inspired by Basu (2006), Reggio (2011) and Emerson and Souza (2007) but focuses more generally on the impact of maternal wage income on child school enrolment and also accounts for effects that are not necessarily related to the distribution of power in the household. The theoretical analysis reveals that the impact of maternal wage income on child schooling

results from three different effects: an income effect, a labour substitution effect, and an empowerment effect. The ultimate effect remains an empirical question, which we address using original and unique household survey data from the Niayes region, the main horticultural region in Senegal. The horticultural export boom has caused a tremendous and sudden increase in female off-farm wage employment on the fields of large agro-industrial estates and in processing and packing units since the early years 2000. This is an ideal case to test whether the horticultural export boom and associated female wage employment has caused indirect effects on child schooling. We use different econometric techniques to estimate the casual effect of female wage income on the propensity of children to be in school, controlling for individual, household and village characteristics. We find that female wage employment in the horticultural export industry has a significant positive and large effect on primary school enrolment for both boys and girls, and that female empowerment is specifically important for the schooling of girls.

A collective household model²

To derive how female wage employment affects child school enrolment, we consider a collective household bargaining model. The collective model is a non-unitary cooperative household model in which it is assumed that bargaining between household members leads to Pareto efficient outcomes. While the use of non-unitary household models is widely supported (e.g. Kevane, 2011; Haddad et al., 1997), there is no unequivocal support for either cooperative or non-cooperative models. The use of cooperative models is rejected by some empirical studies (e.g. Udry, 1996; Doss and McPeak, 2006; Ashraf, 2009) but supported by others (e.g. Browning and Chiappori, 1998; Bobonis, 2009). Our approach follows the evidence provided by e.g. Goldstein and Udry (2008), Rangel and Thomas (2005) and Dauphin et al. (2006) who do not reject efficient bargaining in West-African households.

We consider a household consisting of a female and male head and an unspecified number of children. The household’s utility (U) is a weighted sum of women’s (U_f) and men’s (U_m) utility. The weight (θ) captures the relative balance of power in the household; θ increases the relative bargaining power of the wife and men’s bargaining power is normalised to one:

$$U = \theta U_f + U_m \quad (1)$$

We assume that utility is a concave function of consumption (C), leisure (I_f and I_m) – with women/men deriving utility only from their own individual leisure time – and the schooling of children (S).

$$U = \theta U_f(C, I_f, S) + U_m(C, I_m, E, S) \quad \text{with} \quad \begin{array}{l} \forall x \in C, I, S: U_x > 0, U_{xx} < 0 \\ \forall x \in C, I, S; \forall y \in C, I, S: U_{xy} < 0 \end{array} \quad (2)$$

We assume no savings and investment in the model such that income is completely consumed – this is not a crucial assumption while it simplifies the model. Income is derived from own household production – this includes production at the household farm but can include off-farm businesses and households’ reproductive and maintenance activities as well – and from wage employment outside the household. Household production is a concave function of labour (L) and land or other fixed assets (A). Both women and men allocate labour to household production (L_f and L_m). Children can either work in the household (L_c), go to school (S), or both. Household production can be sold in the market or can be

² The model is inspired by Basu (2006), Reggio (2011), Emerson and Souza (2002, 2007)

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