



## Supermarkets and agricultural labor demand in Kenya: A gendered perspective

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### ABSTRACT

Many developing countries are experiencing a rapid expansion of supermarkets. New supermarket procurement systems could affect farming patterns and wider rural development. While previous studies have analyzed farm productivity and income effects, possible employment effects have received much less attention. Special supermarket requirements may entail intensified farm production and post-harvest handling, thus potentially increasing demand for hired labor. This could also have important gender implications, because female and male workers are often hired for distinct farm operations. Building on data from a recent survey of vegetable farmers in Kenya, a double-hurdle model of hired labor use is developed and estimated. Farmer participation in supermarket channels increases the likelihood of hiring labor by 20%, and demand for hired labor by 61%. A gender disaggregation shows that positive employment effects are especially pronounced for female laborers, who often belong to the most vulnerable population groups. Rural employment generation can be an important vehicle for poverty reduction.

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### Introduction

Developing countries are experiencing a food system revolution, spurred by rapid urbanization, rising incomes, and market liberalization (Mergenthaler et al., 2009; Reardon et al., 2009; Schipmann and Qaim, 2011; Reardon and Timmer, 2012). Supermarkets are quickly gaining in importance, with new opportunities for farmers to integrate into high-value markets (Reardon et al., 2003; Swinnen and Vandeplass, 2010; Rao et al., 2012). These trends may have important implications for agricultural and wider rural development. There may be direct gains in income that accrue to farm households participating in high-value markets. Additionally, there may be indirect effects to households not directly participating. Negative indirect effects may occur if smallholder farmers are excluded from emerging supply chains, which can lead to further marginalization (Balsevich et al., 2003). Yet there may also be positive indirect effects through innovation spillovers to traditional markets and employment generation (Neven et al., 2009; Schipmann and Qaim, 2010). Due to their labor-intensive nature, positive employment effects can be expected especially in horticultural crops (Barrientos et al., 2005; Weinberger and Lumpkin, 2007; Maertens and Swinnen, 2012).

The general importance of rural employment has been analyzed extensively (e.g., Maertens, 2009; Babatunde and Qaim, 2010). Overall, with increasing land and capital constraints, the role of off-farm income is increasing. While agricultural wage income

constitutes a fairly small proportion of off-farm income in general, its relative role often increases with decreasing household incomes (Reardon, 1997; Kijima et al., 2006; Kristjanson et al., 2010). Hence, agricultural employment arising from the expansion of high-value markets could benefit the poorest segments of the rural population in particular.

Previous studies on employment effects of high-value supply chains have largely focused on non-traditional exports (Damiani, 2003; Dolan, 2004; Maertens and Swinnen, 2009). Yet, as Neven et al. (2009) suggest, increasing domestic demand for high-value products may entail new employment opportunities as well. Surprisingly, there are no studies that have attempted to estimate and quantify employment effects of the supermarket revolution in a systematic way.<sup>1</sup> Supermarkets often impose certain quality standards, which require intensified production and changes in traditional cultivation practices. Moreover, extra labor may be needed for additional post-harvest operations, such as cleaning and packaging of products ready for supermarket shelves (Neven et al., 2009).

The supermarket revolution may also have important gender implications. Women farmers tend to have limited access to productive resources such as land and capital (Udry, 1996; Quisumbing and Pandolfelli, 2010). Thus, they may be disadvantaged in terms of entering high-value markets as suppliers (Dolan, 2001; Fischer and Qaim, 2012). Labor market impacts, however,

<sup>1</sup> Hernández et al. (2007) and Neven et al. (2009) compared supermarket and traditional farmers and found that supermarket farmers use more labor. However, they did not control for possible confounding factors, so that a causal relationship could not be established.

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may be more favorable for women. Maertens and Swinnen (2012) reported positive employment effects for female rural laborers in high-value export chains in Senegal. Similar effects may also occur in supermarket channels, when farmers supplying these channels hire more labor for operations where female workers are preferred. Women's participation in labor markets is often positively associated with women's well-being and economic independence (Quisumbing, 2003; Zhang et al., 2004; Quisumbing and McClafferty, 2006). Such gendered effects of the supermarket revolution have never been analyzed.

We contribute to the literature by estimating the impact of farmers' participation in supermarket channels on their demand for hired labor. To analyze gender implications, we differentiate between female and male hired labor. As farmers self-select into supermarket channels, we employ an instrumental variable approach and carry out different robustness checks to test and control for unobserved heterogeneity. We use a double-hurdle model, which accounts for the fact that not all farmers hire labor, and the general decision to hire may be separated from the decision of how much labor to hire.

The analysis is based on data from a survey of vegetable farmers in Kenya. The expansion of supermarkets in Sub-Saharan Africa is not yet as strong as in Asia and Latin America, but in Kenya supermarkets already account for about 6% of the national food retail sector, and 20% of food retailing in urban areas (Planet Retail, 2011). While the focus is largely on processed foods, supermarkets are also gaining ground in fresh product markets. Supermarket procurement strategies have started to influence the horticultural sector around Nairobi, and this phenomenon will likely spread to other parts of Kenya when the modern retail sector expands. Similar developments are also expected in other countries of Africa. Hence, a better understanding of rural labor market effects is important from a research and policy perspective.

## Data and descriptive statistics

### Farm survey

Data for this study were collected in 2008 through a survey of vegetable farmers in Kiambu district, Central Province of Kenya. Kiambu is relatively close to Nairobi and is traditionally known as one of the main vegetable-supplying regions for the capital city. Kiambu is also the district where the supermarket chains located in Nairobi source most of their vegetables. Based on information from the district agricultural office, four of the main vegetable-producing divisions in Kiambu were chosen. In these four divisions, 31 administrative locations were purposively selected, again using statistical information on vegetable production. Within these locations, we used stratified random sampling, differentiating between farmers supplying traditional channels and farmers supplying supermarkets. Since supermarket-supplying farmers are still the minority, we oversampled them using complete lists obtained from supermarkets and supermarket traders. In total, our sample comprises 402 farmers, including 269 traditional channels suppliers and 133 supermarket suppliers. The two sub-samples are representative of vegetable farmers in Kiambu.

A structured questionnaire was used to elicit data on vegetable production and marketing. Production information, including labor use and other input–output details, was collected at the plot level. Data on other farm and non-farm economic activities, as well as on household and contextual characteristics, were also collected. Farmers in Kiambu mainly grow vegetables in addition to maize, bananas, and several other cash crops. The main vegetables produced are leafy types, including exotic ones such as spinach and

kale, and indigenous ones such as *amaranthus* and black nightshade, among others.

Traditional vegetable marketing channels consist of direct spot market trading and sales to middlemen at the farm gate. They mostly involve non-contract transactions with neither promise for repeated transactions nor prior agreements on product delivery and/or price. Some farmers in traditional channels have regular transactions with middlemen, but still without any binding agreement. In contrast, supermarkets do have agreements with vegetable farmers regarding product quality, hygiene, and consistency and regularity in supply (Ngugi et al., 2007; Rao and Qaim, 2011). As a higher effort in farming and post-harvest handling can contribute to meeting these requirements, we hypothesize that participation in supermarket channels increases demand for hired labor. Agreements on quantities to be delivered and prices are also made before delivery, resulting in market assurance and more stable and predictable prices. Similar reductions in price risk were also observed in other studies on supermarket supply chains (Michelson et al., 2011; Neven et al., 2009). Agreements between supermarkets and farmers are mostly verbal with no written contract. Some farmers also supply supermarkets through specialized traders, who use the same type of verbal agreements. Verbal agreements are quite common in contract farming with smallholders, also in other countries (Schipmann and Qaim, 2011).

### Descriptive analysis

Table 1 shows descriptive statistics for the whole sample and for the two sub-samples of supermarket and traditional channel farmers. Average farm sizes are small. Farmers in supermarket channels own somewhat bigger land areas and also cultivate more vegetables than traditional channel farmers. There are also significant differences in terms of farmer age, education, occupational characteristics, and irrigation. While women play an important role in farming in Kenya, the majority of the vegetable farmers in our sample are male. The proportion of male farmers is even slightly higher in supermarket channels. While women are often responsible for food crop production, male household members tend to control cash crop production (Quisumbing, 2003; Weinberger et al., 2011). Increasing degrees of commercialization may further exacerbate the role of women within farming households (von Braun and Kennedy, 1994; Fischer and Qaim, 2012).

The lower part of Table 1 shows details of vegetable production and marketing. More farmers in traditional channels grow exotic vegetables. In other words, the proportion of farmers growing indigenous vegetables is higher in supermarket channels.<sup>2</sup> Supermarket suppliers receive significantly higher prices for both exotic and indigenous vegetables. These prices are expressed per bundle, which may vary in size. Since this is the way prices are expressed by farmers, we do not have exact price information per kilogram. In spite of this inaccuracy, higher mean prices in supermarket channels are consistent with higher quality requirements, as was also reported in other studies (Reardon and Timmer, 2012; Rao et al., 2012). A larger proportion of supermarket farmers employ hired labor for vegetable production. Likewise, the quantity of hired labor per plot is higher among supermarket suppliers.<sup>3</sup> These patterns are similar to findings by Hernández et al. (2007) and Neven et al. (2009). They support our hypothesis of increased hired labor demand through participation in supermarket channels. Strikingly, when disaggregating hired labor use by gender of the laborers, a significant difference between supermarket and traditional channels can only be observed

<sup>2</sup> Recently, African indigenous vegetables have received renewed attention from upper and middle income consumers (Ngugi et al., 2007).

<sup>3</sup> While plots are not equal in size, the difference in mean plot size between marketing channels is small. In the regression analysis, we will control for plot size.

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