



The impact of farm input subsidies on maize marketing in Malawi



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ABSTRACT

This paper investigates the effects of subsidised fertilizer on marketing of maize in Malawi. It uses the nationally representative two-wave Integrated Household Panel Survey (IHPS) data of 2010 and 2013. The results suggest that subsidised fertilizer on average increases farmers' maize market participation as sellers, total quantity of maize sold, and maize commercialisation. In addition, participation in subsidised fertilizer programme is found to increase the probability of farmers to be net sellers and increases net quantity of maize sold. However, the study finds no evidence of effect on net quantity of maize bought and on household maize self-sufficiency. These results suggest that the farm input subsidy programme has contributed toward an increased level of maize market supply engagement for small farmers and in this sense, the policy has the potential to provide the wider external benefits. Furthermore, the results have implication on the sustainability of the subsidy programme, policy formulation and design of programmes for the agricultural sector and small farmers in developing countries.

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1. Introduction

It is widely accepted that small farmers' participation in markets is one of the most important factors necessary for economic growth and poverty reduction in developing countries (Heltberg and Tarp, 2002; Muriithi and Matz, 2015; Pingali, 2007; World Bank, 2007). Markets offer households opportunities to engage in productive activities through investments in diversified livelihood strategies and sell both labour and products (IFAD, 2003; Njuki et al., 2007; World Bank, 2000). Access to input and output markets is also important for farm households' adoption of modern technologies (e.g. fertilizers and hybrid seed varieties), which are crucial for increased productivity and income (Dorward and Kydd, 2005; Zeller et al., 1997). However, in developing countries poor access to, and low participation in markets are pervasive, especially as far as small farmers are concerned, which limit livelihoods opportunities and perpetuate their poverty (Barrett, 2008; Heltberg and Tarp, 2002; Jayne et al., 2010; Poulton et al., 2006). This is one of the major concerns for governments which depend on agriculture as a pro-poor growth strategy (de Janvry et al., 1991).

In the literature, small farmers' lack of access to, and low participation in markets is mainly attributed to barriers to entry (Barrett, 2008; Jayne et al., 2010). These barriers include high inputs requirements in the form of land, chemicals, fertilizer and processing; high products' quality demand, and high transaction costs of marketing (Barrett, 2008; Heltberg and Tarp, 2002; Mather et al., 2013; Poulton et al., 2006). The global agricultural market conditions are rather instable due to multiple factors, including changes in farm policies in high-income countries and a significant decline in donor and state support to the agricultural sector (Jayne et al., 2010). Therefore, several factors, including the ones presented above, have led the majority of small farmers in developing countries to focus on production of food crops for subsistence.

To increase the use of both fertilizers and hybrid seeds by small farmers, and consequently, improve crop production and productivity, a range of farm input subsidy programmes have been used as policy tools by many developing countries prior to the implementation of structural adjustment and stabilisation programmes (IMF, 2008). Although most of these input subsidy programmes were phased out in the 1980s and early 1990s in most countries in sub-Saharan Africa (Husain, 1993; World Bank, 2007), several countries including Malawi have reintroduced them since 1998, (Dorward et al., 2008; IMF, 2008). Since the input subsidies target specific crops, coupons used to redeem subsidised inputs are crop-specific and this may affect farmers' decisions on cropping patterns and, therefore, may have direct effects on marketing of food crops.

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Such potential marketing effects have not been fully analysed in previous studies.

The main objective of this study is to investigate the effects of subsidised fertilizer on marketing of maize in Malawi. The specific objectives include the estimation of the impact of subsidised fertilizer on farmers' participation in maize market as sellers and the quantity sold; the net quantities sold and bought and the commercialisation of maize, (i.e. the ratio of maize quantity sold to total quantity of maize harvested). In simple terms a farmer is defined as a net maize seller if the total quantity of maize sold is higher than the quantity bought and the difference between the two quantities is the net quantity sold and vice versa for a farmer defined as a net maize buyer. The case if a farmer neither buys nor sells maize or the quantity sold is equal to the quantity bought is defined as maize autarky (self-sufficiency). Determining the extent of farmers' maize market participation as sellers, quantity sold, the degree of commercialisation or autarky, net quantity sold and bought is important to give insights into the potential increase or decrease in maize market supply and demand, respectively, as a result of the fertilizer subsidy programme. Such information is essential in understanding the effects on maize prices since the majority of small farmers are net maize buyers. It will also provide an indication of the ability of the programme beneficiaries to self-finance the purchase of fertilizer at commercial prices in the future with income derived from the sale of maize produced with subsidised inputs and hence the ability of the subsidy programme to lift households from autarky and subsidy dependence.

To our best knowledge, this is the first study to empirically quantify the effects of subsidised fertilizer on marketing of maize in Malawi, and specifically on farmers' supply and demand of maize. The only studies which are close to some of the aspects analysed in this paper are Ricker-Gilbert et al. (2013), who investigate the effects of fertilizer subsidy on maize prices in Malawi and Zambia, and Takeshima and Liverpool-Tasie (2015), who analyse the effects of fertilizer subsidies on grain prices in Nigeria. Both studies find insignificant effect of fertilizer subsidies. In contrast to previous studies which focused on marketing of food crops and which consider the general supply side of the market, this paper also includes an evaluation of factors influencing commercialisation of maize in order to identify key determinants necessary for the transition of farmers from subsistence to commercial maize farming.

This paper is structured as follows. The next section presents a review of farm input subsidies in developing countries and reforms in the implementation of the programme in Malawi. Section three discusses the performance of the agricultural sector and marketing in Malawi. Sections four and five present the conceptual framework and the empirical models, respectively. Data sources, descriptive statistics and endogeneity tests are discussed in section six. Results and discussions are presented in section seven, and section eight concludes and discusses policy implications.

2. Reintroduction of farm input subsidies in developing countries

Against the orthodox evidence that subsidies distort markets in the economy, a new wave of agricultural input subsidies is emerging in most developing countries, especially in sub-Saharan Africa (SSA) (DANIDA, 2011; Druilhe and Barreiro-Hurle, 2012; Ricker-Gilbert et al., 2013). Introduction of input subsidies is aimed at addressing challenges of low output and productivity of poor small farmers who are financially constrained to purchase improved inputs for production with the ultimate objective to move towards food self-sufficiency at household and national levels and ultimately to promote poverty alleviation.

There are several studies on the impact of the recently implemented farm input subsidy programmes in SSA. They have focused on both direct and partial equilibrium effects. The effect on crop output generated by farm input subsidies is one of the areas which has been extensively studied. Research by Chibwana et al. (2010), Dorward et al. (2013), Holden and Lunduka (2010) and Ricker-Gilbert and Jayne (2011) finds statistically significant and positive effects of farm input subsidies on maize production and productivity in Malawi. Ricker-Gilbert and Jayne (2011) find that an additional kilogram (kg) of subsidised fertilizer increases maize production by 1.82 kg in the current year and 3.16 kg in the third year of using subsidised fertilizer. These are strong effects because the 1.82 kg and 3.16 kg effects translate to an addition of about 200 kg and 300 kg of maize, respectively, if a household uses 100 kg of subsidised fertilizer. Analysing maize yield response to farm input subsidies, Chibwana et al. (2010) estimate that using subsidised fertilizer only increases maize yield by 249 kg per hectare, while using both subsidised hybrid maize and fertilizer increases maize yield by 447 kg per hectare. Dorward et al. (2013) evaluate the 2012/2013 Farm Input Subsidy Programme (FISP) and they report that a full FISP package increases maize production by at least 500 kg, while only one 50 kg bag of subsidised fertilizer or with hybrid maize seed increases maize production by between 200 kg and 400 kg. Similar results are reported in a study by Mason et al. (2013) who analyse the effects of subsidised fertilizer on maize production in Zambia and find that an additional kilogram of subsidised fertilizer increases maize production by 1.88 kg. A study by Wiredu et al. (2015) who analyse the impact of fertilizer subsidy on land and labour productivity in Ghana finds that receipt of subsidised fertilizer increases rice production by 29 kg per hectare.

The effects of farm input subsidies on input market has also been analysed by several researchers. Ricker-Gilbert et al. (2011) and Mason and Ricker-Gilbert (2013) find that an additional kg of subsidised fertilizer and hybrid maize seed in Malawi crowd-out commercial purchases of fertilizer and hybrid maize seed by 0.22 kg and 0.58 kg, respectively. A similar effect of crowding-out is reported in a study by Chirwa et al. (2013), who find a decrease in purchase of commercial fertilizer of between 0.15% and 0.21% for a 1% increase in subsidised fertilizer. However, Xu et al. (2009) report both crowding-out and crowding-in effects on commercial fertilizer purchases in Zambia, and Liverpool-Tasie (2014) find that subsidised fertilizer increases both participation in the private fertilizer markets in Kano State, Nigeria and the quantities of commercial fertilizer bought in these markets.

Farm diversification effects of input subsidies have also been examined in the context of their impact on land allocation to various crops at household level. Chibwana et al. (2012) and Holden and Lunduka (2010) are some of the recent studies for Malawi. However, these two studies find contradicting results, which is mainly attributed to differences in the methodologies employed (Lunduka et al., 2013). Chibwana et al. (2012) find increased land allocated to maize, while Holden and Lunduka (2010) find a decreased land area. Dorward et al. (2013) and NSO (2014b) support the decrease in land allocated to maize and report that an increasing proportion of farmers grow other crops, mainly legumes. A study by Yi et al. (2015) who analyse the effects of grain subsidies on area under grains in China find positive effects, but only on the liquidity-constrained households.

Several studies have also analysed the household welfare effects of farm input subsidies in Malawi. Chirwa et al. (2013), Dorward and Chirwa (2011), and Dorward et al. (2013) all find improvement in adequacy of food availability at household level. A study by Ricker-Gilbert and Jayne (2011) report that, on average, an additional kg of subsidised fertilizer increases farm net crop income by US\$1.16, however, they find no evidence of effects on household

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