Essays on Child Education, Child Labor and the Agricultural Economy
To my family
Essays on Child Education, Child Labor and the Agricultural Economy
Abstract


This dissertation consists of four different papers. In the first paper we ask if children’s probability to be in school differ among children with different ethnolinguistic backgrounds. In Kenya, approximately one million school-aged children are still not enrolled in school. Our paper contributes to the literature by providing empirical evidence about the relationship between ethnolinguistic background and the child’s probability of being in school. Regardless of specification, Somali and Maasai children are least likely to be in school.

In the second paper we investigate how households’ livelihood diversification strategy influences the child’s probability to work or go to school. We find that children living in households that rely solely on production of their own farm are about 3 percentage points more likely to work and about 2 percentage points less likely to be in school than children from more diversified households.

Continuing with the subject of income diversification, paper three is about income diversification of female headed households. Female-headed households have been found to have less education, less productive resources, and less access to credit than male-headed households. This will limit the options available to them. We find that female-headed households have a larger probability of getting all their earnings from production on their own farm and are also more reliant on transfers than male-headed households.

In the last paper, we explore the short-term welfare impact of higher maize prices on different regions and socioeconomic groups in Kenya. We find that approximately 80% of the population would be negatively affected by higher maize prices. Furthermore, we relax the standard assumption that consumer and producer prices change in the same proportions and allow for heterogeneity in marketing margins among districts. We demonstrate that relaxing this assumption substantially affects the results.

Keywords: Education, Child labor, Income diversification, Prices, Kenya

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Contents

1. SHORT SUMMARY ......................................................... 11

2. BACKGROUND........................................................................ 13
  2.1 Child development and human capital......................... 14
  2.2 Agriculture................................................................. 16
  2.3 Kenya........................................................................... 18

3. THE ESSAYS ................................................................. 20
  3.1 Ethnolinguistic background and enrollment in primary education.... 20
  3.2 Income diversification and working children.................... 21
  3.3 Income diversification among female-headed households.......... 22
  3.4 Welfare impact of higher maize prices when allowing for price heterogeneity......................................................... 23

4. POLICY CONCLUSIONS AND FURTHER RESEARCH .......... 25
REFERENCES ............................................................................. 27
List of Essays

Essay 1: Ethnolinguistic background and enrollment in primary education
Essay 2: Income diversification and working children
Essay 3: Income diversification among female-headed households
Essay 4: Welfare impact of higher maize prices when allowing for price heterogeneity
1. Short Summary

This dissertation consists of four different papers; the first two focus on child education and working children, while the other two consider income diversification among female-headed households and welfare effects of higher maize prices.

In the first paper, we explore whether the probability of being in school differs among children of different ethnolinguistic backgrounds. Previous research has shown that educational opportunities differ among children due to poverty, gender, rural residence and disability. Our paper contributes to the literature by providing empirical evidence about the relationship between ethnolinguistic background and the child’s probability of being in school. Estimates from a three-level random intercept probit model using data from the Kenya Integrated Household Survey 2005/06 reveal that ethnolinguistic background has a statistically significant impact on the probability of being in school. Regardless of the specification, Somali and Maasai children are least likely to be in school, and girls in these groups are especially disadvantaged.

In the second paper, I ask whether there is a connection between the probability that a child is working and/or being in school and the household’s income diversification strategy. In recent years (2004-2008), the rate of employed children in sub-Saharan Africa has increased (Diallo et al 2010). At the same time, there has been a shift in livelihoods whereby households rely more on sources of income from outside their own farms. I find that children living in households that rely solely on the production of their own farm are approximately 3 percentage points more likely to work and approximately 2 percentage points less likely to be in school than children from more diversified households.

Continuing with the subject of income diversification, in paper three, I analyze the income diversification of female-headed households. Female-headed households have been found to have less education, less productive resources, and less access to credit than male-headed households. These disadvantages will limit the options available to them. I find that households headed by a married women are approximately 12 percentage points more likely to rely on income from only their farms compared to households in which the head is a monogamously married man. Female-headed households are also less likely to diversify into non-agricultural wage work than male-headed households.
In the final paper, we explore the short-term welfare impact of higher maize prices in different regions and among socioeconomic groups in Kenya. We find that approximately 80 percent of the population would be negatively affected by higher maize prices and that poor households would lose a larger proportion of their welfare than wealthy households. Specifically, rural landless households would lose the most, whereas households with landholdings of five acres or more would benefit. We simulate a 25 percent increase in maize prices and find that rural poverty would increase by approximately 1 percentage point and urban poverty by 0.5 percentage points. Moreover, the impact differs by region: poverty would increase by 3 percentage points in rural parts of Coast Province, whereas it would be nearly unchanged in rural parts of Western Province. Furthermore, we relax the standard assumption that consumer and producer prices change in the same proportions and allow for heterogeneity in marketing margins among districts. We demonstrate that relaxing this assumption substantially affects the results and that the results from previous research are thus likely biased.
2. Background

Over the last decades, we have seen impressive progress in development around the world, and the proportion of people living in poverty (on less than $1.25 a day) has decreased from 36 percent in 1990 to 18 percent in 2010. However, this progress has been unequal, and a large part of the change is due to the development of some Asian countries, while most countries in Africa have seen more modest development. In sub-Saharan Africa, approximately 48 percent of the population still lives on less than $1.25 a day (UN 2014). There is also considerable inequality within countries. For example, in Kenya, the richest 10 percent of the population receives an estimated 40 percent of total income (World Bank 2014). Most poor people live in rural parts of the country, and they are more likely to be women, children, or members of a minority ethnic group.

However, development is much more than how much money an individual has. According to Amartya Sen, a leading thinker about development, what matters is not what people have, but what a person is and can do. To capture these aspects, we need to look beyond income and include other development indicators, such as, education, health, and gender equality. In addition, we find large improvements in these indicators over the last decades. Health status has improved, and today more children than ever have access to education. Even so, in sub-Saharan Africa, approximately 25 percent of the population is undernourished, girls are less likely to attend school, and despite a large reduction, nearly 10 percent of children die before they turn five years old (UNDP 2014).

Development economics addresses many different questions, ranging from large ones, such as why some countries are poor while other are rich, whether institutions matter, and whether development aid works to really detailed questions such the best way to distribute bed nets. My research interests lie in the decisions made by individuals and households. For example, if we know that returns to education are large, why do some parents not send their children to school? Answering these questions will help us understand what we can do to end poverty.

Therefore, in this dissertation, I focus on the microeconomic aspects of development. The first two papers focus on children and human capital, while the other two focus on the agricultural economy.
2.1 Child development and human capital

“Educations is the most powerful weapon which you can use to change the world”

/ Nelson Mandela

1993, Noble Peace Price lecture

Education is widely regarded as the key to economic development. It can also be viewed as an investment in the individual, which is assumed to increase potential future earnings (Schultz 1960). The estimated average rate of return for one more year of schooling is approximately 10 percent, and the rates of return are higher in low- and middle-income countries (Psacharopoulos and Patrinos 2004). However, education is important not only as an instrument for economic growth but also for a satisfying life and it can thereby be viewed as a goal in itself. Furthermore, education can influence the health status because individuals with more education can more easily access hygiene and disease prevention information.

Several international agreements have pointed to the importance of education. For example, one of the Millennium Development Goals stated that by 2015, all children should be able to complete a full course of primary schooling. Thus, much attention has been paid to access to primary education, and in the developing countries, net enrollment in primary education increased from 80 percent in 1990 to 90 percent in 2012 (UNDP 2014). Despite this, in 2012, 58 million primary school aged children were still out of school. Because of rapid population growth, there were 35 percent more school aged children in sub-Saharan Africa in 2012 than in 2000, and access to primary education is an area that will continue to require policy attention (UNDP 2014).

Given the positive effects of education, one can ask why not all children go to school. One answer is that parents do not know about the large returns to education, and it has been shown that simply informing parents of the rate of return to education can increase school attendance (Jensen 2010, Nguyen 2008). However, this is not the only answer. For example, children who live in rural places are twice as likely to be out of school compared to children living in urban parts, and even though primary education is tuition
free in many developing countries, poverty still hinders children from attending school. Furthermore, especially among poor households, girls are more likely to be kept out of school than boys (UNDP 2014).

Even though the goal of gender parity in primary education has been reached in most parts of the world, in sub-Saharan Africa, there are 92 girls in primary education for every 100 boys. The dispersion increases with the level of education: at the secondary level, there are 84 girls for every 100 boys, and at the tertiary, the respective number is 64 (World Bank data). There is also evidence that certain groups are disadvantaged. Lewis and Lockhead (2007) show that approximately 70 percent of the world’s out-of-school girls are members of excluded groups. Understanding which children that are kept out of school and why is an important step toward fulfilling the goal of universal primary education. Furthermore, increasing girls’ education is important both for its own sake and to fulfill other development goals. Educated girls are less likely to marry early, more likely to invest in the health of their children and more likely to send their children to school, creating a positive circle of development.

When deciding whether a child should be sent to school, parents compare the returns to education with the costs. The costs include both direct cost of education, such as tuition, transportation and books and indirect costs, such as the forgone economic contribution to the household if the child were working (Shultz 1960, Becker 1975). If the costs are larger than the returns to education, the child is kept out of school. According to the latest estimates, approximately 10 percent of the world’s children are engaged in labor. The rate of child labor is largest in sub-Saharan Africa, where approximately 21 percent of children are engaged in labor (ILO 2013).

Most child laborers (60%) work in agriculture, mostly as unpaid family workers. It is important to note that not all participation on the family farm is necessarily bad for the child. For example, helping with some easy tasks can help a child acquire important skills and can be viewed as a natural part of growing up in a rural setting. In sub-Saharan Africa, it is common to combine school and work, and sometimes, working alongside their parents is viewed as important preparation for children’s future. Although work does not have to keep the child out of school, child laborers have been shown to perform worse in school, or even drop out (see Psacharopoulos 1997 for Bolivia and Venezuela and Buonomo 2011 for Nicaragua).

In order to reduce the number of working children, we need to know why children are working. There is a large body of literature on child labor, nicely summarized in, for example, Basu and Tzannatos (2003), Bhalotra
and Heady (2003), Edmonds (2007) and, more recently, Congdon Fors (2012). The child labor supply has been found to be influenced by, for example, poverty, relative returns to schooling compared to work and parental preferences. The reasons for child labor can differ by setting, and to form relevant policies, we need to know what is causing child labor in a specific context. Policies based on the wrong assumptions can lead to disastrous consequences for the child. If children work for their family’s survival, then taking away an income source without compensating for it can lead to an even worse situation.

2.2 Agriculture

"Most of the people in the world are poor, so if we knew the economics of being poor, we would know much of the economics that really matters. Most of the world’s poor people earn their living from agriculture, so if we knew the economics of agriculture, we would know much of the economics of being poor."

Theodore Schultz
Nobel Lecture, 1979

Nearly half of the world’s population, approximately 3 billion people, lives in rural areas. This is where we find approximately 82 percent of poor people, and most of them depend on agriculture, in some way, for their livelihoods (World Bank 2008). Because most poor people live in rural areas, agricultural development is important to reducing poverty.

One important way to reduce rural poverty is to increase farm productivity. Between 1980 and 2004, there was an impressive increase in yields around the world. Most of this increase was due to the transforming economies of Asia, and the cereal yield in the developing countries of Asia nearly tripled between 1960 and 2005. This increase in productivity was driven by increased irrigation, fertilizer use and improved crop varieties. However, this trend has not been seen in sub-Saharan Africa, where yields increased only by one-third during the same period (World Bank 2008) and where the increase in output has not kept up with the increase in population. One reason for this disappointing trend in sub-Saharan Africa is that the increased population has led to overuse of the land, resulting in a decrease in
soil nutrition. Furthermore, most subsistence farmers cannot afford improved seeds, fertilizers or other improved technologies (Todaro and Smith 2015). Even if they manage to increase yields, relying on the production of their own farms for their livelihoods increases vulnerability to economic shocks.

However, it is also important to consider development in the non-agricultural sectors. Structural change is a natural part of the development process, and when countries develop, the agricultural sector typically decreases, while the service and industrial sectors increase. Structural change is not only a macro phenomenon; indeed, it begins at the micro level with households and individuals diversifying out of agricultural production. Although the production of their own farms is often the most important source of income for the majority of rural households in sub-Saharan Africa, smallholders have shifted from being full-time farmers to holding a more diversified income portfolio. However, to access higher-return activities, individuals have to overcome entry barriers, such as education, credit and labor. These constraints can be especially difficult for poor households but can also be linked to gender.

Many studies have documented a gender gap in agricultural production, where the productivity of plots farmed by women is lower than the productivity of plots farmed by men (i.e., Udry 1995). The yield gap between women and men averages approximately 20-30%. Most studies find that this difference can be attributed to varying access to productive resources between women and men. Women have been shown to have less access to land, use less credit, and use less fertilizer. In addition, they generally have lower levels of education and have less access to extension services than men. These factors will not only decrease their productivity but also determine which other options are available to them. For example, women are less likely to work for wages than men, and when doing so, they are more likely to have part-time jobs or seasonal employment and are often paid less (FAO 2011).

Closing the gender gap in agriculture could increase agricultural output by an estimated 2.5-4 percent in developing countries and reduce the number of hungry people by approximately 12-17 percent (FAO 2011). Thus, reducing the gender gap in agriculture is an important task for policymakers. Furthermore, because women tend to spend a larger proportion of their incomes on food and education (e.g. Quisumbing and Maluccio 2000, Doss 2005) increasing the income and bargaining power of women will have positive consequences for the development process.
However, because women’s constraints are determined by gender norms, which are expected to differ by setting, it is important to determine the situation facing women in each context before any policy conclusions can be made.

2.3 Kenya
The papers in this thesis focus on the situation in Kenya. Although most conclusions may generalize to other countries, it is important to understand the specific country context of our results.

Kenya, a former colony of the United Kingdom, became independent in 1963. With a population of approximately 44 million (2009), it is one of the largest countries in sub-Saharan Africa. The poverty level in 2012, using the national poverty line, was an estimated 39 percent (World Bank 2014), and life expectancy in the same year was 61 years (World Bank data). In September 2014, Kenya became a lower middle-income country and the fifth largest economy in sub-Saharan Africa.1

Even though only about 15% of Kenya’s land area is suitable for agricultural, agriculture dominates the economy and approximately 75% of the labor force worked in agriculture (Library of congress 2007). Tea, horticultural products and coffee are the main cash crops, while corn is the main food staple. The semi-arid areas in the north and east are dominated by livestock production. In 2013, agriculture contributed 30 percent of GDP, while the largest share came from services, which contributed approximately 50% of GDP (World Bank data).

During most of the 21st century, the growth rate in Kenya has been relatively high and stable, and since 2009, it has been above the average for sub-Saharan Africa. However, the country was strongly affected by the violence that followed the 2007 presidential election, resulting in a large decrease in growth.

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1 Crossing the line into lower middle-income range was mainly due to a statistical improvement wherein the country’s national income increased by 25% overnight due to a change in the base year used to calculate national accounts.
Kenya has made good progress toward the goal of universal primary education. One important step toward reaching this goal was the introduction of free primary education in 2003, which led to a large increase in the number of students. In 2012, the net enrollment rate in primary education was 84 percent, and there were as many girls as boys in primary education. However, the net enrollment rate in secondary education that same year was only 56 percent, and there were 93 girls for every 100 boys enrolled.

Although progress has been made, Kenya will not be able to fulfill the Millennium Development Goal of gender equality. In 2013, women constituted approximately 36 percent of employees in the non-agricultural sector (Oderoe al 2015), and held approximately 19 percent of the seats in parliament (World bank data). As a way of increasing gender equality, the new constitution (2010) states that no gender can hold more than 2/3 of positions in an appointed or elected body.

Kenya is, in many aspects, a diverse country, and there is considerable variation in poverty levels, human capital, and access to services in different parts of the country. For example, in 2005, the poverty level in the rural parts of the North Eastern Province was approximately 74 percent, while the respective number in the Central Province was 30 percent (national poverty line, KNBS 2007). In an attempt to address these issues, the 2010 constitution changed the administrative division of Kenya, creating 47 county governments (Odero et al 2015).

Kenya is also one of the world’s most ethnically diverse countries, where approximately 69 different languages exist (Lewis et al 2013). The role of ethnicity is strong and plays a central role in political mobilization and resource allocation (Kimenyi, 1997). When the first multi-party elections were
held in Kenya in 1992, politics and ethnicity were strongly connected, with different parties representing different ethnic groups (Omolo 2002). According to Ajulu (2002), ethnic identity was constructed as an instrument to access power. Political parties were created along ethnic lines, and ethnicity became the most important factor in political competition. This was also the case in the 2007 election, where ethnic origins drove voting patterns (Bratton and Kimenyi, 2008). Ethnicity also played an important part in the postelection violence that followed the 2007 election.

3. The Essays

This dissertation consists of four different papers. In the first paper we ask whether children from different ethnolinguistic backgrounds have different probabilities of being in school. In the second paper I examine the connection between income diversification and working children. In the third paper I look at income diversification among female-headed households. In the last paper we analyze how different groups of households are affected if the price of maize increases.

3.1 Ethnolinguistic background and enrollment in primary education

Education is important both for an individual’s future and for the economic development of a country. Therefore, several international agreements have highlighted the importance of education and stated that every child should have access to primary education.

In this paper, we ask whether the probability of being in school differs among children of different ethnolinguistic backgrounds. We expect this variable to capture several important aspects of the expected costs and benefits of education, including culture, norms and language.

The ethnolinguistic diversity in Kenya is considerable and approximately 69 different languages coexist. We identify our language groups in our questionnaire, which was designed to allow the respondent to answer in one of eleven local languages, Swahili or English, where the two later are the official languages of Kenya. The Kenyan census (2009) indicates that approximately 89% of the population belongs to one of these eleven language groups (Kenya National Bureau of Statistics 2010). Answering in a local
language implies that the household uses this language at home, making it a good proxy for ethnolinguistic background.

Because our dataset has a multilevel structure, were each child belongs to a household and each household belongs to a small community (cluster of ten households), we expect children to share observed and unobserved characteristics at several levels. To consider this, we use a three-level random intercept probit model, with random intercepts at the community and household levels.

Our results show that ethnolinguistic background is important for explaining the child’s probability of being in school. We find some evidence that gender norms are important and that ethnolinguistic background is more important for girls than boys. Regardless of the specification, Maasai and Somali children have lower probabilities of enrolling in school than children from all other groups. The effect is statistically significant for both genders but is strongest for girls, suggesting that girls in these groups are particularly disadvantaged.

3.2 Income diversification and working children

In the second paper, I analyze the connections among income diversification, child work and education. In recent years (2004-2008), the rate of child employment in sub-Saharan Africa increased (Diallo et al 2010). At the same time, there has been a shift in livelihoods toward households relying more on sources of income beyond their own farm. In this paper, I investigate how households’ income diversification strategies influence a child’s probability of working and/or going to school.

When the adult in the household diversifies away from production on their own farm, this is expected to influence the children’s time allocation in several ways. Households will choose to diversify if the marginal value gained by doing so is larger than the value of the marginal production of their farm. Thus, when a household chooses to diversify, this will have a positive effect on its total income. Assuming that a child not having to work is viewed as a luxury good by the household, an increase in income will decrease the rate of working children. At the same time, decreasing the amount of adult labor on the household farm will increase the return to the child’s farm work and, thereby, the opportunity cost of schooling. This effect is expected to increase the rate of working children. Because these two effects lead to different predictions, empirical research must determine the relationship between income diversification and the rate of working children.
I focus on children whose main activity is working because these are the ones for whom working might have the most negative consequences. Because work and school are expected to compete for the child’s limited time, I use a bivariate probit regression, which allows these decisions to be correlated. However, because income becomes endogenous when analyzing child labor, we use an instrumental approach and extend our bivariate model to a three-equation mixed-process model (Roodman 2011).

Because working more hours might be more harmful for the child, I also analyze how many hours they work. I find that children living in households that rely solely on production of their own farm are approximately 3 percentage points more likely to work and approximately 2 percentage points less likely to be in school than children from more diversified households. I do not find any differences in the rates of working children across a number of various income diversification strategies. Children living in households that rely on the production on their own farm are also found to work more hours than other children.

3.3 Income diversification by female-headed households
In most rural parts of sub-Saharan Africa, production on one’s own farm is still the main source of income. Even so, the importance of non-agricultural sources has increased, and these have been shown to provide an important way out of poverty. However, not everyone have access to the higher-return activities.

Female-headed households have been shown to have less education, labor, and productive assets as well as less access to credit than male-headed households. This will limit the diversification options available to them. In this paper, I analyze the income diversification of female-headed farming households. More specifically I analyze 1) whether female-headed household are less diversified than male-headed households; 2) whether female-headed households diversify their income in a different way than male-headed households; and 3) what determine the income diversification of female-headed households.

Although I are not aware of any previous study whose main interest is the income diversification of female-headed households, many studies include the gender of the head of household as a control variable. However, we argue that this could lead to misleading conclusions because the group of female-headed households is heterogeneous and thereby faces different constraint. To capture the different constraints faced by different groups of
female-headed households, we control for both the gender of the head and for all types of marital status (monogamously married, polygamously married, divorced, widowed, never married).

Looking at the number of income sources, we do not find that female-headed households are less diversified than male-headed households. Instead, we find that households where the head is married have a larger number of income sources per adult than male-headed households.

However, female-headed households diversify their income in a different way. They obtain a smaller portion of their income from agricultural sources and are instead more dependent on transfers (transfers make up 28% of the income of female-headed households compared with 14% in male-headed households).

However in regard to earned income, female-headed households have a larger probability of relying only on earnings from the own farm. We also find that female-headed households are generally less likely to diversify into non-agricultural wage work. These activities have been shown to be important ways out of poverty. We show that for female-headed households to obtain access to this type of employment, they have to overcome entry barriers such as education and norms.

**3.4 Welfare impact of higher maize prices when allowing for price heterogeneity**

Since in 2005, the world has witnessed a large increase in food prices. Consequently, poverty has increased, and this increase in prices from 2005-2007 added an estimated 100 million people to the ranks of the poor.

In this paper, we evaluate the effect of an increase in the price of maize on different groups of households in Kenya. Maize is the most important crop in Kenya and is grown by approximately 90% of farming households. However, most households also buy some maize on the market, making it more complicated to know who wins and who loses when its price increases.

In order to evaluate the effect of a price increase, we calculate the net benefit ratio (NBR). Households with a negative NBR will lose if the price increases and households with a positive NBR will gain. We find that approximately 80% of households would be negatively affected by an increase in the price of maize. To be able to give policy recommendations, we divide the households by their location, welfare level and land ownership. From this, we find that poor households would lose a larger proportion of their welfare than better-off households. Specifically, rural landless households
would lose the most. Although a larger proportion of urban households lose, the magnitude of the effect is smaller than in the rural areas.

Simulating a 25% increase in the price of maize, we find that rural poverty would increase by approximately 1 percentage point and urban poverty by approximately 0.5 percentage points.

In addition, we suggest methodological improvements for analyzing the effect of a change in price. First, we build on the work of Dawe and Maltso- glou (2014), who relax the standard assumption that consumer and producer prices change in equal proportion. However, Dawe and Maltso- glou assume that the marketing margin, which is the difference between the consumer and producer price is constant among households. We relax this assumption and show that allowing the marketing margin to differ among districts can have a substantial impact when analyzing the spatial impact of a price increase. Taken together, our results point to the importance of considering what type of price increase we are interested in, moving away from the standard assumption that all prices change in the same proportion.
4. Policy conclusions and further research

Today we stand at an important and exciting point in development work. The deadline for the Millennium Development Goals is approaching, and the work of forming the post-2015 development agenda is under way. This thesis yields some important policy conclusions that are relevant to this work.

One of the Millennium Development Goals is that every child should have access to primary education. The work in this area been impressive, and more children than ever attend school; however, in 2012, approximately 58 million primary school-aged children were still out of school (UNDP 2014). In the first paper, we show that educational opportunities vary among children with different ethnolinguistic backgrounds. Specifically, we found that Somali and Maasai children had a lower probability of being in school compared to children from all other groups. These groups have nomadic traditions, and I believe that more research is needed to understand the specific constraints faced by these nomadic communities.

Furthermore, we find that gender and ethnolinguistic background create a double barrier to girls who are members of disadvantaged groups. Therefore, more policies must focus on getting these girls enrolled in school. This could be done, for example, through targeted conditional (or unconditional) cash transfer programs.

In the second paper, we found that children living in households who rely solely on the production of their own farms for income have a larger probability of working as their main activity and are thus less likely to be in school than children from more diversified households. Although working on the family farm might seem harmless, many tasks could be harmful to the child, such as handling sharp tools and exposure to potential harmful chemicals such as inorganic fertilizers and pesticides (ILO 2013). Therefore, it is important to determine what these children are doing. It is also important to form policies to enroll these children in school. Again, conditional cash transfers are a potential solution. Furthermore, more detailed data about children’s total time allocations could improve understanding about the connection between livelihood diversification and time allocation.

In the third paper, I find that female-headed households are more dependent on agriculture for their incomes and have lower probabilities of entering non-farm wage employment, which has been identified as an important way out of poverty. To gain access to this sector, women need to
overcome some entry barriers. Policy should therefore focus on allowing these households to gain access to the labor market. It would also be interesting to utilize data from all the countries in the RIGA database in future research to explore whether the general patterns found in the Kenyan context generalizes to these other settings.

In the final paper, we show that poor and rural landless households are especially vulnerable to increases in the price of maize. This vulnerability can be reduced by increasing their access to employment outside of agriculture or by increasing their productivity on the farm. Furthermore, we find that the assumptions we make about the relative change in consumer and producer prices will have a large impact on the results. Therefore, it is important that future research moves away from simplistic assumptions that these change in the same proportion. More research is needed to understand how consumer and producer prices change depending on the reason for the price change.
References


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