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School drop out and farm input subsidies: gender and kinship heterogeneity in Malawi

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Abstract

An emerging interdisciplinary literature explores how kinship practices affect household resource allocation through efficiency of production and consumption. This paper focuses on a key gender norm - how a resource transfer to households affects school drop out of girls relative to boys, under different kinship practices. Specifically, we investigate how Malawi's farm input subsidy programme affects gendered school drop out across matrilineal and patrilineal communities. Because of matrilineal practices, girls facilitate the inter-generational transfer of wealth in these communities. They inherit property and often *co-reside* with their parents after marriage, taking care of the parents in their old age. Boys undertake a similar duty in patrilineal communities. Our results indicate that school drop out decreases among girls who live in matrilineal households that participate in the subsidy programme. However, the impact is limited to matrilineal communities where couples reside in women's birth home-matrilocal home. School drop out is not affected by FISP receipt in patrilocal communities, where couples settle in the natal home of men. Furthermore, expenditure on schooling increases among matrilocal girls whose household receive FISP, and girls residing in the matrilocal communities experience a reduction in time spent on domestic chores once their household receives the subsidy. Our results suggest that a resource transfer to households reduces gender gaps in school drop out only in communities where investment in women is more valued by traditional practices than the investment in men.

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1 Introduction

Gender gaps in school drop out remain a policy concern, as the global education discourse dedicates disproportionate attention to equitable enrolment, typically ignoring retention and completion (Moshoeshoe et al., 2019). The situation is pervasive in Sub-Saharan Africa (SSA), where more girls than boys drop out of school (Chikhungu et al., 2020). This is despite the fact that several countries [1] in the region implement Free Primary Education (FPE) policies that are well-known to have increased female access to education (Moussa and Omoeva, 2020; Keats, 2018; Lucas and Mbiti, 2012). However, these gender gaps in human capital development need redress, as they could slow economic growth, increase fertility and unemployment, and reinforce poverty traps (Rammohan and Vu, 2018; Workneh, 2020; Kleven and Landais, 2017; Monden and Smits, 2013; Klasen and Lamanna, 2009).

While some SSA countries have lower drop out rates, such as Botswana (7 percent) and Mauritius (2 percent), Malawi is among countries with higher levels of school drop out in SSA. For instance in 2010, the Malawian drop out rate was 46 percent[2], lagging only Chad (72 percent), Uganda (68 percent), and Angola (68 percent), in SSA[3]. Often Malawian school drop outs are, to a greater extent than in other countries, driven by children undertaking many domestic roles, and early marriages, especially among girls (Chikhungu et al., 2020). For instance, National Statistical Office (2015) reports that about 47 percent of Malawian girls marry before the age of 18, while only 7 percent of boys marry at the same age. This is despite the country consistently implementing numerous education interventions that seek to keep more girls in school, such as the FPE.

Malawi pioneered the sub-Saharan FPE policy in 1994, abolishing tuition fees in primary school, but not secondary school (Andriano and Monden, 2019; Chimombo, 2009). This led to an increase in primary school enrolment, especially for girls, closing the gender gap in access to education in the country (Grant, 2017). Nevertheless, the FPE reduced the quality of education due to the very low teacher-to-pupil ratio, and inadequate supply of school facilities and supporting materials such as text books (Chimombo, 2009). Further, parents were required to spend more on non-tuition payments such as school development fund contributions, transport to schools, and school uniforms (Grant, 2015). The parental financial burden also grew because parents had to support more children in school than before, as FPE made primary school accessible to all (Chimombo, 2009). Consequently, school drop outs increased, especially among girls in higher primary school grades, and those who needed to progress to secondary school (Stoner et al., 2019; Fall and Roberts, 2012). That is, parents were sacrificing female education when they faced liquidity constraints (Dessy et al., 2020).

Because the high cost of schooling is commonly identified as the root cause of gender differences in drop outs (Grant, 2017), a resource transfer to households through other welfare programmemes could complement FPE and reverse the drop out inequality. However, traditional practices may dictate how such resources are invested between boys and girls, and potentially exacerbate or mitigate the school drop out rift. This is partly because investment in boys and girls is valued differently across kinship affiliations (Rammohan and Robertson, 2012). We test this hypothesis, using Malawi as a case study. The country's two most common kinship affiliations are patrilineal, in which men inherit wealth (especially land) from their parents, and matrilineal where women are the heirs (Mtika and Doctor, 2002).

Upon marriage, Malawian couples can reside in the birth community of the man, a practice called patrilocal settlement, or they can live in the natal village of the woman in matrilocal settlement (Kishindo, 2011). All Malawian patrilineal communities practice patrilocal settlement, while matrilineal communities

[1] Including Malawi, Uganda, Burundi, Cameroon, Ghana, Kenya, Lesotho, Mozambique, Namibia, Rwanda, Eswatini, Tanzania, and Zambia (Moshoeshoe et al., 2019)

[2] www.knoema.com

[3] www.en.unesco.org

practice both matrilocal and patrilocal settlement arrangements (Berge et al., 2014). In matrilocal settlements, proximity to the natal household allows women to take care of their parents in their old age, and the same applies to men in patrilocal settlements (Rammohan and Robertson, 2012). These asymmetric later-life benefits of raising a child of a particular gender could distort gender-equitable investment in schooling between boys and girls (Rammohan and Robertson, 2012). Therefore, the question of whether a liquidity injection into a household increases investment in a boy or a girl, thus reducing school drop out for the favoured child's gender, likely depends on the benefits that parents obtain from such a decision.

In Malawi, a farm input subsidy programme (FISP) distributes vouchers that allow maize farmers to access cheap production inputs (Ricker-Gilbert, 2013). The subsidy increases maize production and enhances food security through self-sufficiency (Ricker-Gilbert et al., 2011). The FISP therefore unties household liquidity constraints by allowing the farmers to save on food and fertiliser purchases (Sibande et al., 2017; Ricker-Gilbert, 2013). This liquidity is however not neutral because the FISP vouchers are given to household heads, who are often men (Djurfeldt et al., 2018). Moreover, Djurfeldt et al. (2018) and Mwale et al. (2021) show that the subsidy enhances the bargaining position of men within recipient households in matrilocal settlements. Moreover, patriarchal decision-making dominates Malawian homes, as men have better access to complementary inputs such as credit and fertiliser, even when they do not own land (Bhaumik et al., 2016). Men have more income to purchase the inputs because they often work outside home for a salary, unlike women whose labour is mostly unpaid household chores (Walther, 2017).

Men could therefore use the additional autonomy and increased household liquidity from the subsidy to reorganise household expenditure in a manner that increases investment in the child of a gender that offers them the largest future benefits. Men do not own land in a matrilocality. Husbands in this community would therefore be better off if they invest more in a girl than a boy, because she *co-resides* with her parents, taking care of them when she marries. The girl is essentially an old-age safety net for her parents, especially the father, because he does not own land in the community (Berge et al., 2014). Thus, matrilocal customs could compel the husband to use the FISP to reduce gender gaps in school drop out by improving investment in a girl's education. In patrilocal communities, men do not need to improve girls' investment using the FISP because it is the boys that take care of parents in their old age. Therefore, patrilocal husbands are more likely to use the FISP to maintain the status quo of the relatively high drop out for girls.

Studies (Chibwana et al., 2013; Lunduka et al., 2013; Harou, 2018; Arndt et al., 2016; Asfaw and Carraro, 2016; Dorward and Chirwa, 2011) evaluate the effects of the FISP on household welfare. However, only a handful of studies estimate the effects of the programme on the education of children, and their results reveal that FISP increases school enrolment and attendance (Holden and Lunduka, 2010; Chirwa and Andrew, 2013). However, no study disaggregates the impacts of FISP on education by gender. Knowing that in Malawi more girls than boys drop out of school (Grant, 2012; Chikhungu et al., 2020), and the potential influence that kinship traditions could have in re-allocating FISP resources within households, this paper attempts to answer the following questions: 1) do farm input subsidy programmes reduce the gender inequality in school drop out differently, under opposing kinship practices?; 2) what are the transmission mechanisms through which the impacts of FISP on gendered school drop out manifest?

Our results reveal that FISP reduced girls', but not boys', school drop out in the matrilineal kinship. The programme had no similar impacts in the patrilineal kinship. Within the matrilineal kinship, the impacts of FISP on gendered school drop out were limited to matrilocal communities. An increase in education expenditure on girls' but not boys' education was found as the main transmission mechanism through which FISP operates in the matrilocal communities. Further, matrilocal households that received FISP reduced the amount of time that girls spent on fetching water while increasing the time that boys spent on the same activity. Arguably, parents were relieving girls of some household duties to allow them to concentrate on their studies. The girls dedicated more time to schooling thus efficiently using the FISP liquidity that was invested in the girls' schooling expenditures. These impacts of FISP on education expenditure and time

use were significant among children that are of secondary school age. This suggests that FISP was more important among the groups that were excluded from FPE-secondary school children.

Our paper adds to the scholarly work conducted on the role of kinship practices in the intra-household allocation of resources. Chikhungu et al. (2020) show that the increase in household resources will homogeneously reduce female school drop out without further investigating how kinship practices affect resource allocation within households. Moreover, the author investigates the impact of liquidity on drop out for girls only. He did not compare the girls' reduction in drop out to that of boys, to understand whether the resources reduce gender inequalities in education. This paper reveals that a liquidity injection to households reduces gender inequalities in school drop out only in communities where females offer care to their parents when they age, and are custodians of generation wealth for their kinship.

The paper also makes a contribution to the literature on farm input subsidies. I show that the programmes have impacts on gender inequalities conditional on the age group and outcomes that the evaluation focuses on. Karamba and Winters (2015) conclude that the Malawi FISP is non-gender equalising by showing that it does not generate a female advantage in maize productivity among older women. Results in this paper, however, show that the programme is gender-equalising by reducing gendered school drop out, at least for younger women living in their matrilocal homes.

The paper also contributes to research on the role of matrilineal kinship on the efficiency of the agricultural households' organisation structure. Bhaumik et al. (2016) show that the kinship is retrogressive as it leads to under-investment in high value crops, likely because men have no interest in improving land that they do not own and control (Walther, 2018). Despite this negative narrative on matrilineal households' agricultural productivity, we show that the kinship is welfare-improving, at least among children, because it benefits girls' education in the short run, thus reducing gender inequalities in education, and benefiting men who get assistance from their daughters in the long run .

Finally, the paper adds to literature on the impact of households' liquidity shocks on gender differences in education outcomes. While previous studies (Dessy et al., 2020; Björkman-Nyqvist, 2013) show that parents sacrifice female education in times of negative shocks, one would anticipate that in times of abundance they would increase investment in their favoured gender: boys. However, we show that a positive liquidity shock could reverse the girls' investment penalty, at least where traditional practices compel parents to favour the girls.

In section 2, we discuss the relationship between gender and school drop out, to understand the context for the persistence of female disadvantage in education outcomes. In section 3 we present the conceptual map of how the effects of FISP could affect gender gaps in school drop out differently across opposing kinship traditions. Section 4 describes the data used in the paper, while section 5 outlines the method adopted to generate results that are presented in section 6. In section 7 we discuss the the findings, while in section 8 we conclude the paper.

2 Gender and school drop out

Gender gaps in school drop out persist in most low-income countries amidst significant progress made in ending differences in enrolment between boys and girls (Subrahmanyam, 2016). The situation is more pervasive in Sub-Saharan Africa, a region where wide implementation of free primary education has occurred in recent years (Fincham, 2019; Eloundou-Enyegue, 2004). Even more recently, other countries in the region, such as Malawi (in 2019), expanded to abolishing secondary school tuition payments (Chikhungu et al., 2020).

With FPE, countries attained gender parity in enrolment. However, school retention and completion remained far from gender-equal. This is because the FPE policy increased pressure on public school resources,

lowering the quality of education to below pre-FPE levels (Kadzamira and Rose, 2003; Ngware et al., 2011; Owuor, 2018). Countries in Sub-Saharan Africa experienced high repetition rates after FPE was established (Koros et al., 2013). This increased the number of over-aged primary school students. Over-aged girls reach puberty while still in primary school, and they lose interest in education, often dropping out more than boys of similar age (Mzuza et al., 2014).

By abolishing primary school tuition, FPE was believed to reduce female education disadvantage in the region, despite being gender-neutral in its implementation (Eloundou-Enyegue, 2004). This is because in cases where households face liquidity constraints, parents often favour boys' over girls' education investment (Malawi-Government-MoEST, 2018; Johnson, 2006). For instance, in Uganda negative rainfall deviations are found to reduce girls' but not boys' enrolment and class performance (Björkman-Nyqvist, 2013), while in Malawi drought increases girls' but not boys' school drop out (Dessy et al., 2020). Therefore, girls' school drop out could be the result of caregivers' disproportionate support across the gender of the child (Mzuza et al., 2014).

One of the reasons that parents prefer educating boys over girls is that girls are seen as a low(er)-return investment (Johnson, 2006). This is the case in most low-income countries, and is partly attributed to gender differences in labour market outcomes. Women have lower labour market access and earn relatively lower incomes than men (Boyle et al., 2002). Therefore, parents are compelled to make education-investment decisions that favour boys over girls. This increases school retention and completion for males.

Schools that are a long distance away from home is another reason for gender differences in drop out, as it affects boys and girls differently. For instance, in Malawi parents report to be more concerned about the safety of girls, and cite that a long distance to school increases girls' exposure to dangers such as sexual harassment (Grant, 2012, 2017). Moreover, Gondwe (2016) shows that distance to school is directly related to female, but not male school drop out. Possibly, an alternative would be to provide transport for the girls, and in other cases parents rent self-boarding facilities to accommodate female students close to the schools (Kayange, 2020; Mlangeni and Chiotha, 2015). This however, increases the average cost of educating girls relative to boys.

Another reported reason is that parents are less willing to send girls to school for fear of exposing them to other behaviour risks such as early- and out-of-wedlock pregnancy (Grant, 2012). This is particularly the case for older girls of secondary school age in SSA countries that have strong traditions (Mzuza et al., 2014). For instance in Malawi, parents perceive schooling as an opportunity that allows girls to evade parental monitoring and meet with men (Grant, 2012). Their fears are due to the fact that the country has one of the highest rates of early marriages. For instance, 47 percent of Malawian girls marry below the age of 18 and 11 percent of female drop outs are due to teenage pregnancies (Malawi National Statistical Office, 2017). As such, many Malawian parents prefer keeping older girls at home to assist with domestic chores (Gondwe, 2016).

Under these gender-skewed education challenges, parents provide more support to the education of boys than to girls. This arguably increases the school drop out of girls. Nevertheless, contextual factors such as the kinship affiliation of the parents, could alter the severity of this gender bias. This is because the perceived value of girls (boys) is heterogeneous across kinship (Rammohan and Vu, 2018). If parents obtain resources from a welfare programme, in a kinship where women are more valued, the parental bias of investment against girls is more likely to reduce.

3 Conceptual framework

In order to determine whether the FISP impacts gender gaps in school drop out differently in matrilocal and patrilocal communities, I draw from collective household models (Chiappori, 1988, 1992; Chiappori

et al., 2002; Chiappori and Ekeland, 2006). Collective households present couples with differing individual preferences, whose fulfillment rests on each of their respective bargaining power. While these models would mainly focus on whether bargaining power due to the FISP affects kinship bargaining, this paper emphasises on how the end bargaining product affects allocation of household resources.

Within collective models, decision rules for resource allocation can either be cooperative (efficient) or non-cooperative (inefficient). I assume that here the decision rule is non-cooperative. Increasingly, empirical evidence supports this notion. For instance Duflo (2000) showed that only resource transfers to women, but not men, improve nutrition outcomes for South African children. Moreover, Walther (2018) has empirically proven that Malawian households are indeed non-cooperative, as husbands devote less labour to household farms in matrilocal communities, where they are not in full control of production land, hence its produce Walther (2018). Because a detailed theoretical discussion of these issues is beyond the scope of this paper, we now present a heuristic explanation in what follows.

Husbands hold the FISP, therefore, they are empowered (Mwale et al., 2021)[4]. Non-cooperative collective household models would predict that they use this bargaining power to direct household resources, and production processes, in to options that meet their preferences (Chiappori, 1988). Assume they can either invest the resources in household assets such as land, or in human capital such as child education. Assume further that we are in a two-period consumption framework, when they will invest the resources in period 1, and reap the benefits of the investment in the next period, 2. Under these assumptions, the effects of the FISP on school drop out across genders cannot be determined a priori, as I discuss below.

There are two main channels through which a resource transfer to households may affect school drop out: 1) by modifying the propensity to attend school; and 2) by changing the returns to child labour. As theoretically argued by de Hoop and Rosati (2014), if the resources are invested in a valuable asset that demands increased labour, parents may dedicate more time to the investment, and use children in household production. This has been empirically proven in Malawi by Hazarika and Sarangi (2008) where a micro-credit programme increased child labour time in domestic chores (a micro-credit programme also decreased female school attendance in Malawi (Shimamura and Lastarria-Cornhiel, 2010)). However, if the resources are used to finance education expenses, the opposite might happen: children will be encouraged to spend more time in school, to make effective use of the resources, hence being less available for household chores (de Hoop and Rosati, 2014). What is key, however, is that the incentives of husbands to use the resources in either fixed investment or human capital could depend on post-marriage settlement practices.

Matrilocal men would be less inclined to invest in fixed assets such as land, over children's education, because the land is owned by their wives and the wives' extended family. The case is opposite for patrilocal men: they control their land, hence would be willing to invest the resource in land over children's education. This is also because, in matrilineal kinship, patrilocal children affiliate to their mother's community of origin (Mwambene, 2005), even though they reside in their father's community (Phiri, 1983). Therefore, the impacts of FISP on school drop out should be significant in matrilocal but not patrilocal communities. Nevertheless, the matrilocal husband's human capital investment in period 1 is more likely to be gender biased, because male and female children offer different benefits to the husbands in period 2.

Matrilocal husbands are better off investing the liquidity in girls' education, because the husbands have no rights to land in the kinship (Kishindo, 2011), while the girls acquire land in future, and take care of their landless fathers. Moreover, matrilocal husbands aim to win acceptance and respect from their wives' extended family by being hard-working, productive, wealthier and supportive of the wives' clan (Johnson, 2018; Phiri, 1983). Otherwise, they are treated as outsiders, also called *marital immigrants* by Kishindo

[4]FISP not only empowers men, it also unties household liquidity constraints through: savings on income that was used for purchasing market accessed inputs (Ricker-Gilbert and Jayne, 2017), and savings on income used for purchasing food during extended food deficit months (Sibande et al., 2017), and income generated through increases in sales of maize in the market (Sibande et al., 2017; Chibwana et al., 2012)

(2010). Divorce by wives is a credible threat to matrilocal husbands; in fact, the uncle of the wife can demand departure of the husband if he sees him as a liability in the clan (Phiri, 1983). Because the girls are custodians of a matrilocal's generational wealth (Johnson, 2018), matrilocal men might, therefore, earn their in-laws' approval by using the FISP to increase investment in girls' education.

Increasing girls' education investment in matrilocal households could, on one hand, be through using part of the additional liquidity from FISP to finance school expenditures for the girls. On the other hand, parents may wish to ensure that their investment is used efficiently by complementing the spending with changes in household labour patterns. That is, girls may be relieved of some household chores so that they can dedicate more time to their schooling. Together, the changes could improve school performance for the girls, increase the girls' chances of progressing to upper classes, and ultimately reduce the school drop out for the girls.

4 Data and variable description

4.1 Data

The data used in this study is from Malawi's Integrated Household Panel Survey (IHPS) of 2013. The IHPS selected 3,246 households from 204 survey enumeration areas capturing all 32 districts of Malawi in its baseline of 2010. The follow-up wave of 2013 attempted to revisit the baseline households and also tracked all individuals that moved away or split from the original dwellings. Because of the newly-formed dwellings, the 2013 wave had 4,000 households formed from the original 3,246. Attrition at household level was 3.78 percent. Only 2,600 farming households were eligible to participate in FISP, therefore I focus on these households.

The IHPS provides the ideal data for this study for various reasons. The data captures school drop out, the amount of resources spent per child in school, and the amount of hours that the child spends on undertaking household chores at an individual level. The gender and age of the child are also reported. Further, the survey classifies the household in which the child lives as FISP beneficiary or not, and clearly identifies the community in which the households resides by kinship. The IHPS also contains other data that we use as control variables for understanding the relationships of interest.

4.1.1 The outcome variables

The outcome variables used in the study are drop out, expenditure on schooling, and time spent on fetching water. Drop out is suitable in our setting because it is sensitive to short-term shocks. Thus, a liquidity shock such as that of receipt of the FISP could immediately prevent drop out if the reasons for drop out were financial. Investing the liquidity in a child's schooling could also compel parents to make complementary changes that allow the child to concentrate on school, in order to make full use of the spending. An example would be relieving the child from some household chores such as fetching water, that could interfere with schooling time.

Following Dessy et al. (2020), we adopt the United Nations Educational, Scientific and Cultural Organization (UNESCO) definition of drop out: someone who leaves school permanently in a given year and does not return. We limit our analysis to children aged six (the acceptable first-grade starting age in Malawi primary school) to 18 (the anticipated secondary school finishing age). We keep only children that were in school during the baseline survey and trace whether they dropped out by the end-line. Drop out is therefore captured as a dummy of 1 for those that exited the education system and never returned, and zero otherwise.

The FISP could unlock liquidity, increasing the amount of resources available for household spending.

Child education expenses are a possible beneficiary component within the household budget. We therefore include expenditures on education for every child as a possible transmission mechanism. Expenditure is captured as a continuous variable in Malawi Kwacha amounts. We log expenditure to minimise the impact of outliers. The second possible transmission mechanism that we include is time spent on domestic chores in the day before the survey interview, proxied by hours of fetching water per day. The IHPS data also included time spent on fetching firewood that we did not include here, because very few children were reported to have done any firewood fetching in the last 24 hours, such that our estimation models could not converge to produce results.

4.1.2 The treatment variables

The main treatment variable is a dummy variable, FISP, that indicates whether a household was a beneficiary of the subsidy programme in the most recent agricultural growing season or not. We follow previous studies (Karamba and Winters, 2015; Harou, 2018) by using FISP receipt as a dummy unlike the amount of fertiliser applied by a household, because FISP recipients gain liquidity either by using the fertiliser as intended or by reselling vouchers on the secondary market. The second treatment variable is the gender of the sampled child where 1 is assigned to female gender and 0 is assigned to male gender. The final treatment variable is the kinship. We first categorise kinship with a dummy where 1 is assigned to matrilineal and 0 is assigned to patrilineal kinship. We then split matrilineal kinship into a second dummy with 1 assigned to matrilocal settlement and 0 assigned to patrilocal settlement. Settlement is captured, in the IHPS, as common marriage practice for majority of households in a community. We observed that some communities switched their settlement identity between matrilocal and patrilocal across the two survey waves, implying that the majority between the two settlement patterns changed in a community. If such changes in definition were endogenous to FISP, our estimates could be biased. We therefore dropped all children from communities that switched their settlement identity, to remove this potential bias.

4.1.3 The control variables

Table 1: Means and differences of means for control variables by kinship and FISP participation

	(1) Matrilineal	(2) Patrilineal	(3) t-test	(4) FISP	(5) No-FISP	(6) t-test
Child age	11.624	11.665	-0.041	11.514	11.788	-0.274*
Over age	2.390	2.051	0.339**	2.356	2.320	0.036
Household consumption	746276.014	713542.987	-32733.027	714541.669	781709.212	-67167.542**
Household size	6.682	7.428	- 0.746***	6.710	6.879	-0.169
Youth-dep-ratio	1.445	1.670	-0.225**	1.425	1.541	-0.116**
Old age-dep-ratio	0.068	0.123	-0.055**	0.083	0.067	0.015
Age of the head	45.318	45.025	0.292	46.403	43.808	2.595***
Edu of the head	6.011	6.904	-0.894**	5.716	6.731	-1.015***
Female head	0.245	0.189	0.056*	0.239	0.233	-0.006
Rural resident	0.859	0.732	0.127***	0.900	0.761	0.138***
Year 2013	0.473	0.456	0.016	0.415	0.547	-0.132***
Obs.	2169	355	2524	1444	1085	2529

Table 1 shows control variables used in the study. Column 1 and 2 characterise matrilineal and patrilineal kinship respectively, while column 3 shows the difference between these two kinships. Columns 4 and 5 summarise the sample by FISP participation, while column 6 shows the differences between FISP recipients

and non-FISP recipients. Age does not differ between matrilineal and patrilineal children, while FISP children are younger than those from non-FISP households. Matrilineal children are, on average, too old for their class relative to patrilineal children. There are no statistical differences in per capita consumption between matrilineal and patrilineal households. FISP homes are relatively poorer than non-FISP households. Patrilineal and non-FISP households are relatively larger than matrilineal and FISP ones. Matrilineal homes have low youth and old age dependency ratios, while FISP households have a low youth dependency ratio. FISP households are headed by older heads with less education relative to the non-recipient ones. Patrilineal heads are more educated than matrilineal heads. Female-headed households are fewer than male-headed households, however, among the few, more are in matrilineal than patrilineal kinship. There are more matrilineal and FISP households in rural areas relative to patrilineal and non-FISP households.

In Table A.3 of Appendix A, we split the matrilineal controls into matri- and patri-local settlements. Matrilocal households have a significantly lower per capita consumption relative to patrilocal households. Further, matrilocal households have smaller households and younger heads in comparison to patrilocal households. Both communities are mostly male-headed, however there are more female-headed households in matrilocal relative to patrilocal households. In addition, both localities are predominantly rural, however there are more rural households in patrilocal than matrilocal communities.

Overall, the characteristics of our sample suggest that matrilineal, particularly matrilocal, households have a low socioeconomic status and their characteristics resemble those of FISP recipients. This is expected because matrilocal settlements are dominant in the southern region of Malawi where poverty is widespread. Considering that our unit of analysis is individual (a child) and the treatments are at household and community level, I do not expect many individual differences in the means of the control variables.

4.2 Descriptive statistics

Figure 1: School drop out rate by age, gender, and FISP

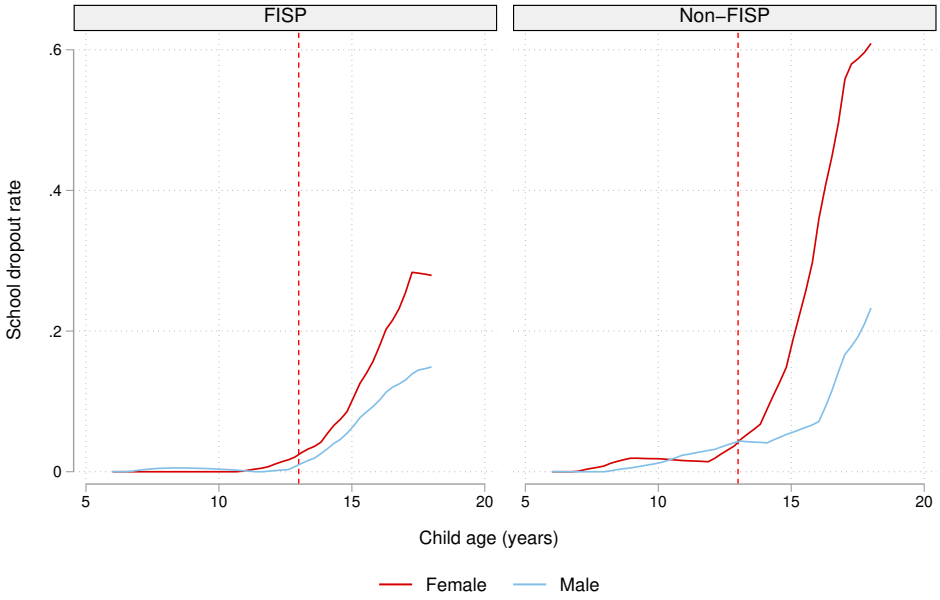


Figure 2: School drop out rate by age, gender and Kinship

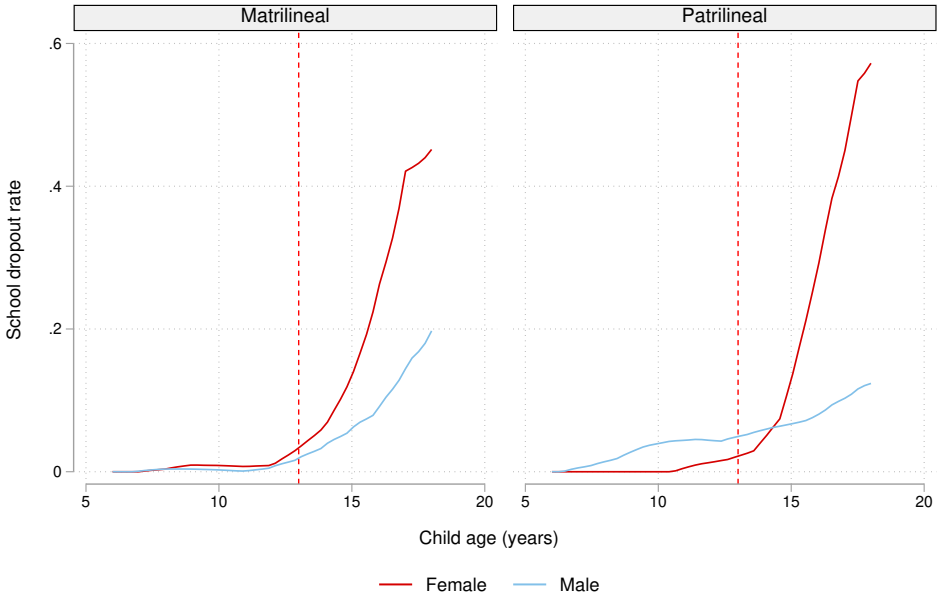
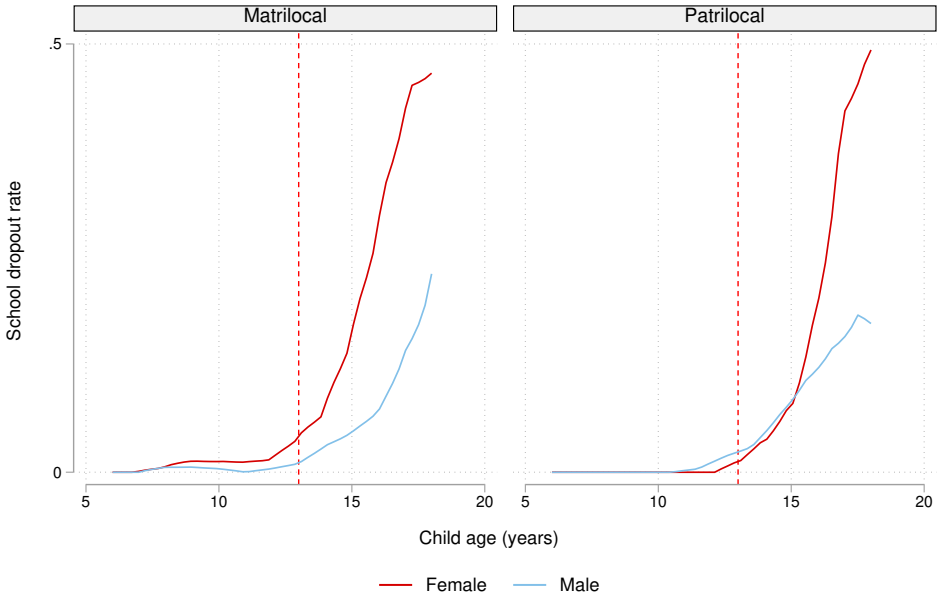


Figure 3: School drop out rate by age, gender and marital settlement pattern



Figures 1, 2 and 3 present gender gaps in drop out rates across different ages. I dis-aggregate the sample by FISP participation (1), kinship (2), and post-marriage settlement pattern (3). The red lines plot drop out against age for girls, while the blue line shows the plot for boys. The vertical line is at age 13, which

is the anticipated primary school exit-age, assuming that the student commenced primary school at the Malawian official age of six, and did not repeat a grade. Overall, older children drop out more than younger ones, and girls have a higher drop out rate than boys. Liquidity could be a problem especially among children above the expected primary completion age of 13, because secondary school demanded tuition fees, as of 2013. However, the liquidity is also necessary for non-tuition expenses such as school uniform, school development fund contributions, transport to school, and self-boarding expenditures, that apply to both primary and secondary education. We also expect drop out to increase after 13, particularly for older girls, possibly because of teenage pregnancy and early marriages.

We observe that children from FISP households begin to drop out earlier than age 13, while those from non-FISP households begin dropping out at age 13. Possibly this is because beneficiary households are more liquidity-constrained than non-beneficiaries as shown in Table 1. Importantly, the differences in drop out between girls and boys for recipients is relatively smaller after age 13 than that for non-recipient children. This could suggest that FISP reduces gender gaps in school drop out. There are no visible differences in drop outs between matrilineal and patrilineal kinships. Within matrilineal communities, matrilocal and patrilocal children portray similar patterns of drop out, however the gender gap in drop out that favours boys begins before age 13 in matrilocal communities, while it only starts after age 13 in patrilocal communities. This could be because patrilocal households have relatively more income than matrilocal households (as shown in Table A.3 of Appendix A) that enables them to keep both girls and boys in school for longer, before they start making hard choices of sacrificing either gender's education due to inadequate resources.

In what follows, we further examine differences in drop outs between boys and girls in FISP-receiving households and those in non-FISP-receiving households. Considering that the programme could re-arrange household production and consumption, we further examine whether there are gender differences in spending on the education of each child, and the child's time use on domestic chores, that we proxy by number of hours that a child spends on fetching water for their home. The comparison also distinguishes between children by kinship and post-marriage settlement patterns. These outcomes could assist in explaining the graphical changes in drop out that are observed in Figures 1, 2 and 3. We compute differences in means and use t-tests to establish their significance.

Table 2: Gender differences in non-FISP households by kinship

	(1)	(2)	(3)	(4)	(5)	(6)
	Matrilineal			Patrilineal		
	Female	Male	t-test	Female	Male	t-test
drop out	0.112	0.040	0.072***	0.101	0.047	0.054
Expenditure	3478.000	3028.238	449.762	4602.879	3731.729	871.150
Water(hrs)	0.480	0.153	0.328***	0.383	0.145	0.238***
Observations	455	420	875	99	107	206

Source: Author's own calculation from IHPS

Table 2 shows differences in outcomes by kinship in households that did not participate in the FISP programme. In matrilineal kinship, drop out rates for girls are significantly higher than for boys. There are no differences by expenditure on education. Girls work more hours fetching water compared to boys. Non-FISP households in patrilineal communities exhibit no differences in drop out, expenditure on education, and time use by gender [5]. Table 3 presents differences in means of outcomes within matrilineal settlements. Drop out is significantly higher for girls relative to boys in non-FISP matrilocal households. There are no expenditure differences and girls continue to work more hours on fetching water than boys. We see no

[5]In Table A.2 of Appendix A, We also show that within gender, matrilineal and matrilocal boys spend more hours fetching water than patrilineal and patrilocal boys

Table 3: Gender differences in non-FISP households by settlement

	(1)	(2)	(3)	(4)	(5)	(6)
	Matrilocal			Patrilocal		
	Female	Male	t-test	Female	Male	t-test
drop out	0.130	0.041	0.090***	0.084	0.040	0.044
Expenditure	4083.623	4160.020	-76.397	2544.190	1428.132	1116.058
Water(hrs)	0.485	0.178	0.307***	0.474	0.117	0.357***
Observations	276	246	522	179	174	353

Source: Author's own calculation from IHPS

Table 4: Gender differences in FISP households by kinship

	(1)	(2)	(3)	(4)	(5)	(6)
	Matrilineal			Patrilineal		
	Female	Male	t-test	Female	Male	t-test
drop out	0.035	0.026	0.009	0.068	0.040	0.028
Expenditure	1516.026	2057.787	-541.761	1564.459	1096.533	467.926
Water(hrs)	0.428	0.150	0.278***	0.338	0.093	0.245***
Observations	650	644	1294	74	75	149

Source: Author's own calculation from IHPS

Table 5: Gender differences in FISP households by settlement

	(1)	(2)	(3)	(4)	(5)	(6)
	Matrilocal			Patrilocal		
	Female	Male	t-test	Female	Male	t-test
drop out	0.040	0.024	0.017	0.024	0.033	-0.008
Expenditure	1744.757	2188.120	-443.362	1019.512	1731.957	-712.444
Water(hrs)	0.409	0.150	0.259***	0.470	0.149	0.320***
Observations	445	460	905	205	184	389

Source: Author's own calculation from IHPS

statistically-significant gender differences in drop out and expenditure for patrilocal children, while girls work significantly more hours on fetching water than boys.

Table 4 shows gender differences in outcomes by kinship for children from FISP households. There are no statistical differences in either drop outs or education spending across gender in both matrilineal and patrilineal kinship. Differences emerge in time use. Girls spend more time on fetching water relative to boys in both kinships[6]. All patrilineal households are patrilocal, therefore, patrilineal means also represent patrilineal-patrilocal children. However, matrilineal households can be matrilocal or patrilocal. Table 5, therefore, splits the matrilineal sample into matrilocal and patrilocal settlements. We see no gender differences in drop out and education spending in both settlement types. Girls spend more time on fetching water in both matrilocal and patrilocal settlements.

The difference in means shows that gender differences in drop out exist and they are prominent in matrilineal areas, particularly among households that did not participate in the FISP programme. Therefore, the FISP could be reducing drop out. Furthermore, we do not see gender differences in child expenditure on education but rather on hours spent fetching water per day, which is just one of the many household

[6]We also found that the average time for fetching water in urban areas is 18 minutes per day for girls and 9 minutes for boys. In rural areas it is 31 minutes per day for girls, while that of boys is 9 minutes per day

chores. These hours could be indicative of a broader picture of intra-household gender division of labour among children. Even so, these differences could be considerably biased in the absence of controls for other characteristics. Therefore, we use econometric models to empirically test these relationships.

5 Methodology

5.1 Empirical strategy

To understand whether FISP reduces or exacerbates gender inequalities in the school drop out and how kinship traditions mediate these effects, we build econometric models that specify school drop out as a function of participating in the FISP. The unit of analysis is individual children. The FISP is measured at household level, and kinship and post marriage settlement practices are measured at community level. The empirical functions can be specified as follows:

$$\begin{aligned} y_{ijcrt} = \beta_1 FISP_{jcrt} + \beta_2 FISP_{jcrt} \times Female_{ijcrt} + \beta_3 Female_{ijcrt} \\ + \boldsymbol{\gamma}' \boldsymbol{z}_{ijcrt} + \boldsymbol{\lambda}' \boldsymbol{x}_{jcrt} + \boldsymbol{\delta}' \boldsymbol{c}_{crt} + \gamma_r + \kappa_t + \mu_i + \varepsilon_{ijcrt} \end{aligned} \tag{1}$$

In Equation 1, y captures drop out for a child i in household j that resides in community c which is in region r, measured at time t. The impact of the FISP on y is measured by β_1 and β_2. Particularly, β_1 measures the total impact of FISP on boys' y. β_2 captures the impact of FISP on girls' y over boys and girls whose households did not receive FISP (relative impact or the deviation from boys' total impact of FISP), while $\beta_1 + \beta_2$ captures the total impact of FISP on girls' y. β_3 measures the gender difference in drop out in the absence of the FISP[7]. Knowing that β_3 is positive in Malawi (girls drop out more than boys as shown by Chikhungu et al. (2020)), a β_2 that is negative and significant, implies that receipt of the FISP is gender-equalising, as it reduces the existent female disadvantage in school drop out. However, these relative shifts in drop out should lead to significant total effects ($\beta_1 + \beta_2$) for girls to register an overall gain.

$\boldsymbol{z}$ contains two control variables: one is age of the child, and another is whether the child is over-age[8]. x contains household levels controls (including a log of household per capita consumption, household size, youth dependency ratio, old age dependency ratio, age of the household head, the squared age of the head, education of the head, squared education of the head, and gender of the household head). c captures residence of the household (whether they are in a rural or an urban area). γ_r represents district fixed effects, κ_t year fixed effects and μ_i personal specific fixed effects.

The paper estimates separate versions of Equation 1. The first uses a sample that is limited to matrilineal kinship while the second uses a patrilineal sample. The matrilineal sample is further split into matrilocal and patrilocal communities. These specifications enable establishing how the impact of FISP on gendered school drop out differs by traditional practices.

After establishing the gender impacts, we then use 1 to further examine the possible transmission mechanisms - whether receipt of the FISP reallocates expenditure on education between girls and boys differently, and whether these variations also exist by time use. We specifically test the impact of the FISP on education spending for a girl and a boy, and number of hours per day that these children spend fetching water for their households. Since older children typically require larger expenditures on education, and perform most tasks at home, we anticipate that the transmission mechanisms will differ by children's age. Particularly, age 13 is critical in this case, because it is the anticipated age for completing primary school

[7] In practical terms we shall not show this coefficient because our identification relies on fixed effects methods that drop time-constant variables such as gender

[8] We construct over-age as the difference between the class in which a child is, and the class in which a child of their age is supposed to be.

in Malawi (Owuor, 2018). Therefore, the stratification assists in understanding how the effects of the FISP on drop out potentially interact with exposure to the free primary education in Malawi.

Under Malawi's FPE, which started in 1994, primary school tuition fees were abolished, and parents had to only pay non-tuition expenses such as school uniforms and transport. However, parents used to pay secondary school tuition for their children until 2019, when secondary school tuition fees were also removed. The data we use in this paper are from 2010 to 2013, when only primary school abolished tuition payment. Consequently, liquidity should be a big constraint for the children in secondary school. Therefore, the impacts of FISP on drop out could be stronger on older children of secondary school ages. These children are also old enough to be given more household chores. Because the children who are sent to school due to FISP liquidity should, by implication, be less available at home, we also anticipate FISP to shock time use for the children who are above 13.

Therefore for the analysis, children who were below age 13 in both waves are represented by *primary*, those who moved from below age 13 in wave 1 to above 13 in wave 2 are coined *transition*, while those who were above 13 in both waves are in the *secondary* category. The age stratification helps us to exclude observations that left the sample in between the waves.

5.2 Functional form

The dependent variables estimated in the study are of two types. The first, drop out, is binary. Therefore, we estimate the drop out equations as Linear Probability Models (LPMs). The LPM controls for the correlation between covariates and time invariant unobserved heterogeneity using Fixed Effects (FEs). To control for heteroskedasticity and serial correlation that are prevalent in LPMs, I cluster the standard errors at village level, which is also the administrative unit for the distribution of FISP coupons. The second dependent variables are expenditure on schooling (logged) and time use, which take on properties of nonlinear corner solutions. A number of households do not spend on children's education, or do not use school-going children in domestic chores, but for those that spend, the distribution is relatively continuous. To circumvent corner solutions, we model the impact of the FISP on schooling and time use expenditure by the Tobit estimator. A Tobit model avoids corner solutions by estimating a linear relationship even when there is a left or right censoring in the dependent variable. It does so by first computing the probability of participation, and use that probability as a weight in the impact of the treatment, x, on outcome y.

5.3 Identification

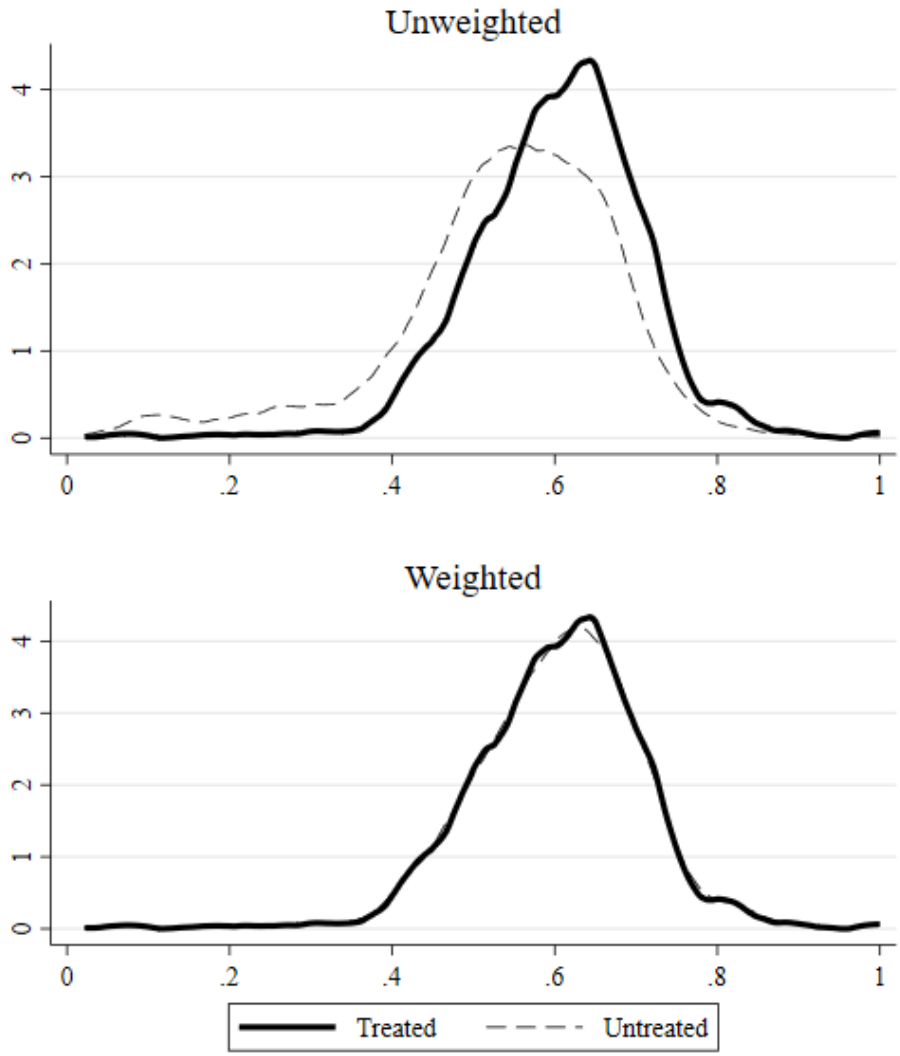
The main empirical challenge facing most studies measuring the impact of the FISP on various outcomes is that selection into the programme is non-random. It is well documented that the FISP selection criteria are poorly defined, which has led to non-poor and less-vulnerable households being included among selected households. Availing for the FISP could therefore be subject to other attributes that are non-observable to the researcher and bias Ordinary Least Squares (OLS) estimates. Ricker-Gilbert (2013) identifies the relationship to the village head or a member of Village Development Committee (VDC), farming ability, risk aversion and motivation as important determinants of FISP participation that are not observable to the data we use. However, these attributes are persistent over short periods of time, and our sample also covers only three years. Therefore, we use the fixed effects (FE) models for the binary outcomes and the Correlated Random Effects models with means, for the Tobit models (for more details see Mundlak (1978) and Chamberlain (1984)). These two methods remove time invariant unobserved bias in similar ways: they demean the variables of interest such that the observed effects of FISP on our outcoes, β_1 and β_2 in equation 1, are the short-run impact of entry or exit into FISP receipt on school drop out. We are able to use these models because FISP had enough variation between the two waves: 80 percent of the households were non-

participants in both waves, 60 percent were participants in both waves, 20 percent joined, while 41 percent left the programme between the two waves.

In addition to the FE models, we deal with any remaining source of observable bias by re-weighting Equation 1 with Inverse Probability Weights (IPW) of FISP participation. The first stage of IPW involves estimating a probit model of FISP participation. We use Government guidelines and literature provided determinants of FISP selection as the independent variables. The estimations are implemented on baseline (2010) data to capture the prior characteristics. Table B.4 of Appendix B presents factors that determine FISP participation. We used the estimates to generate propensity scores of programme participation. We weight households that received the subsidy by one, while those that did not receive that FISP are weighted by $\frac{1}{1-p_{i,j,c,r,t}}$. The re-weighting is to make the treated and control groups resemble each other in terms of observable attributes (for a detailed discussion of IPW see Hirano and Imbens (2001)).

Figure 4 shows how propensity scores of FISP participation are spread between programme beneficiaries and non-beneficiaries. The upper panel displays treatment and control groups before weighting, while the bottom panel shows the two after weighting with the IPW. Most observations are in the region of common support. However, their means are still apart, such that some degree of bias still remains. After weighting, the distribution shown in the bottom panel shows that the treated and control groups resemble each other. Therefore, weighting Equation 1 using the IPW reduces observable bias.

Figure 4: Kernel density distribution of propensity scores of FISP and non-FISP households



6 Results

Table 6: The effects of FISP on school drop out, school expenditures and hours of fetching water

	(1)	(2)	(3)	(4)	(5)	(6)
	Kinship		Matrilineal		Matrilocal	
	Matrilineal	Patrilineal	Matrilocal	Patrilocal	Mechanisms	
	drop out	drop out	drop out	drop out	Expenditure	Water hours
FISP	0.002	0.009	-0.020	0.028	0.164	0.069
	(0.019)	(0.042)	(0.030)	(0.023)	(0.425)	(0.080)
FISP×Girl	-0.107***	-0.027	-0.109**	-0.083	1.205**	-0.168*
	(0.032)	(0.075)	(0.046)	(0.043)	(0.582)	(0.093)
Individual FE	Y	Y	Y	Y	Y	Y
Mundlak controls	N	N	N	N	Y	Y
District FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Other controls	Y	Y	Y	Y	Y	Y
Observations	2157	353	1416	741	1416	1416
P: $\widehat{\beta}_{FISP} + \widehat{\beta}_{FISP\times F} = 0$	0.000	0.814	0.000	0.118	0.001	0.090

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Dropout is a binary variable indicating whether a child observed in school in 2010 permanently left by 2013, *Expenditure* is the logged expenditure in Malawi Kwacha on a child in the most recent academic year with zeroes replaced by 1, $Water - hours$ is the number of hours that a child spent drawing water in the day before the survey interview was conducted. $Matrilineal(Patrilineal)$ is where the household in which the child lives is in a $Matrilineal(Patrilineal)$, $Matrilocal(Patrilocal)$ is where the community practices $Matrilocal(Patrilocal)$ post-marriage settlements.
Standard errors are clustered by enumerator area and displayed in parentheses. The sample is limited to farming households in rural areas. Estimates are re-weighted using inverse propensity scores of FISP participation. Control variables include *Age of the child; household percepita consumption; household youth dependent ratio; household old age dependent level; age of household head; squared age of the head; education of the head;squared education of the head; whether the household is female headed; whether the household lives in rural area; and time year dummy*
Source: Own calculations using IHPS 2010-2013 data

Table 6 presents results on the impact of FISP on school drop out between girls and boys, and the possible transmission mechanisms that drive the results. The table shows only the treatments of interest, and the full details including coefficients of control variables are included in Table C.5 of Appendix C. Column 1 of table 6 shows results for matrilocal communities. The main coefficient, which measures the total effects of FISP on boys' drop out (because we include the interaction between FISP and girls in the equation) shows that FISP does not change males' school drop out. However, the interaction term reveals that FISP reduces girls drop out by 11 percent in the recipient households. The test for joint significance, $\widehat{\beta}_{FISP} + \widehat{\beta}_{FISP\times F} = 0$, confirms that the total effect of FISP on girls' drop out is significant. Column 2 shows that the programme has no impact in patrilineal communities.

Columns 3 and 4 of Table 6 split the matrilineal sample into matrilocal and patrilocal communities respectively, to further understand the matrilineal settlement in which the gender differences in school drop out due to FISP operate. Column 3 shows that in FISP households, the FISP does not affect boys' drop out, while it reduces drop out for girls by 11 percent. The joint test, $\widehat{\beta}_{FISP} + \widehat{\beta}_{FISP\times F} = 0$, confirms that the aggregate effect of FISP on girls' drop out is significant. Column 4 shows that the FISP does not reduce drop out in patrilocal communities. In Table C.7 of Appendix C we estimate models that interact FISP, girls and matrilocal dummy to measure to the direct impacts of the programme on drop out of girls and boys, within the settlements. The results remain consistent with what we find here: a joint test of significance (P: FISP + FISP× Matrilocal + FISP× Girls + FISP× Girls× Matrilocal=0) reveals that FISP reduces drop out only among girls of matrilocal settlements. Further, a split by ages reveals that the impacts are

pronounced among older children (above 13 in both waves).

Columns 5 and 6 explore the possible transmission mechanisms for the impact of FISP on school drop out. Having shown that the effects of FISP on drop out are driven by matrilocal communities, we limit the sample for the transmission mechanisms to matrilocal children. Column 5 shows that FISP has no aggregate effects on boys' schooling expenditures. However, the expenditure for girls increases by 121 percent in FISP households. The test for joint significance, $\widehat{\beta}_{FISP}+\widehat{\beta}_{FISP\times F}=0$, confirms a significant increase (a stronger effect - at 1 percent level of significance) in the expenditure on girls' schooling. Column 6 shows that FISP does not affect the hours in a day that boys spend fetching water for their households. However, the programme reduces the girls' disadvantage. It reduces the total time that girls spend in fetching water for their households by 16.8 percent. The test for joint significance, $\widehat{\beta}_{FISP}+\widehat{\beta}_{FISP\times F}=0$, confirms that the total effects of FISP on hours that girls spend on fetching water for their households is statistically significant.

Table 7: The matrilocal effects of FISP on education spending and time use by age

	(1)	(2)	(3)	(4)	(5)	(6)
	Expenditure			Water hours		
	Primary	Transition	Secondary	Primary	Transition	Secondary
FISP	0.055	0.073	1.998	0.001	0.169	0.242*
	(0.380)	(0.904)	(1.841)	(0.101)	(0.150)	(0.133)
FISP×Female	0.332	1.236	2.652	-0.032	-0.424**	-0.364**
	(0.583)	(1.215)	(2.301)	(0.111)	(0.193)	(0.172)
Individual FE	Y	Y	Y	Y	Y	Y
Mundlak controls	Y	Y	Y	Y	Y	Y
District FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Other controls	Y	Y	Y	Y	Y	Y
Observations	790	414	212	790	412	211
P: $\widehat{\beta}_F+\widehat{\beta}_{F\times F}=0$	0.401	0.114	0.000	0.633	0.054	0.218

NOTES: * $p<0.1$, ** $p<0.05$, *** $p<0.01$
Expenditure is the logged expenditure in Malawi Kwacha on a child in the most recent academic year with zeroes replaced by 1, *Waterhours* is the number of hours that a child spent drawing water in the day before the survey interview was conducted. *Primary* is where the child was aged between 6 to 13 in both waves of the survey, *Transition* is where the child was below 13 in wave 1 and above 13 in wave 2 and *Secondary* is where the child was above 13 in both waves.
Standard errors are clustered by enumerator area and displayed in parentheses. The sample is limited to farming households in rural matrilocal areas. Estimates are re-weighted using inverse propensity scores of FISP participation. Control variables include *Age of the child; household percapita consumption; household youth dependency ratio; household old age dependency level; age of household head; squared age of the head; education of the head; squared education of the head; whether the household is female headed; whether the household lives in a rural area; and time year dummy*
Source: Own calculations using IHPS 2010-2013 data

Table 7 presents results for the dis-aggregation of the transmission mechanism by age. Again, the full details including coefficients of control variables for the table are included in Table C.6 of Appendix C. Columns 1 and 2 show that FISP does not affect expenditure on education among the primary and transition age groups. Column 3 shows that even though the FISP does not change the expenditure on boys (the main FISP coefficient) and the relative advantage of girls in FISP households over boys and girls in non-FISP households (FISP×Girls), the test for joint significance shows that the programme's total effects on expenditure for girls in secondary school is significant (at 1 percent level of significance).

Column 4 of Table 7 shows that the FISP does not affect the amount of time spent in fetching water among the primary group for both girls and boys. Column 5 reveals that the programme does not affect

hours spent by boys of transitioning age. It however reduces the girls' disadvantage. The time that girls of transitioning age spend in fetching water for their households reduces by 42 percent. The test for joint significance confirms this result. Column 6 shows that the total effects of FISP on time spent fetching water by boys in the secondary age increases by 24.2 percent. Girls experience a reduction in their relative disadvantage in the time spent on fetching water. However, the aggregate effect of FISP on hours spent on fetching water for girls of secondary school age is null. Therefore, the programme does not affect secondary school girls' time use. Combining the transition and secondary results, FISP shifts the time use burden from girls in transitioning age to boys of secondary age.

7 Discussion

Much of the research on gender gaps in educational attainment has focused on the impact of policies on schooling equity. Less is devoted to examining the mediating role of contextual factors on the impact of welfare policies on equitable access to education across genders. In Malawi, a large number of households receive farm input subsidy vouchers that increase household food security and disposable income. Moreover, opposing kinship practices in the country that value girls and boys differently *co-exist*. Our findings suggest that Malawian girls in households that receive farm input subsidy vouchers and are living in matrilineal kinship areas experience a reduction in school drop out, while boys do not obtain similar gains. The results are limited to matrilocal communities. An increase in expenditure on the girls' schooling is found as the main mechanism through which the subsidy reduces the girls' drop out. A reduction in the time dedicated by the girls to domestic chores and an increase in the time for boys performing the same chores, is another supporting channel for the impacts of FISP on drop out.

Departing from a Malawian baseline of overall high school drop out among girls (Chikhungu et al., 2020), these results suggest that the FISP programme reduces girls' education disadvantage in matrilocal communities. This is likely because matrilocal girls are more valued by their kinship, for being custodians of generation wealth, as inheritance transfers from mother to daughter (Berge et al., 2014). Furthermore, matrilineal parents more likely invest in girls as a form of old age insurance. This is because matrilineal women, particularly of matrilocal communities, reside in their natal village upon marriage, and take care of their parents in their old age (Johnson, 2018). It has been shown that in cases where parents have a guaranteed future alternative source of income such as pensions, gender differences in children's investment decline (Bau, 2021). Parents receiving FISP in Malawi are farmers who are not formally employed and will not have access to a pensions in the future. Therefore, matrilocal parents invest part of the proceeds from FISP in girls' education as a safety net. The safety net is more important particularly for matrilocal husbands, because these men have no land to invest and rely on for future survival.

Parents also view investment in girls' education in matrilocal communities as not only important for the care they will receive in future, but also for the benefit of the girls' marital welfare. This is important because divorce rates are high in matrilineal kinship, especially in the southern region of the country, which is predominantly matrilocal (Myroniuk et al., 2021; Chae, 2016). Johnson (2018) finds that matrilineal parents increase investment in girls' education to enable daughters to enter marriage with better partners, potentially preventing divorce. Arguably, educated women are more empowered and depend less on their husbands for financial support. Furthermore, their income contribution could relieve pressure on household resources, preventing conflicts that are motivated by competing financial interests. In addition, education increases outside options for the girls, which earns them respect and better treatment from their husbands (Boertien and Härkönen, 2018; Walther, 2017). These factors could also reduce women's destitution when divorce takes place.

On the contrary, divorce rates are relatively low in patrilocal communities (Walther, 2017), in comparison

to matrilocal communities Johnson (2018). Therefore, the result that the impact of the FISP is absent in patrilocal communities could possibly emerge because there is no need to invest in girls' education for better marriage. Furthermore, husbands who make most decisions inside households have a weak connection with their children in patrilocal areas (Kishindo, 2011). The children are mostly identified with their maternal clan's community (Phiri, 1983; Walther, 2017). Therefore, patrilocal husbands likely have less interest in their children, let alone the zeal to reduce gender differences in education. Nevertheless, patrilocal husbands are more empowered than matrilocals *marital immigrants* (Kishindo, 2010). This is because matrilocal husbands face an additional constraint - they live in the village of their wives, under the overall command of the maternal uncle of the wives (Johnson, 2018). Therefore, matrilocal men would possibly support kinship preferences, such as those of educating girls, to maintain a good relationship with their in-laws. Their patrilocal counterparts are at liberty to not use the FISP in a similar manner.

In light of the evidence suggesting that school drop out is non-responsive to FISP receipt in patrilineal areas, our results highlight that the programme supports the status quo - low girls' education, in cases where men are fully empowered and benefit less from the raising of girls (Walther, 2017). Arguably, patrilineal fathers are unwilling to use the additional resources and bargaining power from the FISP to reduce the high girls' drop out. In fact, these men would be less concerned if girls drop out of school and marry early, because doing so minimises the need for parental investment in women, who are not available in the community to take care of their parents in the parents' old age. Moreover Baruwa et al. (2020) reveal that northern Malawi, a region that is predominantly patrilineal and practices patrilocal settlement customs, has the highest child marriage rates in the country relative to the matrilineal central and southern regions.

The impacts of FISP on school drop out in matrilocal communities are found to be transmitted strongly (1 percent level of significance), through the increase in expenditure on schooling for older girls of secondary school ages, but not for the primary school and transitioning ages. This confirms Kayange (2020) and Mlangeni and Chiotha (2015) finding that the cost of educating older girls is relatively higher than that of younger girls in Malawi, because parents need to consider other factors including boarding facilities to accommodate girls closer to schools, or alternatively transport, to protect them from risks such as sexual malpractices (Grant, 2012). Therefore, parents that receive FISP and have older girls of secondary school age are more likely to spend more on girls' schooling to protect and ensure the success of their daughters. This result also disentangles the effects of FISP and FPE. While FPE increased access to education at primary school level, secondary schools remained inaccessible due to tuition and high non-tuition costs. Possibly, resources from FISP improved access to secondary school through financing tuition payments, and the FISP also improved the quality of education by financing non-tuition expenses, for matrilocal girls.

Not only are matrilocal parents increasing spending on girls to reduce drop out, but they are also rearranging labour patterns inside households. Even though the impact of this mechanism is weaker (10 percent level of significance) than the expenditure effect (1 percent level of significance), it is likely a complement to the high expenditures that parents are making on these older girls. That is, the parents relieve the girls from some household labour so that the girls can have more time to concentrate on schooling, thus ensuring effective use of the invested expenditures on the girls' education. Time use change only happens for girls in transition but not for girls of secondary school age, likely because most of the girls who are of secondary school age in both waves might have already left home to stay close to school, thus were unavailable for the housework. This is unlike the girls in the transitional group who might have been available to do more housework for the closest period before transition. The boys who were of secondary school age in both waves and are taking up the job left by girls may have already exited school.

The negative relationship between FISP and matrilocal girls' school drop out should also be understood within the context of the impacts that the FISP has on household welfare. Particularly, FISP increased maize productivity. Therefore, with or without maize marketing FISP increased availability of food inside recipient households. These FISP households could therefore save income on food purchases (Sibande et al.,

2017). Moreover, subsidising fertiliser allows recipients to save income that was previously used to purchase commercial fertiliser (Ricker-Gilbert and Jayne, 2017). The liquidity from both food production and fertiliser savings are likely used to finance children's education, and particularly to finance girls' education, in matrilocal communities where traditional values and incentives compel caregivers to favour investment in girls.

8 Conclusion

This paper provides evidence that general welfare programmes can have positive unintended consequences for development outcomes, far beyond their original design, if mediated by the right contextual factors. It has specifically shown that farm input subsidies lead to a reduction in girls' school drop out in a country where girls' school drop out is higher than that of boys', when mediated by the matrilineal kinship traditions within matrilocal communities. The paper applied fixed effects models to Malawian panel data obtained from children of the ages 6 to 18.

The results revealed that farm input subsidies reduce drop out for girls in areas where upon marriage women *co-reside* with their parents in the natal community and inherit family wealth. Living in the birth community allows women to help their parents when the parents reach old age. Therefore, the girls are an old age insurance mechanism for the parents in matrilocal communities (Bau, 2021). Further, matrilocal communities experience high divorce rates which compel parents to educate girls so that they can find better partners, allowing for longer-lasting marriages, and reduce destitution, should divorce happen. Even though the subsidy empowers male recipients, who benefit less from the matrilocal practices, they use the additional bargaining power to educate girls.

Examining possible transmission mechanisms, we show that expenditure on education for matrilocal girls increases due to the FISP, and girls reduce their hours spent on household chores. These changes are observed in age groups that could no longer access Free Primary Education. Therefore, continuing with school after the FPE adds a cash burden to the households. Men use the FISP to help their daughters who are in secondary school with the much-needed liquidity, and allow the girls to spend less time on chores, possibly to allow the girls to concentrate on schooling. Therefore, the resource investment and the free time from relieved household chores complement each other to improve the girls' chances of succeeding in school.

Our findings therefore suggest that school drop out for girls, which is higher overall than for boys in most poor countries, is likely to reduce in cases where a resource transfer to a household meets traditional practices that compel its holders to use their improved liquidity position and increased bargaining power to educate girls. Otherwise, school drop out that favours boys is likely to persist in alternative environments, unless countries enact policies that reduce the opportunity cost of educating girls. Extending free education beyond primary school could ensure such gender equity in education.

In contexts where gender inequity persists due to parental old age reliance on boys, it could be suggested that countries adopt both a liquidity programme like FISP, and institutional changes that channel households towards reducing gender differences in education investment. These could include introducing public pension plans and programmes that support savings for old age survival, to reduce parental dependence on children of a specific gender as old-age insurance.

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Appendices

A Characteristics of matrilineal, patrilineal, matrilocal and patrilocal residents

Table A.1: The differences in characteristics by within gender, between kinship

	Matrilineal	Patrilinieal	t-test	Matrilineal	Patrilineal	t-test
		Female			Male	
Drop out	0.113	0.101	0.012	0.101	0.047	0.054
School expenditure	3501.084	4602.879	-1101.795	4602.879	3766.934	835.945
Water hours	0.478	0.383	0.095	0.383	0.142	0.241***
Observations	452	99	551	99	106	205

Table A.2: The differences in gender characteristics by settlement patterns

	Matrilocal	Patrilocal	t-test	Matrilocal	Patrilocal	t-test
		Female			Male	
Drop out	0.132	0.084	0.048	0.041	0.040	0.001
School Expenditure	4128.498	2544.190	1584.308	4211.379	1428.132	2783.246**
Water hours	0.481	0.474	0.008	0.178	0.117	0.061*
Observations	273	179	452	243	174	417

Table A.3: Intra-matrilineal differences in characteristics

	(1)	(2)	(3)
	Matrilocal	Patrilocal	t-test
Child age	11.594	11.682	-0.088
Over age	2.239	2.679	-0.440***
Household consumption	700466.388	833815.056	-133348.668***
Household size	6.247	7.519	-1.272***
Youth-dep-ratio	1.453	1.429	0.024
Old age-dep-ratio	0.073	0.057	0.016
Age of the head	44.918	46.086	-1.168*
Age of the head^2	2186.706	2264.655	-77.949
Edu of the head	6.095	5.848	0.248
Edu of the head^2	56.413	47.430	8.984***
Female head	0.287	0.164	0.122***
Rural resident	0.821	0.933	-0.111***
Year 2013	0.477	0.464	0.014
Obs.	1427	742	2169

Table A.3 dis-aggregates matrilineal control variables by post marriage settlement. We find no differences in child age between matrilocal and patrilocal communities, however, more patrilocal children are too old for

their class. Matrilocal communities are relatively poorer than patrilocal communities. Matrilocal households are smaller than patrilocal households. Matrilocal heads are relatively younger than those from patrilocal communities. Matrilocal heads are highly educated in comparison to patrilocal heads. Even though both matrilocal and patrilocal households are predominantly patriarchal, matrilocal households have relatively more female-headed households than those from patrilocal communities. Patrilocal households are more rural than matrilocal households.

B FISP participation

Table B.4: Probit estimates on FISP participation

	(1)	(2)
	Marginal effects	Standard Errors
Household consumption (log)	0.091	(0.076)
Landholding (log)	0.058	(0.066)
Landholding^2	-0.000	(0.000)
Suitable agricultural area	0.185***	(0.032)
Villagers pay chief for land	-0.548***	(0.135)
Education of head	0.046*	(0.026)
Education of head^2	-0.004*	(0.002)
Age of head	0.037*	(0.021)
Age of head^2	-0.000	(0.000)
Female head	-0.057	(0.103)
Tropical warm subhumid	-0.014	(0.093)
Tropical cool semiarid	-0.028	(0.201)
Tropical cool subhumid	-0.522***	(0.162)
Constant	-1.755*	(0.969)
Observations		1369
Pseudo R-squared	0.046	

Marginal effects reported

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B.4 shows marginal effects on factors that affect FISP participation. Residing in suitable agriculture areas increases chances of obtaining subsidy vouchers. The results suggest that, even though the post-2008 FISP started to focus on social protection (Lunduka et al., 2013), it was areas that were suitable for maize production which obtained the most coupons. I find a negative association between FISP and villages which pay the chief to obtain land. In Malawi, over 80 percent of land is held under customary law (Berge et al., 2014). Areas that sell land are urban and peri-urban. Therefore, most FISP coupons go to remote areas. Education only reduces the chances of obtaining FISP among the highly-educated. The highly-educated, most likely, have alternative income sources from the labour market. As such, they are relatively well-off, and not eligible for the program. Older heads are more likely to receive FISP. This is consistent with the social protection goals of the program (Lunduka et al., 2013). Arguably, younger heads are less vulnerable for being actively involved in the labour market. There is also a negative association between living in cool sub-humid areas and receiving vouchers.

C Full results with controls

Table C.5: The effects of FISP on school drop out, school expenditure, and time use

	(1)	(2)	(3)	(4)	(5)	(6)
	Kinship		Matrilineal		Matrilocal	
	Matrilineal	Patrilineal	Matrilocal	Patrilocal	Mechanisms	
	Drop out	Drop out	Drop out	Drop out	Expenditure	Water hours
FISP	0.002	0.009	-0.020	0.028	0.164	0.069
	(0.019)	(0.042)	(0.030)	(0.023)	(0.425)	(0.080)
FISP×Female	-0.107***	-0.027	-0.109**	-0.083	1.205**	-0.168*
	(0.032)	(0.075)	(0.046)	(0.043)	(0.582)	(0.093)
Age of the the child	-0.060**	0.031	-0.057**	-0.065	0.580	-0.038
	(0.024)	(0.072)	(0.027)	(0.042)	(0.353)	(0.051)
Over age	0.076***	0.039	0.074***	0.078***	-0.673***	0.019
	(0.013)	(0.031)	(0.016)	(0.022)	(0.187)	(0.020)
Household consumption (log)	-0.013**	0.039	-0.012**	-0.014	0.213***	0.009
	(0.006)	(0.034)	(0.006)	(0.021)	(0.076)	(0.017)
Household size	0.011	-0.046*	0.018*	-0.000	-0.061	-0.027
	(0.008)	(0.027)	(0.010)	(0.009)	(0.103)	(0.020)
Household's youth dependency ratio	-0.049**	-0.063	-0.052**	-0.039	0.136	0.060*
	(0.020)	(0.066)	(0.025)	(0.031)	(0.232)	(0.034)
Household's old age dependency ratio	0.138	-0.309	0.080	0.265	0.228	-0.261*
	(0.113)	(0.276)	(0.101)	(0.268)	(0.921)	(0.135)
Age of household head	-0.004	-0.032	-0.007	0.001	-0.025	0.020
	(0.009)	(0.026)	(0.013)	(0.018)	(0.102)	(0.020)
Head's age^2	0.000	0.000	0.000	-0.000	0.001	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Head's education	0.023***	0.003	0.021***	0.025	-0.244***	0.013
	(0.006)	(0.043)	(0.008)	(0.016)	(0.078)	(0.015)
Head's education^2	-0.001**	0.000	-0.001*	-0.001	0.009***	-0.001
	(0.000)	(0.002)	(0.000)	(0.001)	(0.003)	(0.001)
Female-headed household	0.069*	-0.267**	0.090**	0.037	-1.351*	-0.102
	(0.040)	(0.134)	(0.046)	(0.081)	(0.703)	(0.076)
Rural	-0.071	-0.296	0.029	-0.009	-1.345*	0.031
	(0.110)	(0.352)	(0.103)	(0.208)	(0.704)	(0.168)
Year 2013	0.160**	-0.027	0.155**	0.164	-0.224	0.272*
	(0.068)	(0.176)	(0.075)	(0.124)	(0.961)	(0.148)
Individual FE	Y	Y	Y	Y	Y	Y
Mundlak controls	N	N	N	N	Y	Y
District FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Observations	2157	353	1416	741	1416	1416
P: $\widehat{\beta}_F + \widehat{\beta}_{F\times F} = 0$	0.000	0.814	0.000	0.118	0.001	0.090

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.6: The effects of FISP on education spending and time use in matrilocal communities by age

	(1)	(2)	(3)	(4)	(5)	(6)
	Education spending			Hours of water per day		
	Primary	Transition	Secondary	Primary	Transition	Secondary
FISP	0.055	0.073	1.998	0.001	0.169	0.242*
	(0.380)	(0.904)	(1.841)	(0.101)	(0.150)	(0.133)
FISP×Female	0.332	1.236	2.652	-0.032	-0.424**	-0.364**
	(0.583)	(1.215)	(2.301)	(0.111)	(0.193)	(0.172)
Age of the child	-0.308	1.410*	1.213*	0.097	-0.192**	-0.025
	(0.385)	(0.740)	(0.669)	(0.090)	(0.076)	(0.072)
Over age	-0.081	-1.204***	-1.090***	0.011	0.006	0.023
	(0.176)	(0.280)	(0.378)	(0.033)	(0.042)	(0.023)
Household consumption (log)	0.140*	0.226	0.532**	0.055**	-0.055	-0.005
	(0.085)	(0.143)	(0.229)	(0.022)	(0.044)	(0.039)
Household size	-0.104	0.152	-0.353	-0.021	-0.055	-0.017
	(0.099)	(0.198)	(0.353)	(0.027)	(0.043)	(0.030)
Household's youth dependency ratio	-0.004	-0.071	-0.084	0.059	0.049	-0.012
	(0.325)	(0.445)	(0.864)	(0.040)	(0.060)	(0.082)
Household's old age dependency ratio	0.233	2.305	-1.619	-0.126	-0.590	-0.446
	(0.996)	(2.433)	(1.749)	(0.146)	(0.368)	(0.341)
Age of household age	0.050	0.031	-0.593**	0.007	0.044	-0.001
	(0.132)	(0.182)	(0.241)	(0.029)	(0.045)	(0.033)
Age of household age^2	0.000	0.000	0.007***	0.000	-0.000	0.000
	(0.001)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
Education of household head	-0.169**	-0.022	-0.416	0.007	0.025	-0.028
	(0.080)	(0.143)	(0.279)	(0.021)	(0.026)	(0.024)
Education of household head^2	0.007*	-0.002	0.017*	-0.001	0.001	-0.000
	(0.004)	(0.005)	(0.010)	(0.001)	(0.001)	(0.001)
Female headed household	-1.296*	-0.227	-0.799	0.016	-0.254	-0.053
	(0.742)	(1.529)	(1.708)	(0.089)	(0.164)	(0.125)
Rural	0.907	-4.054***	-2.954	0.144	-0.415	0.186
	(0.708)	(1.475)	(2.099)	(0.229)	(0.430)	(0.263)
Year 2013	1.963*	-3.088	-2.200	-0.087	0.685***	0.308
	(1.122)	(2.173)	(1.494)	(0.256)	(0.226)	(0.190)
Mundlak controls	Y	Y	Y	Y	Y	Y
Individual FE	Y	Y	Y	Y	Y	Y
District FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Observations	790	414	212	790	412	211
P: $\widehat{\beta}_F + \widehat{\beta}_{F\times F} = 0$	0.401	0.114	0.000	0.633	0.054	0.218

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.7: Factors that affect school dropout in Malawi: FISP× Female× Matrilocal

	(1)	(2)	(3)
	Dependent variable: School dropout		
	Under 13 years	Transition 13 years	Over 13 years
FISP	0.009	0.027	0.062
	(0.006)	(0.049)	(0.089)
FISP× Matrilocal	0.003	-0.052	-0.354**
	(0.009)	(0.069)	(0.166)
FISP× Female	0.001	-0.104	-0.417**
	(0.008)	(0.101)	(0.170)
FISP× Female× Matrilocal	-0.033	0.071	0.291
	(0.026)	(0.131)	(0.240)
Age of the child	-0.010	-0.049	-0.113*
	(0.009)	(0.053)	(0.065)
Over-age	0.013*	0.117***	0.089***
	(0.008)	(0.019)	(0.033)
Household consumption (log)	-0.007*	-0.021**	-0.049**
	(0.004)	(0.010)	(0.024)
Household size	0.006*	0.002	0.030
	(0.003)	(0.012)	(0.024)
Youth dependence ratio	-0.042	-0.020	-0.044
	(0.031)	(0.037)	(0.055)
old-age dependence ration	0.041	0.164	0.301
	(0.041)	(0.162)	(0.322)
Head age	0.006	-0.004	0.020
	(0.005)	(0.016)	(0.021)
Head age^2	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Head school	0.001	0.020*	0.051***
	(0.003)	(0.012)	(0.018)
Head school^2	-0.000	-0.001*	-0.002***
	(0.000)	(0.001)	(0.001)
Female head	0.067*	-0.075	0.015
	(0.035)	(0.065)	(0.135)
Rural Residence	-0.064	-0.730**	-0.531
	(0.062)	(0.338)	(0.486)
Year 2013	0.017	0.142	0.398***
	(0.025)	(0.149)	(0.150)
Observations	1175	660	322
P: FISP + FISP× Matrilocal + FISP× Female + FISP× Female× Matrilocal=0	0.320	0.407	0.000

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Dropout is a binary variable indicating whether a child observed in school in 2010 permanently left by 2013, *Expenditure* is the logged expenditure in Malawi Kwacha on a child in the most recent academic year with zeroes replaced by 1. $Matrilocal(Patrilocal)$ is where the community practices $Matrilocal(Patrilocal)$ post-marriage settlements.

Standard errors are clustered by enumerator area and displayed in parentheses. The sample is limited to farming households. Estimates are re-weighted using inverse propensity scores of FISP participation. Control variables include *Age of the child; household per capita consumption; household youth dependency ratio; household old age dependency level; age of household head; squared age of the head; education of the head; squared education of the head; whether the household is female headed; whether the household lives in a rural area; and time year dummy*

Source: Own calculations using IHPS 2010-2013 data