Smallholder Risk Management Solutions (SRMS) in Malawi and Ethiopia

The commercialisation of pigeonpea and women's income in southern Malawi: a simulation game

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Abstract

The commercialisation of smallholder food crops may disempower women if men take control of the income from what were once considered 'women's crops'. We explore the potential impact of commercialisation on women's income from growing pigeonpea in southern Malawi. A simulation game was designed to identify each household's choice of three models of income sharing at different levels of income from pigeonpea, and to compare how women and men divided income between investment in assets (*katundu*) and savings for future consumption (*kusunga*). Husbands and wives first played separately and then jointly. When the income from pigeonpea was set at Malawi Kwacha (MWK) 7,000, all 97 sample households used a model of income sharing where all income was pooled and divided between *katundu* and *kusunga.* When the income from pigeonpea was set at MWK 30,000, 70 households (72%) retained the same model of income sharing but 27 households (28%) opted for a model where some part of *kusunga* was reserved for individual use by husbands and wives. Wives' division of income between *katundu* and *kusunga* did not differ significantly from the division made independently by their husbands, or from the division made jointly with their husbands. Perceptions on the gender division of labour and on women's control over decision making for pigeonpea did not differ significantly between husbands and wives. These findings show that income from pigeonpea is allocated according to shared household needs rather than by gender, and that allocation between investment and future consumption does not differ by gender. We conclude that the commercialisation of pigeonpea in southern Malawi is unlikely to disempower women.

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Acronyms

FGD	Focus Group Discussion
IHS	Integrated Household Survey
MWK	Malawi Kwacha
OPM	Oxford Policy Management
RBM	Replicable Business Model
SRF	Seed Revolving Fund
SRMS	Smallholder Risk Management Solutions

In August 2018, US $1 = MWK 731 (Source: Reserve Bank of Malawi)

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1 Introduction

Commercialisation is widely viewed as a viable pathway away from poverty for smallholders in Africa. Optimism about commercialisation is fuelled by the rapid growth of urban and global markets, but the commercialisation of crops that were previously grown primarily for home consumption may have a negative impact on equity. Poorer smallholders may be excluded from commercialisation if they lack the necessary resources, knowledge, and skills to participate in the development of new value chains. Furthermore, commercialisation may disempower women if they lose control over the income from what have traditionally been regarded as 'women's crops'. These crops play an important role in household food security and may also be critical for child nutrition. The intersectionality between poverty and gender means that women in poorer smallholder households may be doubly disadvantaged. However, while income and gender inequalities overlap, they should not be conflated (Chant, 2004; Jackson, 1998). Understanding the intersectionality between poverty and gender is critical if commercialisation is to meet the development goals of both poverty reduction *and* gender equity.

Pigeonpea (*Cajanus cajan*) is traditionally regarded in Malawi as a 'women's crop'. Pigeonpea is grown primarily in southern Malawi, where it is normally intercropped with maize. Historically, women have been responsible the management of intercrops, with control over their utilisation. By contrast, men have been responsible for 'cash crops' like tobacco. These gender roles reflect the historical development of settler economies in eastern and southern Africa, where the introduction of the hut tax has forced men to earn cash by growing crops for sale or working as wage labour on white-owned estates and mines. However, commercialisation may be changing these gender roles. About 35% of pigeonpea production is sold, with India and the Indian diaspora as important export markets (Orr *et al.*, 2017). The growing market for pigeonpea may encourage men to claim greater control over income that was previously controlled by women. However, the impact of commercialisation on women is context-specific. The contrasting histories of cotton and tobacco in Malawi show that the outcome is neither unilinear nor predictable (Vaughan, 1985). Hence, it is not a foregone conclusion that the commercialisation of pigeonpea will have a negative impact on gender equity.

An important constraint on the development of the value chain for pigeonpea in Malawi is the lack of access of smallholders to certified seed of improved varieties (Kaoneka *et al.*, 2016; Me-Nsope and Larkins, 2016). Simply increasing farmer awareness of improved varieties would raise the rate of adoption from 14% to 47% (Simtowe *et al.*, 2016). To overcome this supply constraint, the project developed a Replicable Business Model (RBM) based on a seed revolving fund (SRF) (Weber and Tiba, 2017). In Year 1, farmers will receive 2 kg of certified improved pigeonpea seed, of which 1 kg will be the improved variety *Mwaiwathualimi* (ICEAP 00557) and 1 kg will be the improved variety *Chitedze-1* (ICEAP 01514/15). These are medium-duration genotypes released in 2010 and 2011 respectively (Kaoneka *et al.*, 2016). Following the harvest, each farmer will deliver 4 kg of pigeonpea back to revolving fund for each kilogramme of certified seed received (a total of 8 kg). At least 400 kg of pure C1 seed from the returned pigeonpea will subsequently be included in the SRF, while the rest will be sold as grain and the income used to buy more certified seed for distribution in Year 2.

The general objective of the study is to determine whether the development of the value chain for pigeonpea in Malawi poses a risk for gender equity. Specifically, the objectives are to determine:

- the degree of control and the share of income from pigeonpea that women currently enjoy;
- how women's control and share of income from pigeonpea might change with commercialisation; and
- the level of control and income women would trade off in exchange for a higher household income from pigeonpea.

To help answer these questions, we developed a simulation game. Husbands and wives were presented with different options for sharing income at different levels of cash income from pigeonpea. Women and men first

played separately, then together. The results allow us to quantify gendered differences in the use of income from pigeonpea, to measure women's control over income, and to measure how these might change as a result of commercialisation.

Intra-household decision making has generated a large amount of literature (Doss, 2011), but the use of experimental games to explore decision making is still relatively new (Viceisza, 2012). The use of such games to explore decision making in the context of smallholder commercialisation is newer still (Lenjiso *et al.*, 2016). Yet games offer several advantages for understanding the potential impact of commercialisation on gender equity. First, games are interactive and allow players to make decisions based on changes in key variables, such as price levels. Second, we can compare the choices made when husbands and wives play individually and together, and we can compare the results to measure their relative bargaining power. Third, we can identify independent variables to explain why players made certain choices and thus gain a deeper understanding of the factors that determine decision making.

The report is organised into six sections, of which this introduction is the first. The second section describes the simulation game. Section 3 describes the data and methods. Section 4 presents the research results, and Section 5 discusses their meaning and implications. The final section concludes.

2 Designing the simulation game

2.1 Conceptual framework

The unitary model of the farm household has been replaced by models that recognise the existence of conflict, power relations, and bargaining between husbands and wives (Folbre, 1986; Kabeer, 1994). Two basic models are relevant for the study of commercialisation.

Model 1: the patriarchal model: husbands dominate decision making and control cash income. Women have limited autonomy and, where conflicts arise over the use of resources, women invariably lose. In the context of commercialisation, therefore, this model predicts that men will take control over the income from 'women's crops', and women will become mere providers of labour. In this model, commercialisation is viewed as a zero-sum game, in which one person's loss is another's gain.

Model 2: the cooperative–conflict model: households are characterised by 'the co-existence of extensive conflicts *and* pervasive cooperation' (Sen, 1990; emphasis added). The cooperative–conflict model views the household as an arena for cooperation, in which power and control over resources is open to negotiation between women and men. In the context of commercialisation, this opens the door to win–win solutions, in which increased income may benefit both women and men. By agreeing to share roles and additional income, households may gain more from commercialisation than if they tried to maximise their gains as individuals.

We designed the simulation game to allow households to choose between the following models of household decision making:

- *Model 1*: income is divided between women and men, and decisions on utilisation are made independently;
- *Hodel 2*: income is shared between women and men, and decisions on utilisation are made jointly; and
- *hybrid model*: some income is shared and decisions on utilisation are made jointly; some income is divided, and decisions on utilisation are made independently.

2.2 Household decision making

The primary social units for household decision making in southern Malawi are the *mbumba* and the *banja*. The *mbumba* is the matrilineage, which consists of a mother and her adult daughters, their spouses, and their young children, living independently in their own homes but clustered together in a hamlet. Traditionally, the eldest brother of the sisters—the 'owner' or 'guardian' of the lineage (*mwini mbumba*)—has authority over the *mbumba*, although this may be shared with the older women in the lineage. The *mwini mbumba* is consulted by his sisters over 'important decisions such as the treatment of an illness, marriage disputes, and funeral arrangements' (Peters, 2010: 184). Women inherit land from their older female relatives, while children inherit moveable property (*katundu*) from their mother's brother rather than from their father. The *banja* is a conjugal unit, usually a nuclear family made up of a woman, her husband, and children. After marriage, a man usually moves to his wife's natal village (*chikamwini* marriage). Women have substantial autonomy because they 'own' agricultural land and stay in the village of their birth surrounded by their own relatives. In the event of divorce or the death of their wife, men return to their own natal village, while children stay with the mother.

The focus of this study is on decision making within the *banja.* We ignore the role of the *mwini mbumba*, on the grounds that their authority does not extend to how income is shared within the household. In the study area, cash income entering the household was normally divided into two parts (Figure 1). The first part

(*katundu*) was used as capital for investment in fixed assets.[1] The second part (*kusunga*) was saved or held in reserve for future consumption expenses (e.g. soap or beer) or for working capital to pay for hired labour or buy farm inputs.[2] This division applied not just to income from pigeonpea, but also to income earned from hired labour (*ganyu*) or the profits (*wini*) from small business. Note that these two categories are not fixed; if the household runs short of money for consumption needs, it can sell assets from *katundu* and use the money for consumption. In all cases, the division of income into *katundu* and *kusunga* is made jointly after negotiation (*kukambirana,* or *mgwirizano*) between husband and wife.[3]

In Model 1, the division of the income into *katundu* and *kusunga* is made jointly and the income is shared.

Figure 1. Division of household income, Model 1

X % income	X % income
Katundu wa nyumba	**Kusunga**
Bicycle	Food
Goat	Fertiliser
School fees	Seed
Cow	Payments to hired labour
Stores of food	Capital for small business
	Soap; beer

In Model 2, husbands and wives agree together on how to divide the income between *katundu* and *kusunga*, but this time the amount allocated to *kusunga* is divided into separate shares, one for the wife and one for the husband (Figure 2).

Figure 2. Division of household income, Model 2

X % income	X % income	X % income
Katundu wa nyumba	**Kusunga (wife)**	**Kusunga (husband)**
Bicycle		
Goat		
School fees		
Cow		
Stores of food		

In Model 3, husbands and wives agree to divide income into *katundu* and *kusunga* where income is shared, but they also reserve a share of income for their personal use (Figure 3). According to participants in focus group discussions (FGDs), this model is sometimes used for rice, the most lucrative cash crop in the study area.

[1] The Chichewa word *katundu* is translated as 'goods' or 'stocks to sell' (Plass, 2013). Other definitions include 'things, moveable property' (Guerin, 1985). An older dictionary gives 'a burden, gathered together to make a load, household stuff made into loads' (Scott, 1892).
[2] The Chichewa word *kusunga* is translated as 'to reserve or keep' (Plass, 2013) or 'to hoard, reserve for future use' (Guerin, 1985).
[3] The Chichewa word *kukambirana* is translated as 'sharing of experience or views; dialogue; discussion; negotiation'. *Mgwirizano* is translated as 'agreement, cooperation' (Plass, 2013).

Figure 3. Division of household income, Model 3

X % income	X % income	X % income	X % income
Katundu wa nyumba	**Kusunga**	**Kusunga (wife)**	**Kusunga (husband)**
Bicycle	Food		
Goat	Fertiliser		
School fees	Seed		
Cow	Payments for hired labour		
Stores of food	Capital for small business		
	Soap; beer		

2.3 The simulation game

The complete version of the simulation game is available at http://sudart.hu/game/ppgame.php. Here we summarise its main features. The game was played in four rounds, described below:

- *Round 1*: households are given two choices for dividing the household income from pigeonpea and asked to choose their current system. In the game, this choice is made by the wife. Players are then asked to divide MWK 7,000, which represents the average value of household pigeonpea production (two 50 kg bags) at September 2018 market prices (MWK 70/kg). After making the division, they roll a die to simulate unexpected shocks that will require additional expenditure. If necessary, the share allocated to *katundu* is reduced to cover the additional expenditure required from *kusunga*. Husbands and wives play separately, then together.
- *Round 2*: households repeat Round 1, but with income from pigeonpea raised to MWK 12,000 (representing the same level of production, but at a market price of MWK 120 kg). Husbands and wives play separately, then together.
- *Round 3*: households are given an income of MWK 7,000 from pigeonpea. They are offered the choice of paying MWK 100 to the cooperative in advance for improved seed, with the possibility of earning MWK 7,000 and up to an additional MWK 6,000 in the next season. If they agree, they roll a die to simulate variable rainfall. The number they throw determines how much additional income they receive (1 = MWK 1,000). Husbands and wives play jointly.
- *Round 4*: households are given an income of MWK 30,000 from pigeonpea, representing a market price of MWK 300/kg. They are asked to choose between three different models of allocating this income. Husbands and wives play jointly.

Figure 4. Design of the simulation game

Round	Scenario	Household model	Income from pigeonpea (MWK)	Instructions
1	Current system	Model 1: *katundu* + *kusunga*	7,000	1. Choose current system. 2. Allocate income shares. 3. Roll die to simulate variable season. 4. Reallocate income shares. 5. Play separately, then together.
		Model 2: *katundu* + separate *kusunga*		
2	Current system	Model 1: *katundu* +	12,000	Same as Round 1.

		kusunga Model 2: *katundu* + separate *kusunga*		
3	Willingness to pay cooperative for seed	Either: pay cooperative and receive MWK 15,000 Or: do not pay cooperative and receive MWK 7,000		1. Choose pay/do not pay. 2. Roll die to simulate variable season.
4	Optional system	Model 1: *katundu* + *kusunga* Model 2: *katundu* + separate *kusunga* Model 3: *katundu* + *kusunga* + separate shares of *kusunga*	30,000	1. Choose preferred system. 2. If Model 3, allocate income shares.

2.4 Hypotheses

The simulation game was designed to test hypotheses about attitudes toward risk and about the impact of commercialisation on women's income. In this working paper, we focus on commercialisation, leaving the analysis of risk derived from the game for a separate paper. We used the simulation game to test four hypotheses:

H1: Women prefer Model 2 (separate *kusunga*) over Model 1 (shared *kusunga*).

H2: Households will choose Model 3 if their income from pigeonpea rises to MWK 30,000.

H3: Women's allocation of income between *katundu* and *kusunga* will differ from their husband's.

H4: Women's allocation of income between *katundu* and *kusunga* will differ from the final allocation agreed jointly with their husbands.

3 Data and methods

3.1 Household survey

The simulation game was administered at the end of a household survey conducted in Temani Economic Planning Area, Phalombe District, southern Malawi. A structured questionnaire was administered to all 249 households that received improved pigeonpea seed from the Sukhamphete Pigeonpea Growers Cooperative in the 2017/18 season. The questionnaire was designed by the lead author in consultation with other members of the Smallholder Risk Management Solutions (SRMS) project. The lead author pre-tested the questionnaire in the survey area in early September 2018. The survey was administered in early October 2018 under the supervision of Oxford Policy Management (OPM). The enumerators were selected MSc students with previous experience of household surveys from our project partner, Lilongwe University of Agriculture and Natural Resources. Enumerators received both classroom and field training, after which the questionnaire was further revised. Data was collected on hand-held tablets. The dataset was cleaned, stored, and analysed by OPM using the Statistical Package for the Social Sciences.

Since the objective was to understand gender relations, the game was restricted to households headed by married men (n=187). Table 1 shows, however, that only 97 male-headed households successfully completed the game ('players'). In other cases, the husband and wife were unavailable at the same time (61 cases), or information for the husband or wife or both was missing (29 cases). Thus, only 97 male-headed households (52%) completed the section of the game on the intra-household distribution of income. This lower response rate than we expected was due to the difficulty of having both husband and wife present and to the complexity of the game, which combined both the gendered distribution of household income and attitudes toward risk by husbands and wives.

Table 1. Number of sample households, 2017/18 season

	Male-headed	Female-headed	Total
Number of households interviewed for the seed supply survey	187	62	249
Number of households where both husband and wife were available to play the game	126	0	126
Number of households that did not complete the game	29	0	29
Number of households that completed the game	97	0	97

Source: SRMS Seed Supply Survey (2018)

3.2 FGDs

Information on household decision making was obtained through four FGDs, held separately with women and men. Participants were all members of the Sukhamphete Pigeonpea Growers Cooperative and were purposely selected by the management of the cooperative to represent the different villages from which members were drawn. Groups averaged eight participants. Flip charts were used to capture information on how income was shared. Discussions focused on the different systems households used to allocate income from pigeonpea, and the reasons for choosing these systems. All discussions were tape-recorded and transcribed from Chichewa.

3.3 Poverty score

To measure social inclusion in the RBM, we used a Poverty Scorecard to estimate the share of the sample households that lay below the poverty line. The Poverty Scorecard used 10 indicators from Malawi's Second Integrated Household Survey (IHS) of 2004/05 to estimate the likelihood of a household having consumption below a given poverty line (Schreiner, 2015). The 2004/5 IHS was conducted by the National Statistical Office of Malawi from March 2004 to March 2005. The Poverty Scorecard therefore allowed us to relate poverty levels in the sample households to the national poverty line. Unfortunately, a Poverty Scorecard based on the IHS for 2010/11 was not available, but the share of households in Malawi below the national poverty line showed no significant change between 2004/05 and 2010/11.[4] Our use of a Poverty Scorecard based on the 2004/05 IHS should therefore not distort the results.

All points in the Poverty Scorecard are non-negative integers, and total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). To get absolute units, scores had to be converted to poverty likelihoods, or probabilities of being below a poverty line. This was done via look-up tables. In the case of the national poverty line, for example, scores of 35–39 received a poverty likelihood of 47.8%, and scores of 40–44 received a poverty likelihood of 36.1%. Thus, the Poverty Scorecard allowed us to relate the level of poverty in the sample households to different poverty lines at the national level.

[4] The share of households in Malawi below the national poverty line in 2010/11 was estimated at 50.7%, which was not significantly different at the 95% confidence level from the estimate of 55.9% in 2004/05 (Government of Malawi, 2012: 206, Table 13.2). The national poverty line based on the 2016/17 IHS has not yet been published (Government of Malawi, 2017).

4 Results

4.1 The players

Of the 187 male-headed households in the sample, 97 (52%) completed the section of the game concerned with income distribution. This section compares socioeconomic indicators for these two groups to check that the households that completed the game were representative. The results show that the households that completed the game had a higher share of income from agriculture and a lower share of income from *ganyu* or casual labour (which may explain why husbands and wives were unavailable at the same time). They were also more likely to be members of the cooperative and to cultivate more land. However, there was no statistically significant difference in the level of poverty measured by the Poverty Scorecard, or in the quantity of pigeonpea they harvested. We conclude that the households that completed the game were representative of the households that received improved seed in 2017/18.

Table 2. Socioeconomic indicators for players and non-players

	Male-headed households			*P*-value
	Completed (n=97)	Not completed (n=90)	All (n=187)	
Poverty Scorecard	39.59	39.50	39.55	.962
Age of household head (in years)	46.5	45.7	46.1	.728
Education (in years)	5.4	5.6	5.5	.660
Number of children under 15	2.6	2.3	2.5	.210
Number of adults over 60	0.3	0.2	0.3	.591
Number of females aged 15–60	1.3	1.2	1.3	.395
Number of males aged 15–60	1.3	1.2	1.3	.395
Total household size (number of members)	5.3	5.1	5.2	.404
Dependency ratio[1]	1.37	1.29	1.33	.618
Number of households owning cows	9	8	17	.746
Number of households owning oxen	4	0	4	.111
Number of households owning goats	37	35	72	.467
Number of households owning sprayer	8	5	13	.571
Total livestock units [2]	0.27	0.62	0.44	.215
Total value of livestock (MWK) [3]	57,113	131,778	93,048	.218
Income from agriculture (%)	66.3	55.7	61.2	.007
Income from *ganyu* (%)	18.8	26.9	22.7	.026
Income from business (%)	11.4	14.7	13.0	.248
Income from other (%)	3.3	2.6	2.9	.690
Does anyone in your household normally do *ganyu* for others?	55	64	119	.031

(Yes)				
Does your household usually employ *ganyu* to work on your farm? (Yes)	31	33	64	.539
Did your household receive a voucher for seed/fertiliser last season (2017)? (Yes)	31	29	60	1.00
Which month do you normally run out of maize?	Oct	Sep	Sep	.210
Which month did you run out of maize this season (2017/18)?	Sep	Sep	Sep	.694
Are you a member of the Sukhamphete cooperative? (Yes)	69	53	122	.092
Total income from sale of crops (MWK/year)	69,611	386,631	222,187	.293
Gross land cultivated (in acres)	3.31	2.29	2.82	.000
Pigeonpea harvested (50 kg bags)	2.34	3.38	2.83	.167

Notes: [1] Children under 15 + adults over 60 / males + females aged 15–60.

[2] Ox, 0.7 units; improved cow, 0.6 units; local cow, 0.5 units; goat, 0.1 units.

[3] Ox, MWK 150,000; cow, MWK 110,000; goat, MWK 20,000.

Source: SRMS Seed Supply Survey (2018)

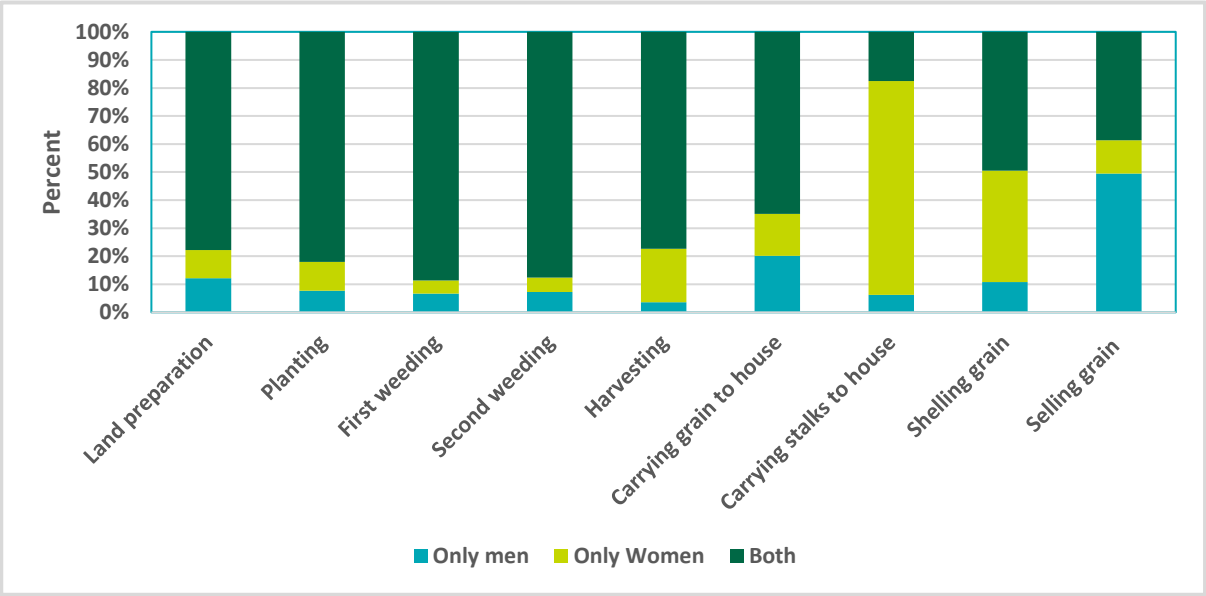
4.2 Gender roles

Before playing the simulation game, players were asked who participated in the production and sale of pigeonpea, and how much control women had over decision making.[5] To control for disagreement, these questions were put to husbands and wives separately.

Generally, husbands and wives agreed on the gender division of labour. We therefore combined their answers to present a composite picture (Figure 5). Seven of the nine activities were usually carried out jointly. One activity (carrying pigeonpea stalks to the house for use as firewood) was usually done only by women, while one activity (selling harvested grain) was most likely to be done only by men.

[5] The Chichewa word for 'control' used by participants in FGDs was *mwini*, which is defined as 'owner, proprietor' (Plass, 2013).

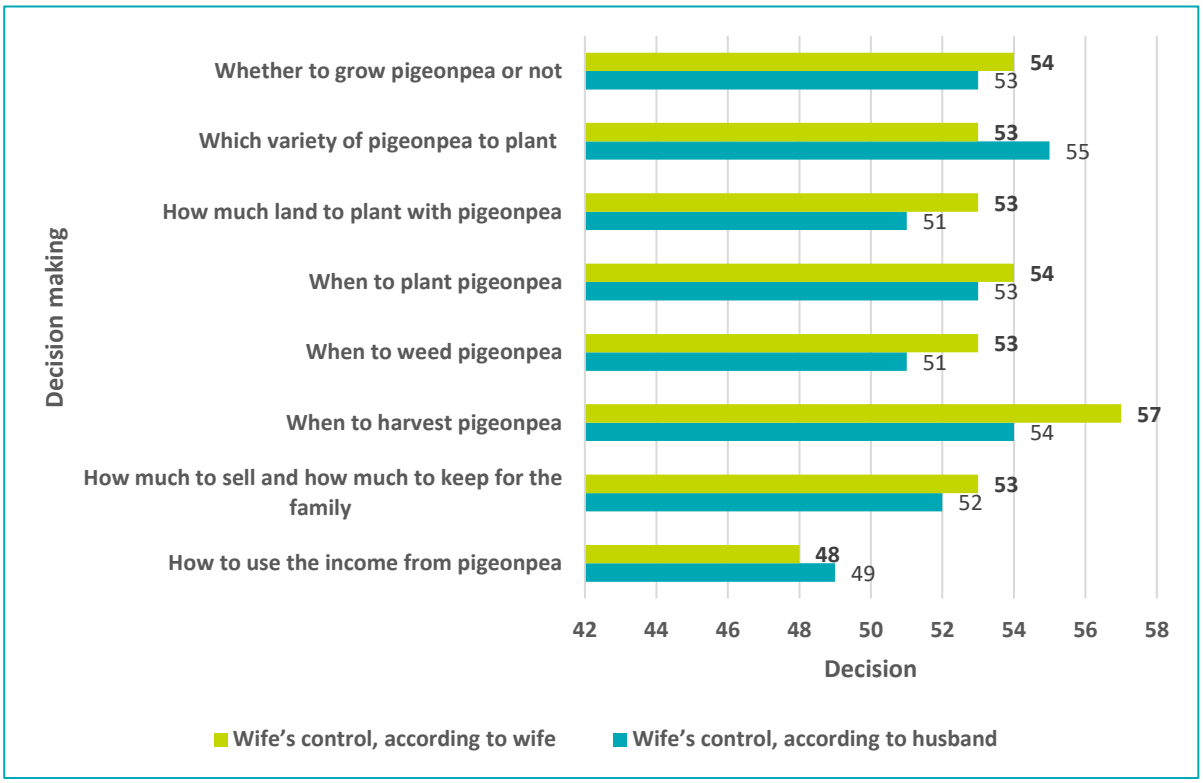
Figure 5. Gender division of labour for pigeonpea



Source: SRMS Seed Supply Survey (2018)

Husbands and wives also agreed on the gender division of control for pigeonpea. For this question, we asked both spouses how much control over decision making was exercised by wives. None of the perceived differences in women's control were statistically significant (Figure 6), but for six of the eight activities wives claimed a *higher* degree of control over decision making than their degree of control as perceived by their husbands. The two exceptions were deciding which variety of pigeonpea to plant and deciding how to use the income from pigeonpea. In these cases, wives perceived a *lower* degree of control than that perceived by their husbands. However, for the all-important decision on how to use the income from pigeonpea, the difference in women's control perceived by husbands and wives was not statistically significant.

Figure 6. Gender division of control for pigeonpea (%)



Source: SRMS Seed Supply Survey (2018)

4.3 Allocation of income from pigeonpea

In Round 1, wives and husbands were asked which system their household currently used to allocate income from pigeonpea. They were given a choice between Models 1 and 2. The results show that all 97 wives and all 97 husbands who completed the game separately chose Model 1, in which income from pigeonpea is first shared, then divided into *katundu* or *kusunga* (Table 3). None of the couples reported that their household used Model 2, where income allocated to *kusunga* is allocated separately to husband and wife. Similarly, when households were asked to choose jointly which system they currently used to allocate income from pigeonpea, they unanimously chose Model 1. Exactly the same happened in Round 2, when income from pigeonpea was increased to MWK 12,000. Finally, in Round 3 households were asked which system they would use if income from pigeonpea rose to MWK 30,000. This time, the decision was made jointly by wives and their husbands. At this level of income, 70 households (72%) opted to remain with Model 1; 27 households (28%) opted for Model 3, where (in addition to *katundu* and *kusunga*) households also reserve a part of *kusunga* for individual use by husbands and wives. Once again, none of the sample households chose Model 2.

Table 3. Choice of model for sharing household income (number of households)

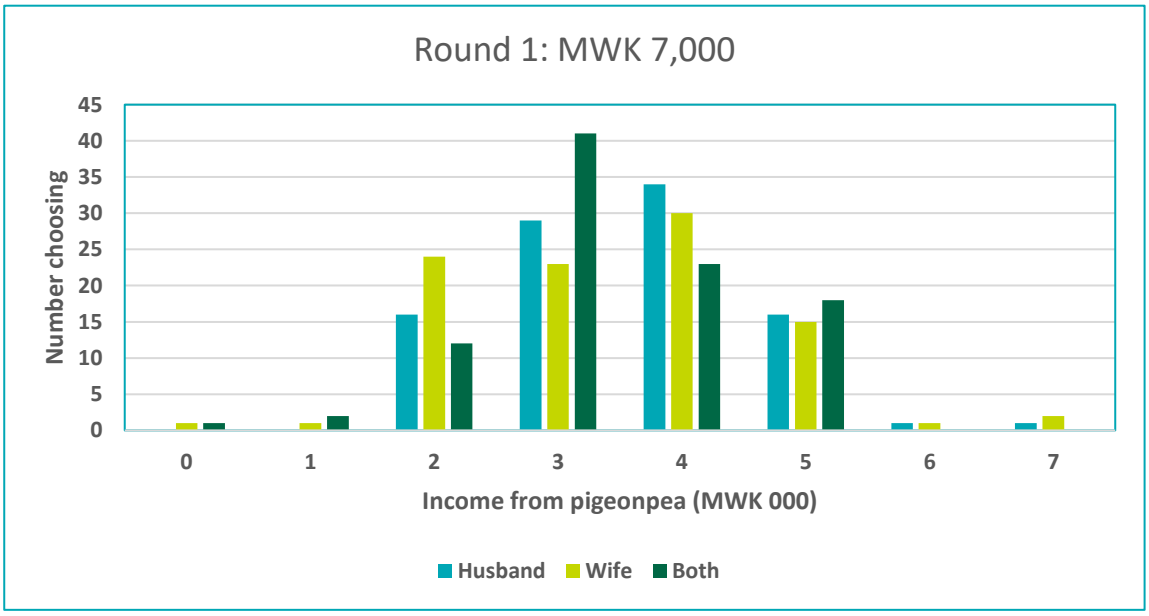
Model	Description	Rounds 1–3	Round 4
Model 1	Shared *katundu* + *kusunga*	97	70
Model 2	Shared *katundu* + separate *kusunga*	0	0
Model 3	Shared *katundu* + *kusunga* + separate shares of *kusunga*	Not available to play	27
Total		97	97

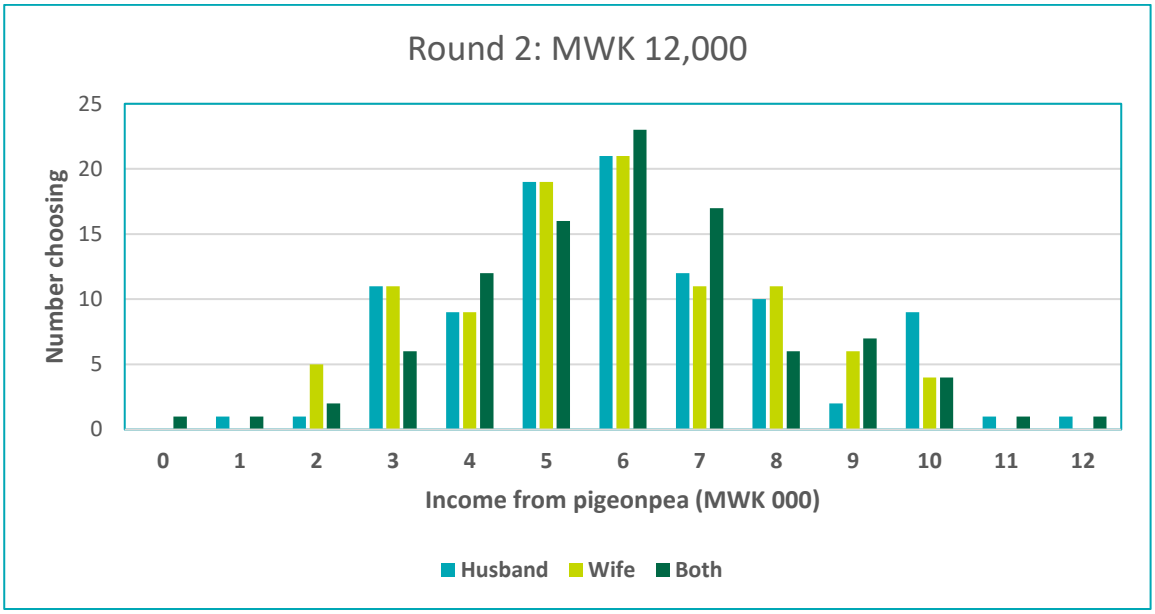
Source: SRMS Seed Supply Survey (2018)

Husbands and wives were asked how they would allocate income from pigeonpea. They first answered independently, then jointly. Comparing the results when playing independently and when playing together gives a measure of the relative bargaining power of wives. If the wives' allocations differed significantly when playing independently and playing with their husband, the lower the wife's bargaining power in the household over the allocation of income from pigeonpea.

Figure 7 shows the variation in allocation to investment (*katundu*) between husbands and wives for Rounds 1–2 of the simulation game. In Round 1, with income from pigeonpea set at MWK 7,000, most players allocated MWK 2,000–5,000 to investment. Wives tended to allocate a lower share of income to investment than their husbands. When decisions were made jointly, the share allocated to investment changed (wives allocated more, and husbands allocated less) to cluster near the middle of the distribution at MWK 3,000. In Round 2, with income set at MWK 12,000, there was less variation in the range of investment, with choices concentrating in the middle of the range at MWK 6,000–7,000. In contrast with Round 1, this time there was little difference in the allocation between husbands and wives. When decisions were made jointly, choices moved toward the upper end of the range, clustering around MWK 6,000–7,000.

Figure 7. Share of income from pigeonpea allocated to investment (*katundu*), by gender





Source: SRMS Seed Supply Survey (2018)

Table 4 shows the mean allocation of income for each round. We used the paired t-test to compare differences in mean values. The results for Rounds 1 and 2 showed no significant differences between:

- the mean values of income allocated by husbands and wives;
- the difference in mean values of income allocated independently by women and jointly with their husbands; and
- the difference in mean values allocated independently by men and jointly with their wives.

The results for Round 3 showed one significant difference: wives allocated more income to *kusunga*. This anomaly arose because wives were 10% more lucky in Round 2, so they had 10% more coins in the variable Round 3, and they spent the extra income on *kusunga*.

Table 4. Allocation of income from pigeonpea, by gender (MWK)

Player	Round 1 (n=97)		Round 2 (N=97)		Round 3 (n=97)	
	MWK 7,000		MWK 12,000		Variable	
	Katundu	*Kusunga*	*Katundu*	*Kusunga*	*Katundu*	*Kusunga*
Husband alone	3,590	3,410	6,060	5,960	4,850	5,250
Wife alone	3,430	3,570	5,760	6,260	4,850	5,580
Both husband and wife	3,410	3,520	6,000	5,920	4,980	5,020
	P-values for significant difference in means (paired t-test)					
Husband/wife	.324	.324	.254	.253	1.00	.189
Husband/both	.110	.364	.782	.851	.564	.346
Wife/both	.882	.726	.266	.152	.535	.030

Source: SRMS Seed Supply Survey (2018)

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5 Discussion

We begin with a *caveat*. Our findings are based primarily on information collected by a household survey (the seed supply survey) and an experimental game. However, the ability of these methods to yield accurate information on the impact of commercialisation on women's income is limited. First, respondents may be understandably reluctant to share information on this sensitive topic with strangers. Second, even those who are willing to share information may find it difficult to contravene social norms on how income should be shared and on gender relations. Consequently, there may be a big difference between what respondents report and what they really do. Ethnographic research using participant observation is needed to determine how closely these norms are followed in practice. Remarkably, given its importance for commercialisation, we found no in-depth ethnographic study on the process of income distribution within the household against which to compare our findings. Without this evidence, we can only compare our results with those from other surveys.

5.1 How households allocate income

Our expectation, based on previous research, was that women and men would have separate streams of income, and that as a 'women's crop' income from pigeonpea would be controlled by women (Orr *et al.*, 2016). By contrast, the results show a majority preference for Model 1, where income streams are pooled and where control of *kusunga* is managed jointly through negotiation between husband and wife (Table 3). Conversely, none of the players chose a model of income sharing where husbands and wives had individual control of *kusunga*. The choice of system did not change when we raised the level of pigeonpea income from MWK 7,000 to MWK 12,000.

Participants in FGDs offered several insights into the reasons for this preference:

> *'The best option is to go for the first way of agreeing with the wife when you have got money, because then you sit down and agree what you should do with the money.'* (Men's FGD)

> *'When we sell our goods and make money, then we sit down and look into the problems at home and see what we are lacking, what are the problems to solve first. … If the money is MWK 20,000, we take MWK 10,000 to the wife to solve her problems and I will take MWK 10,000 to solve my problems.'* (Men's FGD)

> *'First we need to sit down and see what we have at home. Do we have some livestock or not? Then we need to sit down and discuss. The woman has to negotiate; you have a lot of money but you don't have a goat, and you can see that there are children going to upper classes. What are we going to do in the future? Go and buy two goats for rearing. Then if we keep our livestock at home, it's now the man's turn to say what he wants.'* (Women's FGD)

Conversely, the system where income allocated to *kusunga* was managed separately by husbands and wives (Model 2) was less preferred because it was associated with marital discord, or even impending marital breakdown.

> *'Mostly these situations happen if there is disagreement* [kusakwirizana] *in the family. … If you, the husband, are having an affair …, when things go like that in the family then the woman will insist on having her own share. … Mostly these things happen when you have lost control* [udindo] *of your own house.'* (Men's FGD)

> *'Sometimes we can agree during the growing period to sell one bag of pigeonpea, but at the time of harvest the man can change his mind and squanders the money drinking beer … so the lady also changes her mind due to this situation, so we should share [separately … when things go like that in the family, then the woman will insist on her own share].'* (Women's FGD)

Similarly, this system may operate '*when the wife is rude … if a man is also drinking too much … when we start doubting each other, then we share* [separately]' (Men's FGD).

Participants regarded a system where income was shared and decisions made jointly as the social norm. This system signified a relationship based on mutual trust and a strong marital bond, whereas a system where income was managed separately implied the opposite, usually because the husband's behaviour threatened the relationship through excessive drinking or sexual misconduct. This makes it easier to understand why none of the players were willing to admit to using this system.

Ethnographic evidence also finds that households where income is pooled is regarded as the social ideal:

> *A 'good' husband divides the money he earns with his wife whereas a 'bad' one uses most for his own purposes, forcing his wife to either beg her husband for help or fend for herself. Both spouses keep control of whatever monies they earn … but a good marriage is marked by reciprocal knowledge and sharing of each other's income and by a minimum of conflict over the resources directed by each spouse to his/her respective matrilineal group* (Peters, 1997: 202–203).

In southern Malawi, therefore, pooling income and sharing information about finances is regarded as part of the 'conjugal contract', which 'sets the terms by which husbands and wives exchange goods, income, and services, including labour' (Whitehead, 1981). As a result, there is social pressure on men to share income from wage labour, as well as on women to share the income from pigeonpea:

> *Even in the southern region with greater opportunities to market pigeonpea, women in the group interview reported that it is customary for women who sold pigeonpea to return all generated revenue to men/husbands* (Me-Nsope and Larkins, 2016a: 15).

Model 3, where some portion of *kusunga* was allocated for individual use by husband and wife, was used only when the income from crop sales reached a high enough level to justify separate shares. This system is normally used for rice, the most lucrative cash crop. When we increased the income from pigeonpea to MWK 30,000, a third of households chose this system of income distribution (Table 3).

> *'If there are 10 bags of rice, and if there are three children at home, they sit down and negotiate—one bag for each child, then seven bags as an asset for the whole family. Out of the seven, we keep two bags, one bag for the man and one bag for the woman, keeping five bags for the household. If we get a big harvest of pigeonpea (say five bags), we will share, the same way as with rice.'* (Men's FGD)

However, participants in FGDs were careful to justify this system as a reward for individual effort, emphasising that it did not undermine the principle that income was shared:

> *'Fieldwork for rice* [in the dambo] *is hard labour, therefore they do that to compensate themselves. … The wife and the husband sacrifice themselves to work, so there is need for compensation* [kuzipepezeza]*. … It's like doing* ganyu*; you have to work harder.'* (Men's FGD)

This system of pooling income from cash crops suggests that we need to rethink the impact of commercialisation on women's income. The binary model of income distribution—pooled or separate streams of income—is too simplistic. Instead, households have adapted to commercialisation by incorporating separate shares into a model where the bulk of income is shared and managed jointly. In rural Malawi, money is perceived as a destabilising force, threatening homes and marriages through its power to provoke volatile behaviour (Kaler, 2006). This institutional innovation allows households to combine the social norm that income should be shared with the individual benefits of a higher income from cash crops.

5.2 Women's bargaining power

We expected to find significant differences between wives and husbands in the share of household income allocated to *katundu* and *kusunga* and also between the allocation wives made playing individually and the allocation they made when they played jointly with their husbands. Instead, we found no significant differences (Table 4).[6] Even when playing alone and unobserved by their husbands, the share of income from pigeonpea that wives allocated to *katundu* and *kusunga* was the same as that allocated by their spouse. What explains this apparent unanimity?

Part of the answer lies in the view—shared by both women and men—that pigeonpea is *not* a women's crop. When we posed this question separately to husbands and wives, all 97 of them replied that pigeonpea was a crop 'for both women and men'. This view was echoed by the findings for the gender division of labour and the gender division of control. Once again, both women and men perceived that the labour for pigeonpea and decision making for pigeonpea was evenly shared (figures 5 and 6). Other surveys in Malawi have also found little evidence for a gender division of labour in crop production (Mvula and Mulwafu, 2015).[7] Since husbands and wives view pigeonpea as a shared enterprise, we might expect them to have similar ideas about how income from the crop should be spent.

Nevertheless, the consensus is striking. It suggests that there is fundamental agreement on the preferred allocation of income from pigeonpea within the household. This can only be based on past experience. Husbands and wives know from their history of shared decision making and negotiation what allocation of income will satisfy their spouse, and each strives to find the allocation that is most likely to result in agreement. Of course, this negotiation is about dividing income between investment and consumption for the household as a whole, which is less contentious than dividing income between husband and wife. The share allocated to *kusunga* depends on the economic status of the household: '*Poorer families will use all the money to buy food*' (Men's FGD). The fact that husbands and wives made the same allocation between *katundu* and *kusunga* when playing separately suggests they have a common understanding of their household needs based on their economic status and are accustomed to making these decisions together.

This argument is supported by the comments participants in FGDs made on how decisions are reached. These comments make clear that, while the man may have 'the final say' in decision making,[8] women are usually consulted and may have considerable bargaining power. However, to describe decision making as 'shared' does not mean that women have an equal voice:

> *'The man has control, but they have to negotiate.'* (Men's FGD)[9]
>
> *'If the woman sees that what the man is saying is of substance, she just agrees. … When what he says has no value, the lady always disagrees; she cannot accept.'* (Women's FGD)
>
> *'In some families, the woman can have most of the power, but in most families they just agree, they go together. … The wife can have something to say of substance, and the man can consider that and understand what the wife has said.'* (Men's FGD)

[6] These results contradict the findings from a recent study of the value chain for pigeonpea, which found that women have very limited control over how income from pigeonpea sales is spent (Me-Nsope and Larkins, 2016a: 15). We cannot explain this difference.
[7] By contrast, a recent study of the value chain for pigeonpea suggests that women are 'more likely' to be 'in charge of' seed selection, seed storage, harvesting, transport, and cooking (Me-Nsope and Larkins, 2016a). However, from the questionnaire it seems that this question related to the gender division of labour, since producers were asked 'who carried out' specific activities (Me-Nsope and Larkins, 2016b).
[8] We did not ask this question directly in the questionnaire, but instead asked women and men separately to estimate their share of control. However, other surveys make it clear that the 'final' decision is almost always made by men (Mvula and Mulwafu, 2015).
[9] Many proverbs in southern Malawi reflect this patriarchal view of the household with the man as the 'final' decision maker: '*Wamkulu mbanja ndi mwamuna* [the head of a household is a man]' and '*Ng'ombe yaikazi sikoka ngolo* [a cow does not pull an ox-cart]' (Nagoli and Chiwona-Karltun, 2017).

Other survey data confirm that decision making is usually shared between husbands and wives. For example, a recent nationwide survey shows that, in southern Malawi, decisions over how to use the wife's cash earnings are mainly made jointly (47%) or mainly by the wife (28%), with only 24% of decisions made mainly by the husband. Similarly, decisions over how to use the husband's cash earnings are usually made jointly (57%), with 36% made mainly by the husband (Government of Malawi, 2017: 416–417). Similarly, women in southern Malawi have considerable control over decision making on major household purchases: 57% of women reported making these decisions either alone or jointly with their husbands (Government of Malawi, 2017: 426). Control varies according to the importance of the decision. Ethnographic evidence from Zomba District found that 'where husbands were present the majority of agricultural decisions were made jointly, though decisions involving the expenditure of large amounts of cash were often made by the husband' (Vaughan and Hirschmann, 1983: 93–94). In southern Malawi, therefore, the stereotype of a patriarchal household where men dominate decision making is questionable. Only in a minority of households do men have complete control.[10]

There are good economic reasons why husbands and wives prefer to make household decisions together. One is to avoid the negative consequences that follow separation or divorce. The system of matrilineal inheritance in southern Malawi gives women significant bargaining power. Men must vacate the marital home, forgo their right to cultivate their wife's land, and return to their own village. Presumably, this encourages husbands to allow their wives a say in decision making. On the other hand, female-headed households where the head is separated or divorced are significantly poorer than households where couples stay together.[11] Presumably this gives women an incentive to allow men the final say in decision making. The negative consequences of not making decisions jointly may have a powerful deterrent effect.

Joint decision making also has economic benefits. Economists have used nationwide survey data to test hypotheses about household decision making. Two studies are available. The first examines how different types of decision making affect total household income. The results show that total income is significantly higher in households where decisions are made jointly. The authors conclude that improving cooperation between husbands and wives is a more effective way of increasing household income than improving women's bargaining power (McCarthy and Kilic, 2017). The second study compares total household income between married households in matrilineal and patrilineal systems. It reveals that, *ceteris paribus*, household income is significantly higher for households in matrilineal systems. The reason is that men are more likely to work for wages that give higher returns than working on the family farm:

> *Where land belongs to men, husbands are residual claimants of agricultural income should the couple divorce; as a result, they allocate more time to agriculture at their optimal choice. As wages are higher than the average product of agricultural labour, this leads to lower household income and, consequently, lower consumption than for those households where land belongs to women. There is a mismatch between what is individually optimal and what is optimal for the household: patrilineal husbands are better off engaging in more agricultural labour, even though their spouse and children would benefit if they switched to wage labour* (Telalagic, 2014: 3).

Not only is income higher in matrilineal households, but the distribution of this income within the household is also essentially the same as in patrilineal households.[12] Hence, the benefits of higher income are being shared by husbands and wives, which suggests that decisions about household expenditure are being made jointly. Again, the promise that a higher income will be shared gives married couples an economic incentive for cooperation. Ethnographic evidence suggests that cooperation between husbands and wives is critical to

[10] Researchers on microfinance have also found, to their surprise, that married couples in southern Malawi routinely share decisions and information about household finances: 'This is counter to what we know from research with low-income women of other parts of the world' (www.womensworldbanking.org/news/blog/helps-note-household-dynamics-rural-malawi/).
[11] The value of assets owned by male-headed households is double that of female-headed households, and male-headed households are more likely to own productive agricultural assets. In contrast, households with young, female, or divorced heads are more vulnerable to loss of assets (Devereux *et al.*, 2006).
[12] Matrilineal households spend a lower share of their expenditure on their sons' education and men's clothing, but the magnitudes are small and the coefficients are only significant at the 10% level (Telalagic, 2014: 35).

reap the full benefits of commercialisation: 'All the most successful families engaged in commercial farming and/or business are based on a strong partnership between husband and wife' (Peters, 1987: 207).

Yet despite these benefits, cooperation is hard to achieve, or at least to sustain over time. Southern Malawi is characterised by 'fragile marriages' (Peters, 1997). Its divorce rates are among the highest in Africa. In Balaka District, southern Malawi, one-third of first marriages end within five years. After 25 years, almost 65% of first marriages have been dissolved (Reniers, 2003). Rural Malawians blame this fragility on modernity, particularly the greater availability of cash income, but marriages seem to have been equally fragile in the past (Kaler, 2001). The juxtaposition of patriarchy with a system of matrilineal inheritance makes marriage a difficult balancing act. Husbands have authority as the head of the household, but women control access to land. In this context, shared decision making becomes a mechanism for balancing these competing claims and securing the marriage. This also helps explain why our game players preferred a system of pooling income over separate shares. This system acts as a barometer for the health of their marriage. Pooling income is the ideal 'conjugal contract' to which couples aspire, one which they may never fully live up to but to which they can hold each other accountable.

6 Conclusions

The research questions and hypotheses of this study were based on three assumptions about the impact of the commercialisation of pigeonpea on the distribution of income within the household. However, the results from the simulation game challenge all three of these assumptions.

First, we hypothesised that women and men have separate streams of income, and that income from pigeonpea is controlled by women. However, the simulation game showed that households prefer a system of income distribution where income is pooled rather than divided into separate shares for husbands and wives. Moreover, pigeonpea is not regarded as a 'women's crop'. Neither women nor men perceive a gender division of labour or gender division of control for pigeonpea. As a result, the income from pigeonpea does not automatically 'belong' to women; rather, pigeonpea is regarded as a crop for both women and men and the income from sales belong to the household as a whole.

Second, we hypothesised that commercialisation would change women's control and share of income from pigeonpea. However, the simulation game showed that, when income from pigeonpea rose from MWK 7,000 to MWK 30,000 (more than 300%), two-thirds of the players continued to pool this income in the same way as before, rather than dividing it into separate shares. The other third of players also continued to pool the income from pigeonpea, but allowed husbands and wives part of this income for their personal use. This system of income distribution is used for commercial crops like rice. In this way, commercialisation benefits both husbands and wives individually without compromising the principle that most income is pooled. These results suggest that the commercialisation of pigeonpea will not change the practice of pooling income, or, if it does, it may benefit women by giving them an individual share of this income.

Third, we hypothesised that women might be willing to trade off some income from pigeonpea in exchange for a higher income from pigeonpea for the household as a whole. However, this question did not arise, since the income from pigeonpea was pooled. Decisions about the use of the income from pigeonpea were also made jointly. The allocation of this income to investment or consumption showed no significant differences between husbands and wives. This convergence suggests a history of shared decision making in the distribution of income.

These findings challenge the patriarchal model of the household, which predicts that commercialisation will disempower women. This model has limited relevance in southern Malawi, where matrilineal inheritance and uxorilocal marriage give women significant bargaining power. At the same time, patriarchal norms give men authority as heads of household with the final say in decision making. These competing claims are negotiated through social institutions. The expectation that couples share income is part of the conjugal contract. This helps explain why players prefer a system of pooling income to one of separate shares, and why decisions about the allocation of income to investment or consumption are shared by husbands and wives.

The main lesson from this study is the need to place commercialisation in context. Two institutions—matrilineal inheritance and the conjugal contract—govern the distribution of income within the household in southern Malawi. The evidence presented here suggests that, thanks to these institutions, the commercialisation of pigeonpea will not disempower women.

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