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Political Economy of Agricultural Producer Support in Malawi

An Econometric Test of Determinants of Producer Protection in the Maize Sector

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ABSTRACT

Malawi has struggled to achieve sustained agricultural growth over the last four decades. As such there is need for increased investment and supportive policies if greater success is to be realized. As a prerequisite to identifying the role that improved policies and investment can play, a better understanding is needed of the incentives that producers in the agricultural sector obtain currently. However, research on the subject has been scanty. For this study, annual Producer Subsidy Equivalent (PSE) for the staple food crop, maize, were calculated for the period 1970 to 2010. All of the PSEs were negative, implying that agricultural producers have been implicitly and consistently taxed through policies that transfer income from producers to consumers. This is consistent with trends in developing countries – developing countries commonly tax the agricultural sector, while in contrast developed nations subsidize the sector. However, the annual value of the implicit tax on agriculture in Malawi per unit of production has declined over the years from US$298/mt in 1970 to US$182 in 2010. In order to understand the determinants of this observed pattern of declining implicit taxation, a Newey–West regression analysis was used to test political economy explanations for the changes in levels of agricultural protection. Our research shows that implicit taxation on maize producers declined with increasing levels of social accountability and international donor pressure and with declining agricultural production.

1. INTRODUCTION

Chimanga ndi moyo (maize is life) is a saying that underlines the importance of maize as the main staple food for Malawians (Smale, 1995). Over the past 100 years, both the colonial and then the independent government of Malawi implemented a number of policies aimed at boosting production and consumption of maize. Overall, the outcomes have been disappointing. Poverty levels have remained stagnant at above 50 percent (NSO, 2011) and malnutrition among children under five years of age remains high at 48 percent (World Bank, 2013). The Maputo Declaration on Agriculture and Food Security in 2003 states that increasing investment in agriculture is necessary to achieve economic growth and poverty reduction in Africa. As Malawi demonstrates, the 10 percent budget share target that African heads of state set for themselves under the Maputo Declaration can quite readily be achieved through expensive subsidy programs without engaging in investments in public goods that are critical for the longer-term sustained transformation of the sector (Poulton, 2012).

Undoubtedly, the Farm Input Subsidy Program (FISP) that the government of Malawi has implemented over many of the past 8 years has contributed to high maize production. However, its impact on poverty reduction has been dismal. The National Statistical Office (NSO) (2011) reports that poverty levels are still at pre-FISP levels. This implies that investment alone without supportive policies is not sufficient to transform the agricultural sector on which so many Malawian households rely for their economic well-being. Unless policies change and resources are used more effectively, it is projected that the prevalence of poverty and the number of undernourished people in the country will continue to rise. Identifying the role that future agricultural policies and investment should play requires an understanding of how current and past policies have distorted the incentives maize producers face. This understanding is a prerequisite to designing more efficient strategies for agricultural transformation in Malawi.

This paper contributes knowledge on producer incentives and how they have evolved in Malawi. The paper starts with an overview of the methodology used and then presents annual Producer Support Estimates (PSE) for the period 1970 to 2010. It concludes with an analysis of the political economy determinants of support to maize producers.

2. METHODOLOGY

2.1 Producer Support Estimates (PSE)

PSEs capture in a single number the overall effects on agricultural producers of different types of governmental programs and interventions (OECD 2000). This makes it superior to other indices, such as the Nominal or Effective Rates of Protection that account for only a small proportion of the transfers between the government and the producers of agricultural commodities (Chitiga, et al., 2008). PSEs can be expressed in three ways: (i) as the total value of transfers to the commodity produced (Total PSE or TPSE); (ii) as the total value of transfers per unit of the commodity produced (Unit PSE or UPSE) and (iii) as the total value of transfers as a percentage of the total value of production including transfers (Percentage PSE or PPSE). The calculation of PSEs acknowledges the fact that polices which deliver assistance to producers do so by transferring income from either consumers or taxpayers. The value of production can be measured at domestic prices or at world prices.

In algebraic form, where the level of maize production is Q_p, the domestic price of maize is P_d, the world price of maize is P_w, direct payments are D, levies on producers are L, and B are indirect payments e.g. subsidies on inputs, the PSE expressions are:

$$TPSE = Q_p \times (P_d - P_w) + D - L + B \quad (1)$$

$$UPSE = \frac{TPSE}{Q_p} \quad (2)$$

$$PPSE = \frac{TPSE}{Q_p \times P_d} \times 100 \quad (3)$$

The TPSE is essentially comprised of two main components: a Market Price Support (MPS) component and a Budgetary Transfer component. The MPS measures the monetary value of transfers from consumers to producers arising from policy measures that create a gap between domestic and border prices. On the other hand, the Budgetary Transfers component represents the various budgetary payments made directly to producers (Kirsten et al., 2000). The PSE is the sum of the detailed components listed here:

- Market price support
- Payment based on output
- Payment based on area planted
- Payment based on historical entitlements
- Payment based on input use
    - Based on use of a variable input
    - Based on use of on-farm services
    - Based on use of fixed inputs
- Payment based on input constraints
    - Based on constraint on variable input
    - Based on constraints on fixed inputs
    - Based on constraints on a set of inputs
- Payment based on overall farming income

However, in the maize sector in Malawi, the only forms of payments made to producers in the period under review (1970 to 2010) were based on variable inputs (seed and fertilizer). All other forms of payments that are part of the PSE calculation were zero. As such, the estimates derived in this study are a summation of market price support and payments based on variable input use.

2.2 Determinants of Producer Support Levels

A regression model was fitted to assess how the UPSE is affected by changes in factors of the Malawian political economy. The data used in this analysis is made up of 41 annual observations from 1970 to 2010. The small sample size means that our analysis is limited to measuring the association between variables.

The Newey-West regression was the quantitative method used for the analysis. This is an extension of the Huber/White or sandwich robust variance estimators that produce consistent estimates in the presence of heteroskedasticity. The Newey-West (Newey & West 1987) variance estimator produces consistent estimates when there is autocorrelation in addition to possible heteroskedasticity. The coefficient estimates are derived as in an OLS regression.

$$\hat{\beta}\ OLS = (X'X)^{-1}X'y \quad (4)$$

where β is a vector of unknown parameters in the OLS regression, X is a vector of independent variables, and y is the dependent variable. When there is no autocorrelation, the variance estimates are calculated using the White formulation:

$$X'\hat{\Omega}X = X'\hat{\Omega}_0 X = \frac{n}{n-k}\sum_i \hat{e}_i^2\, x_i' x_i \quad (5)$$

In this case, $\hat{e}_i = y_i - x_i\hat{\beta}_{OLS}$, where x_i is the ith row of the X matrix, n is the number of observations and k is the number of predictors in the model, including the constant if there is one. If autocorrelation exists up to lag (m), $m > 0$, the variance estimates are calculated using the Newey-West (1987) formulation:

$$X'\hat{\Omega}X = X'\hat{\Omega}_0 X + \frac{n}{n-k}\sum_{l=1}^{m}\left(1 - \frac{1}{m+1}\right)\sum_{t=l+1}^{n}\hat{e}_t\hat{e}_{t-1}\left(x_t' x_{t-li} + x_{t-l}' x_t\right) \quad (6)$$

Where x_t is the row of the X matrix observed at time t.

Policies are a result of interaction between politics and economics, rather than solely an economic necessity to correct market failures. In order to answer the questions of why and how public policy evolves in a way that exhibits certain regularities beyond the horizons of traditional welfare analysis, much of the academic literature has focused on the integration of political and economic markets and the endogeneity of government policy (Anderson and Hayami, 1986). This approach is what is termed "political economy".

Using a political economy framework, a number of competing hypotheses for how the UPSE is affected by changes in factors of the Malawian political economy are suggested and tested:

Checks and balances: This hypothesis posits that inefficient policy choices will persist as long as government officials can avoid being socially accountable (Masters & Garcia 2009). In our use of this perspective, social accountability in Malawi was measured using the Checks and Balances index available in the World Bank Political Institution Database created by Keefer (2010). Globally, rich industrialized countries are known to subsidize their producers, while poor developing countries tax them. Based on this stylized fact, it is reasonable to expect that maize producers in Malawi are taxed by domestic policies. We therefore hypothesize that the level of implicit taxation would be inversely related to the degree to which there are check and balances in Malawi's political system.

Donor programs: Giuliano & Scalise (2009) highlighted the role that international donor pressure plays in shaping policies, most especially in developing countries. Following the poor economic performance of Malawi in the late 1970s, loans from the International Monetary Fund (IMF) and the World Bank were obtained to maintain economic stability. Reforms, such as liberalization of markets, were preconditions to accessing these loans. Donor pressure was measured by a dummy variable that assumed a value of 1 in the period of Structural Adjustment Programs (SAPs) and zero otherwise. Since liberalization is aimed at removing distortions in agricultural markets, a negative relationship between donor programs and implicit taxation was envisaged.

Electoral competition: Elections are an important input to final policy outcomes (Cox 1990; Myerson 1993). Electoral periods in Malawi are characterized by policy swings. For instance, the prices for tobacco and maize fertilizers in 2005 were at MK 1,450 and MK 950 per 50 kg, respectively. They were harmonized in the subsequent year at MK 900; reduced to MK 800 thereafter, before being slashed to MK 500 in the lead up to 2009 general elections, without any plausible economic reasoning (Chinsinga 2010). Because incumbents will use domestic policies to transfer resources to farmers, who constitute a majority of the electorate, the value of implicit taxation is expected to reduce in the lead-up to elections.

Politician-voter interaction: The Downsian Politician-Voter Interaction Model (Downs 1957) offers an alternate explanation for observed agricultural policies. The theory does not concentrate on lobbying power or on social aspects (de Gorter & Swinnen 1994). Rather, it is based on the behavior of self-interested and fully informed voters and politicians. A key feature of the Model is that an exogenous change in the relative income per capita between groups will induce politicians to partially compensate a group experiencing a relative reduction in their income. An income ratio measured as the ratio of per capita income in agricultural sector to per capita income in other sectors of the economy was included in the model. A positive relationship between implicit taxation and this variable is anticipated.

Food sufficiency motives: Food self-sufficiency has been a prime objective of the government of Malawi from as early as 1950 (Phiri 1993). Maize is the staple food for 93 percent of the population, such that food self-sufficiency is synonymous to maize self-sufficiency (Ragnar, et al. 2003). It has always been cheaper for Malawi to produce its own maize than to import from other countries (Mataya & Kamchacha 2005), and importation of food worsens the import bill that is already hard to satisfy without balance of payment support from donors. Self-sufficiency is measured using the ratio of domestic production to consumption, i.e., production divided by consumption. As the government is expected to transfer more resources to producers when the country is self-sufficient and to reduce it otherwise, an inverse positive relationship between self-sufficiency and implicit taxation is anticipated.

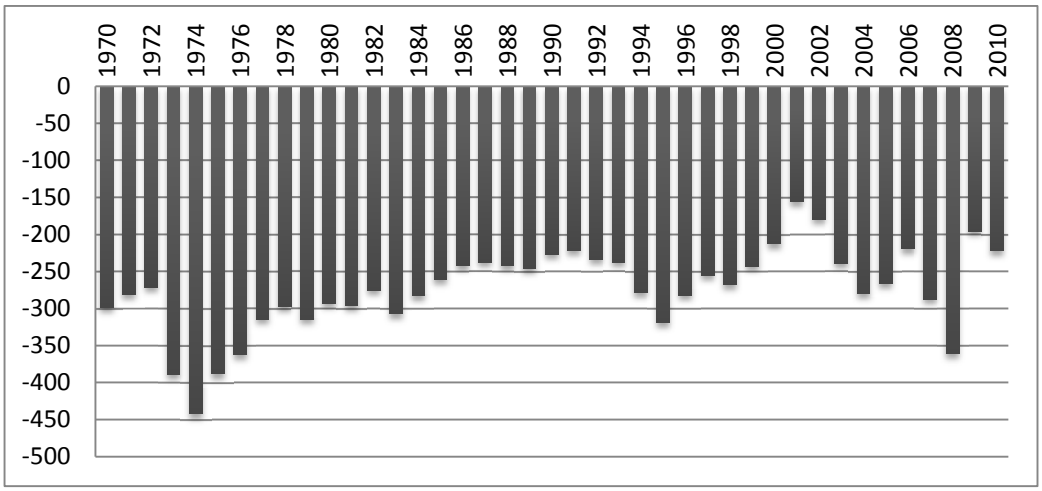
3. TRENDS IN PRODUCER SUPPORT

In this chapter we present the unit producer support estimates for the maize sector in Malawi over the period 1970 to 2010. The chapter begins by discussing the two main components of PSE: market price support and budgetary transfers. The components are then aggregated into a single figure, the UPSE, which summarizes the interaction amongst various policies and how they affect government support to farm production per unit of maize produced.

3.1 Market Price Support

Market price support (MPS) is an indicator of the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers arising from policy measures that create a gap between domestic market prices and the border price of maize. The annual MPS estimates per ton of maize produced are presented in Figure 1. The negative values of the MPS demonstrate that farmers were taxed by policies that kept the domestic producer prices at levels lower that the border price.

Figure 1—Annual market price support (MPS) for maize producers in Malawi, 1970 to 2010, US$ per mt



Maize is a strategic crop in Malawi. As a result, government has always maintained control of the maize market to ensure that maize remains affordable to urban consumers. Before market liberalization in 1987, the Agricultural Development and Marketing Corporation (ADMARC), a parastatal entity, was the sole buyer of smallholder produce. ADMARC, in consultation with the Ministry of Agriculture, set minimum smallholder producer prices. The prices were the same across the country and over the entire buying season. ADMARC was not allowed to sell below its purchase price, but in principle any losses it realized were to be offset by outlays from the Department of Treasury. In reality, no losses were ever covered by government. As a result, ADMARC maintained low consumer prices, but prevented losses by keeping the producer prices lower (Kircher et al. 1985). This created a wedge between the domestic prices and the import parity prices ranging between $272 to $442/mt from 1970 to 1980.

In 1981, Malawi started implementing Structural Adjustment Programs. A focus for these programs was to increase the production of smallholder export crops by increasing the producer prices offered by ADMARC, while at the same time maize prices were to be held down to reduce the relative price of food crops so as to encourage transfer of land to export crop production (Harrigan 2003). Consequently, producer prices did not adjust towards the border price. By 1987 Malawi faced a food crisis. This took two forms – a decline in maize production per capita, particularly of improved maize (Sahn et al. 1990), and a collapse in ADMARC's ability to purchase maize. The food crisis put pressure on government and more specifically on then President Kamuzu Banda, as he identified his populist legitimacy with domestic maize availability. A complete reversal of policies followed. Government increased maize producer prices by 36 percent (Harrigan 2003), reducing the wedge between the domestic and import parity prices to $237/mt.

The post liberalization era has seen a decline in ADMARCs market share and, consequently, in its ability to influence market prices. Government price control mechanisms, such as the price band (1995 to 2000), government set prices (2000 to 2004), and minimum producer prices (2005 to present) have not been adhered to. This has resulted in declining maize prices, reaching a record low in 2001 of $155 per mt. However, government has maintained some form of control by regulating the supply on the local market through export bans in times of shortages and through food imports. In 2008, government announced a state monopoly and monopsony in maize marketing. Licenses for all traders except ADMARC were revoked. The producer price was fixed at K45,000/mt. This increased the price wedge between the domestic and import parity prices to $360/mt.

3.2 Budgetary transfers to producers

The only form of government support in the maize production system in Malawi relates to payments that reduce the on-farm cost of variable inputs. Fertilizer and maize seed programs have been implemented in Malawi since 1952 (Phiri 1993). They are either implemented as subsidies or as safety net programs aimed at addressing the needs of vulnerable

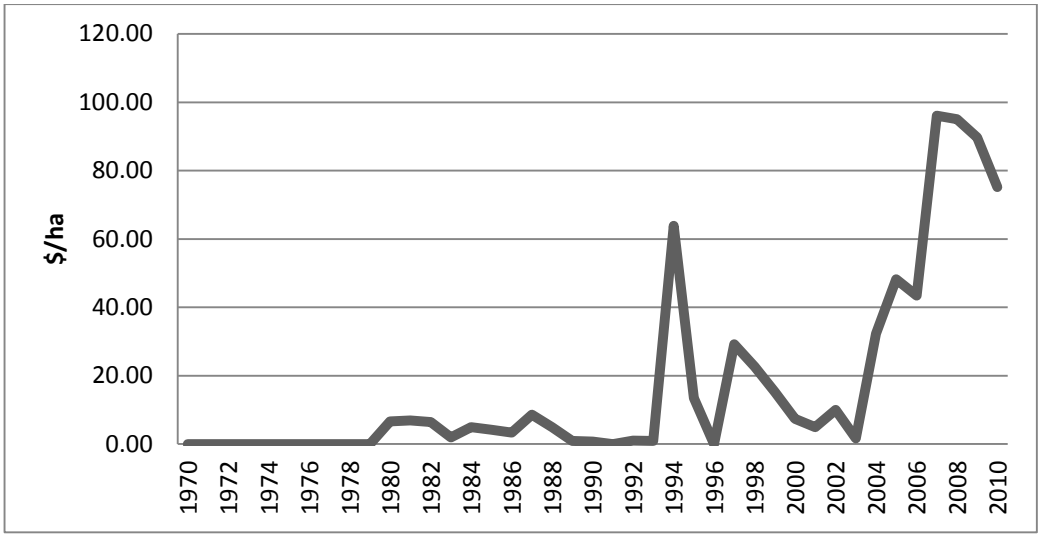
households. Table 1 presents a summary of input programs implemented in Malawi from 1970-2010. The main aim of these programs has been to improve the productivity of smallholder maize farms so as to achieve food sufficiency.

Table 1—Main maize input programs implemented in Malawi

Year	Program	Description
1970-1995	Agricultural Input Subsidy Program	Subsidized seed and fertilizer for smallholder farmers
1995-1997	Supplementary Input Program	Input kit distribution to vulnerable households
1998-99	Starter Pack Program	Universal distribution of fertilizer and seed
2000-04	Targeted Input Program	Targeted fertilizer and seed distribution
2005	Extended Target Input Program	Expanded targeted fertilizer and seed distribution
2006-2010	Farm Input Subsidy program	Targeted voucher based maize seed and fertilizer subsidies

The value of payments for variable input use has been increasing (Figure 2). The effects of the Fertilizer Subsidy Removal Program (FSRP) implemented in the 1980s are visible in the figure. By 1986 the subsidy per hectare had declined by 50 percent from $6.6 in 1980 to $3.3 in 1986. However, following the food crisis in 1987, the fertilizer subsidy level was increased to 24 percent and the FSRP was suspended indefinitely. The subsidy level increased to $8.5/ha. The removal program was revived in the early 1990s under the Agricultural Sector Assistance Credit (ASAC). This coincided with a change in government in 1994. The newly elected Muluzi administration was keen to win back donor confidence and swiftly moved to implement reforms that included massive devaluation of the kwacha and complete removal of subsidies.

Figure 2—Variable input payments per hectare: 1970-2010

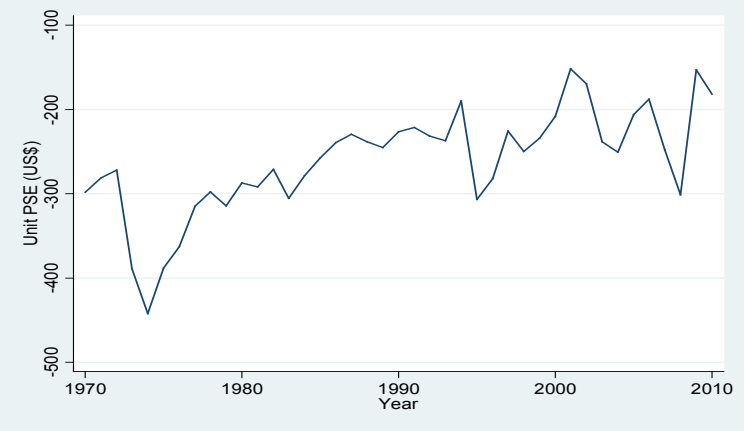


All input subsidies were completely removed in 1995. However, the droughts in 1992 and 1994 resulted in widespread poverty and food insecurity. The government responded by implementing safety net programs. Notably, the Starter Pack Program (SPP) a universal input kit program, transferred $22/ha in 1998/99 season, and its successor, the Targeted Input Program (TIP) that was implemented from 2000-2004, transferred $32/ha to farmers in its final year. During the electoral campaign leading to 2004, a strong national consensus on the need to change the strategy from free input distribution to subsidies was evident (Chirwa, Kydd, & Dorward 2006). The subsidies were eventually reintroduced in 2005/06 season at $48/ha and rose to $75/ha by 2010.

3.3 Producer Subsidy Equivalent

The aggregate effect of these policies, i.e. the sum of market price support and budgetary transfers, represented by the PSE can be looked at as government's way of responding to the classic "food policy dilemma" with consumers demanding low food prices and, on the other hand, the need to create adequate incentives to encourage farmers to engage in food production. On average, maize producers are deprived of US$269/mt/year in implicit taxation arising from policies that keep the domestic maize price lower than the world price. Much as government implements programs, such as FISP, that transfer resources to producers, its outlays under these programs are not enough to offset the negative effect for producers of maize price distortions. Our results, shown in Figure 3, demonstrate that government from 1970 to 2010 has been oriented towards satisfying the food needs of consumers, who are comprised of urban dwellers and farmers who cannot produce enough to meet their subsistence demand, at the expense of net maize producers.

Figure 3—Unit Producer Support Estimate (UPSE) for Malawi's maize producers per mt, 1970 to 2010



This is most likely due to the strategic importance of maize in Malawi. Politically, the legitimacy of any administration is associated with its ability to provide food at low prices to the populace (Chinsinga, 2011). Economically, maize constitutes a large share of the Consumer Price Index (CPI), such that rising maize prices result in surging inflation levels, resulting in economic instability. As a result, government pursues policies that guarantee a low maize price to satisfy the needs of the consumers, most of whom are in urban areas and, as Cammack and Kelsall (2010) observed, demand a relatively functional state that delivers public goods and responds to the needs of the electorate. The results reaffirm the stylized fact about agricultural protection that developing countries tax the agricultural sector, while their developed counterparts subsidize it (Swinnen and van der Zee, 1993)

4. DETERMINANTS OF PRODUCER SUPPORT

The annual PSE estimates show that the level of support for maize producers in Malawi has varied over time, reflecting changes in levels of taxation and input subsidies for the maize sector. In this section we explain these variations using a political economy framework. We first review the variables used in the model reviewed and then proceed with a discussion of the results.

4.1 Data properties

The independent variables in the model are a checks and balances index, a dummy variable for the years when the Structural Adjustment Programs were in operation in Malawi, the income ratio between the agricultural sector and other sectors of the economy, a dummy variable for electoral years, and the national maize sufficiency ratio. We also include a dummy variable for the period of democratic governance in Malawi that started in 1994 and dummy variables for when the United Democratic Front (UDF) and the Democratic Progressive Party (DPP) held the presidency, respectively.

Checks and balances: The checks and balances independent variable (CHECKS) measures the degree to which policy implementers can be held accountable for their actions. We used the checks and balances index from the World Bank Political Institution Database (Keefer, 2010).

In a presidential system, the index rises by one:

- For each chamber of the legislature, unless the president's party has a majority in the lower house and a closed list system is in effect (implying stronger presidential control of his/her party, and therefore of the legislature).
- For each party coded as allied with the president's party and which has an ideological (left-right-center) orientation closer to that of the main opposition party than to that of the president's party.

In parliamentary systems, the index is incremented by one

- For every party in the government coalition, as long as the parties are needed to maintain a majority.
- For every party in the government coalition that has a position on economic issues (right-left-center) closer to the largest opposition party than to the party of the executive.

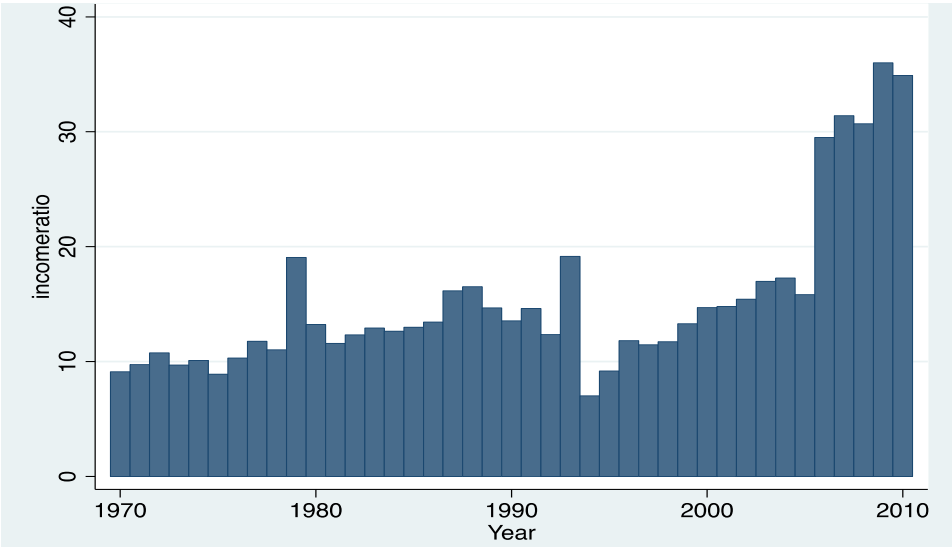
In parliamentary systems, the prime minister's party is *not* counted as a check if there is a closed rule in place – the prime minister is presumed in this case to control the party fully.

The index for Malawi had a value of 1 from 1975 to 1994, 4 from 1995 to 2008, and 3 from 2009 to 2010. The values are reflective of the level of control that the president or ruling party has over the Parliament and other control systems. During the MCP one party regime, the presidency was for life and membership to Parliament was by appointment, hence the lowest value of the index. The decline in the index from 4 to 3 in 2009 was due to the overwhelming majority of the ruling party (DPP) in parliament when Mutharika was president.

Structural Adjustment Programs: The SAP variable in our analysis concerns the implementation of Structural Adjustment Programs that started in 1981 in Malawi. Following the poor performance of Malawi's economy in the late 1970s, government obtained loans from the IMF and the World Bank to maintain economic stability. However, these loans had strict pre-conditions that had to be followed before they could be disbursed. These conditions included structural reforms to the economy and the liberalization of markets. The SAPs were implemented between 1981 and 1995.

Income ratio: The income ratio (INCOMER) is the ratio of per capita income in the agricultural sector to that in the rest of the economy. The results presented in Figure 4 point to a large difference in incomes between agriculture and the other sectors. After drought in 1994, per capita incomes in the agricultural sector declined to an equivalent of 7 percent of those in the other sectors. Until recent years, the highest ratio of 19 percent was recorded in 1979 and 1993. In general, the low incomes in agriculture can be attributed to limited value addition within the sector. Unprocessed products fetch low prices and keep Agriculture GDP low. In contrast, the other sectors of the economy produce high value products. In addition, the low adoption of modern technologies results in low productivity of labor employed in agriculture compared to other sectors.

Figure 4—Ratio of per capita income in the agricultural sector to the rest of the economy, 1970 to 2010, in percent

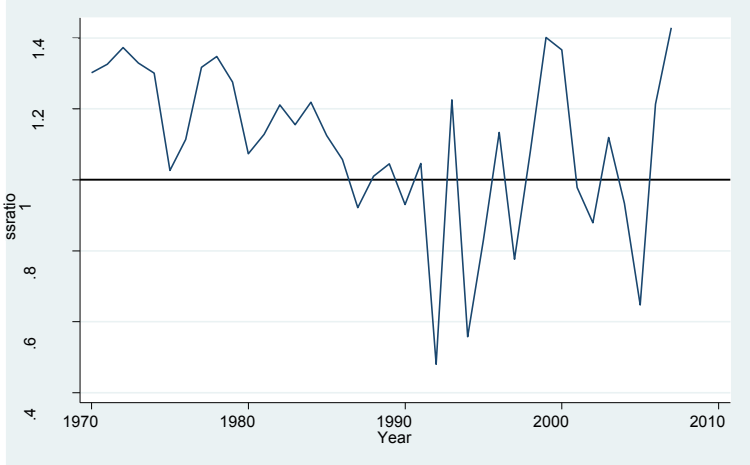


Source: Own calculation using data from National Statistical Office and the World Bank

Electoral years: Malawi made a transition to multiparty democracy in 1993 which paved the way to periodic elections of president and legislators. The terms for both the president and Members of Parliament last for 5 years. Upon expiry fresh electoral mandates are required. Four general elections have taken place in Malawi so far – 1994, 1999, 2004, and 2009. The electoral years are captured in our analysis through the ELEC dummy variable.

Self-sufficiency ratio: The self-sufficiency ratio (SSR) was calculated as the ratio of domestic maize production to consumption. A ratio of greater than one means that the country was self-sufficient in maize. The average ratio for the period between 1970 and 2010 was 1.09 meaning that in an average year domestic production in Malawi meets maize consumption needs. However, drought year production usually falls critically below demand. For instance, the lowest SSR was in 1992 when a drought reduced maize production by half, such that production could only cover 48 percent of domestic production.

Figure 5—Maize self-sufficiency ratio in Malawi, 1970-2010



Source: Calculated using data from National Statistical Office and the World Bank

Democracy: Following a national referendum in 1993, Malawi made a switch to multi-party democracy that paved way to a new constitution and presidential and parliamentary election the following year. A dummy variable DEM was used to capture the effect of the transition, it takes the value of 1 for the democracy period and 0 otherwise.

Political party in government: Our analysis considers the period during which Malawi was ruled by three presidents; Kamuzu Banda (1964-1994) from the Malawi Congress Party (MCP), Bakili Muluzi (1994-2004) from the United Democratic Front (UDF) and Bingu wa Mutharika (2004-2012) initially of UDF, but who formed his own party the Democratic Progressive Party (DPP) early in his first term. In our analysis, we include two dummy variables reflecting when the UDF party was in power (UDF) and when the DDP party was in power (DPP).

4.2 Model estimation and results

Modeling time variant data poses three key challenges; non-stationarity, endogeneity, and serial correlation. The Augmented Dickey-Fuller (ADF) test for unit root (Dickey and Fuller, 1979) was employed to test for the presence of unit root. The results of the ADF test (Table 6.2) for components of the dependent variable and selected independent variables indicate that the null hypothesis of the existence of unit root or non-stationarity could not be rejected at a 5 percent level of significance for the model variables. Differencing the series once led to the rejection of the null hypothesis of unit root at a 1 percent level of significance. This implies that both the producer support estimates and the political economy factors considered are integrated of order 1, I(1).

Table 2—ADF test results

Variable	Test statistic	5 percent critical value	P-value
ln(producer support estimate)	-1.661	-2.972	0.4515
ln(market price support)	-1.777	-2.964	0.3918
ln(direct transfers)	-2.075	-2.986	0.2546
Self-sufficiency ratio	-2.095	-2.964	0.2467
Income ratio	-1.905	-2.978	0.3299
Checks and balances	-1.129	-2.964	0.7035
d_ln(producer support estimate)	-10.663	-2.964	0.0000***
d_ln(market price support)	-4.226	-2.966	0.0006***
d_ln(direct transfers)	-3.713	-2.994	0.0039***
d_Self-sufficiency ratio	-5.454	-2.966	0.0000***
d_Income ratio	-4.472	-2.980	0.0002***
d_Checks and balances	-3.213	-2.966	0.0193**

Significance level: ***1%, **5%, *10%

Using the stationary variables, an Ordinary Least Squares (OLS) model was fitted. Due to the small sample size, including all variable in a single equation would greatly reduce the degrees of freedom. As a result, two equations were

estimated. The results obtained from the regression were then used to test for endogeneity, heteroskedasticity and autocorrelation. Heteroskedasticity was estimated using the Breusch-Pagan/Cook Weisberg test. In both models, the null hypothesis of constant variance was rejected at a 1 percent level of significance. Autocorrelation was tested using the Durbin-Watson d-statistic. The estimated d-statistic was 1.20 and 1.05 for models 1 and 2, respectively. The residuals from the fitted model were then predicted. Autocorrelation function of the residuals was plotted to determine the autocorrelation lag length. In model 1, autocorrelation was present up to lag 1, while in model 2, it was present up to lag 4. The presence of both heteroskedasticity and autocorrelation means that assumptions for the appropriate use of OLS regression are violated and the estimates are no longer the Best Linear Unbiased and Efficient (BLUE). Conclusions drawn from such estimates would be spurious. In consequence, the Newey-West regression was used to fit the models. This model uses the Newey-West (1987) variance estimator that produces consistent estimates when there is autocorrelation in addition to possible heteroskedasticity. The regression results are presented in Table 3.

Table 3—Estimation models of political economy determinants of maize producer support estimates (PSE) and its components (market price support (PSE) and direct budgetary transfers (DBT) to farmers), Malawi, 1970 to 2010

Variables	PSE-1	PSE-2	MPS-1	MPS-2	DBT-1	DBT-2
Checks and balances (CHECKS)		24.61***		3.11***		2.19
		(8.07)		(1.12)		(1.75)
Structural adjustment program (SAP)	65.56***	79.39***	-2.96	-1.70	3.33**	2.59
	(18.00)	(28.71)	(1.89)	(2.27)	(1.50)	(3.62)
Income ratio (INCOMER)	0.004***	0.006***	0.55	0.16	-0.24	-1.11
	(0.00)	(0.00)	(0.38)	(0.43)	(0.31)	(0.56)
Election years (ELEC)	-17.17		-1.66	1.03	12.40*	19.84
	(17.84)		(2.66)	(3.08)	(6.75)	(11.35)
Self-sufficiency ratio (SSR)		-0.61**		0.33		-0.23*
		(0.27)		(0.45)		(0.13)
Democratic governance period (DEM)	10.74*		14.28***		47.46	
	(5.81)		(2.89)		(3.14)	
UDF in power (UDF)	47.69**		4.91**		-36.42***	
	(18.64)		(1.35)		(3.34)	
DPP in power (DPP)		-38.77***		4.72		18.20
		(10.82)		(4.82)		(10.00)
Constant	-	-	-95.21***	-90.46***	3.38	40.17**
	392.01***	342.18***	(4.00)	(3.77)	(3.42)	(17.78)
	(25.26)	(52.36)				
Prob> F	0.000	0.00				

Statistical significance level: *** 1%, ** 5% and * 10%, () standard errors

4.3 Discussion

4.3.1 EFFECTS OF STRUCTURAL ADJUSTMENT PROGRAMS

The SAPs promoted two kinds of reforms in the maize sector: market liberalization and removal of input subsidies. Market liberalization and price decontrols were supposed to bid up maize prices and reduce the difference between the domestic and the border price, implying positive gains for producers. On the other hand, the removal of subsidies would reduce direct transfers to producers. Contrary to expectation, the results in Table 3 point to an insignificant relationship between market price support and the SAPs, implying that the structural reforms did not significantly reduce maize price distortions in the country. The significant and positive coefficient in the first DBT model shows that direct farm support increased during the SAPs. These results suggest that the observed significant and positive effect of SAPs on PSE resulted from increasing transfers and not from market liberalization as might have been expected. This is probably a consequence of a lack of commitment from government to implement the reforms in both input and output markets during the adjustment period.

4.3.2 EFFECTS OF SOCIAL ACCOUNTABILITY AND DEMOCRACY

The coefficients on the checks and balances variable and the dummy variable for democracy show that these factors positively influence the level of support to producers. This means that increasing social accountability reduces implicit taxation of producers. In the three decades of autocratic rule (1964-1994), the government had zero tolerance of criticism

and politicians were not held accountable, even if they implemented sub-optimal policies. However, the advent of multi-party democracy in the mid-1990s led to greater scrutiny of government and its institution. This result suggests that increasing accountability within the public system has the potential to improve agricultural policy performance.

4.3.3 EFFECTS OF SELF-SUFFICIENCY MOTIVE

Food sufficiency is also a significant determinant of producer support. The negative coefficient on the sufficiency ratio variable in model 2 for the PSE model, indicates that government will increase support the producers whenever domestic production declines. As such, it is natural for any government to intervene in the maize market and stimulate domestic production. The negative and significant coefficient for the variable in the second DBT model indicates that government increases outlays to stimulate production. This is usually in form of input programs such as those we have seen in Malawi since 1998. However, the insignificant coefficient in the MPS model indicates that government does not use pricing, marketing and trade policies to boost maize production.

Apart from the negatives associated with rising food prices in the political arena, such as loss of political support and legitimacy to govern the country, economically surging maize prices in Malawi are inflationary and would lead to a rise in economic and social instability. As such, government is usually unwilling to introduce policies that will bid up food prices. In most cases, it moves in with food imports and exports bans to quell price increases when domestic supply declines.

4.3.4 EFFECT OF AGRICULTURAL INCOMES RELATIVE TO INCOMES IN OTHER SECTORS

As expected, the PSE was more positive as incomes in the agricultural sector fell relative to the incomes in the rest of the economy. This result implies that politician will respond with redistributive policies whenever income in the agricultural sector declines. A fall in income of farmers increases the marginal utility of income for farmers and their effective demand for support. Ceteris paribus, governments can increase their political support by exploiting this difference to build political support from farmers through increasing agricultural protection when agricultural income is falling in relative terms (Swinnen et al., 2000). The high politicizing of agricultural input programs such as the Starter Pack Program and the FISP is probably is a result of this phenomena, as in order to amass political support governments want to appear responsive to farmers' needs.

4.3.5 EFFECT OF ELECTORAL PERIODS

Prior to 1994, Malawi had a life president and members of parliament were appointed by the presidency. This meant the populace had no voting rights. After constitutional reforms, the periodic general elections were introduced in 1994 and farmers, who constitute over 80 percent of the population, became an obvious target of support for anyone vying for office. Promises of favorable food policies or maize policies per se, are a common feature in party manifestos, and any successful input program is highly politicized and personalized – an indication that the farming community gains some power through their ability to influence outcome of elections.

Elections are an important input process of final policy outcomes (Cox, 1990; Myerson, 1993). The results show that in the lead up to general elections direct transfers to maize producers increase probably to woo support from farmers who represent the majority of the electorate. For instance, government has exploited the Farm Input Subsidy Program (FISP) through populist pricing to shore up its popularity and legitimacy (Chinsinga, 2011). In the lead up to the 2009 presidential and parliamentary elections the redeemed price of fertilizer under the FISP was slashed from K800 to K500 per 50kg bag. However, the results show that the changes in PSE levels that resulted from this action were statistically insignificant.

4.3.6 EFFECTS OF REGIME CHANGE AND POLICIES

Finally, we analyzed whether a change from one government to the next had an effect on producer support. We observe from our models that implicit taxation reduced in the UDF regime, while in the DPP regime it worsened. Immediately after assuming office in 1994, the UDF government introducing wide-ranging reforms in both input and output markets. Fertilizer subsidies were eliminated in 1995, but the implementation of relief programs such as the Drought Recovery (1994/95), Supplementary Input (1995/1996), Starter Pack, and Targeted Input Programs maintained a significant amount of budgetary transfers to maize producers.

In output markets, under the UDF government the pan-territorial and pan-seasonal pricing of maize was replaced by a price band system that required ADMARC to defend the floor price. The financial troubles that the parastatal was facing made it difficult to defend the band. Coupled with low production and low marketed surpluses, prices rose sharply. By 1998, the price of maize had quadrupled. This reduced the wedge between domestic and border prices. In contrast, the DPP government that followed was characterized by price controls and market and export controls. In 2008, government revoked licenses of all private traders and ADMARC assumed monopsony status. These sorts of controls increased the

price wedge and the revenue losses far outweighed the gains from the heavy investment through FISP. Overall, producer taxation increased.

5. CONCLUSIONS

The main aims of this study were to establish the true nature of incentives and disincentives that are faced by maize producers in Malawi by estimating the PSE and to assess the determinants of the PSE. The analytical methods used included the PSE estimation procedure developed by OECD (2000) and econometric modeling using the Newey-West method. This section presents the summary of key findings.

Government support to maize farmers rose over the 40-year period (1970-2010). Despite the increasing trend in support, all PSEs over the study period were negative, implying that maize producers in Malawi are implicitly taxed through policies that transfer income from producers to consumers. Governments are concerned with keeping food prices low for consumers and implement policies that maintain the price at levels lower than the border price. Unfortunately, potentially compensating budgetary transfers are small in magnitude and do not offset entirely the effect of lower than parity prices. This result suggests that government policies offer incentives only to subsistence producers, whereas those producing for the market face huge disincentives that result from unfavorable trade and marketing policies.

A number of competing hypotheses were drawn from the political economy literature to help explain the estimated PSE. These included social accountability, international donor pressure, political support motives, the electoral campaign hypothesis, and a food sufficiency motive. Using a Newey-West regression analysis, these hypotheses were tested. It was observed that PSE increased with increasing levels of social accountability, international donor pressure, and declining production. It was further observed that the government increased support to producers when their incomes fell relative to those in other sectors. However, we found no evidence supporting the hypothesis that PSE increase during campaign periods

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