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A Tale of Extremes: The Political Economy of Agricultural Policies in Argentina and Malawi

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A Tale of Extremes:
The Political Economy of Agricultural Policies in Argentina and Malawi

Lucio Castro[1] and Ephraim Chirwa[2] [3]

Abstract

We attempt to answer why two countries so alike as Argentina and Malawi have implemented similarly discriminatory policies against their large agricultural sector, and then examine the effects of those policies upon the long run economic performance of both countries. By analyzing their agricultural policymaking process and using descriptive statistics and time series econometric techniques, we find that policy responses to exogenous economic shocks are to a large extent endogenous to the policymaking process -specifically, discriminatory policies are more likely the more fragmented the agricultural sector and the more informal the productive organization- and that discriminatory policies negatively affected long term growth.

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1. INTRODUCTION

Argentina is a middle-high income country located in South America, endowed with a relatively small population living on an immense geography. It is also one of most competitive agricultural producers in the world. In turn, Malawi is a small but densely populated, landlocked and low income economy situated in Southern Africa. It is also one of the poorest countries in the world and a large net food importer, frequently affected by serious food security crisis.

Despite these vast differences, Argentina and Malawi share some commonalities. Agriculture is a crucial activity for both economies. Historically, they have both imposed highly distortive policies against their agricultural sector. More intriguingly, their economic performance in the long run has been similarly disappointing.

What are the economy-wide consequences of these countries´ specialization in agricultural production? Why two countries so alike have implemented similarly discriminatory policies against its agricultural sector? Why their economic performance over the long term has been so disappointing? Is this related to policy discrimination against agriculture? Is it possible to identify some common factors in both countries that explain the persistence of distortive policies in the agricultural sector?

We attempt to provide some answers to these questions by analyzing the political economy of agricultural policies in Argentina and Malawi from a comparative and historical perspective. We also examine the effects of these policies upon the long run economic performance of both countries. To do so, we mix the use of an analytical narrative, aimed to understand the rationale and dynamics of the agricultural policymaking process (PMP), with the utilization of descriptive statistics and time series econometric techniques to analyze the long run economic impacts of agricultural price shocks.

We find that policy responses in Argentina and Malawi to economic shocks that are exogenous to the agricultural sector (e.g. exchange rate devaluations, variations in the terms of trade or the ideology of the Government) are, to a large extent, endogenous to the

agricultural policy making process (PMP) that, in turn, emerges from sector-specific political economy equilibria.

Our main hypotheses is that, albeit the two countries are extremely different in many respects, certain common features of their PMP and, at least partially, of the economic structure of both countries, make them respond in similar ways to exogenous price and policy shocks in the agricultural policy arena. Specifically, our investigation suggests that discriminatory agricultural policies are more likely to be implemented in the presence of an agriculture sector characterized by productive and geographical fragmentation and a largely informal productive organization.

We contribute to the literature by applying the PMP political economy framework to the analysis of a specific arena: agricultural policy, and to an African and a Latin-American economy from a comparative and historical perspective. Another contribution is to examine the long run economic effects of agricultural price and policy shocks on economic growth in the two countries.

The remainder of the paper is organized as follows. Section 2 compares the structure and evolution of the economy in Argentina and Malawi from a comparative and historical perspective. Section 3 analyses the links between the features and evolution of the agricultural sector and the long run economic performance of both countries. Sector 4 studies the political economy of the agricultural policies in Argentina and Malawi. Section 5 provides an empirical assessment of the sectoral and broader economic effects of agricultural price and policy shocks in both countries. Section 6, concludes.

2. A TALE OF EXTREMES

In this section, we provide a description of the similarities and differences between the economies of Argentina and Malawi. Second, we analyze the structure, evolution and economic importance of the rural sector in both countries. Third, we provide an account of the participation of agricultural production and exports in global markets with particular attention to its relative productivity performance.

2.1. THE ECONOMY

Argentina and Malawi are extremely dissimilar economies. The Argentine economy is 46 times larger than the Malawian economy. While the PPP-adjusted gross domestic product (GDP) of Argentina is around US$ 566.9 billion, Malawi´s is only US$ 12.3 billion. Argentina is also 16 times wealthier than Malawi, with a GDP per capita (PPP-adjusted) of US$ 14.126 versus only US$ 881, respectively. Additionally, the population of Argentina is almost three times larger than the one of Malawi (40 million vs. 14 million inhabitants). However, Malawi is a more densely populated country, with 128 inhabitants per kilometer against only 15 inhabitants in the case of Argentina. (See Table 1)

Table 1: Argentina and Malawi. The Economy

	Argentina	Malawi
GDP in PPP (U$S millions)	566,922	12,271
GDP per capita (thousands of U$S PPP adjusted)	14,126	881
Population (millions)	40	14
Density (inhabitants per squared km)	15	128
Skilled/Unskilled (Percent)	0.81	0.33
Capital/Labor (thousands of U$S)	55.5	1.6
Human Development Index (2007)	0.87	0.49

Source: own calculations based on FAOSTAT, IMF & UNDP (2010)

Table 1 also shows that, in terms of their factor endowments, Argentina has a more skilled labor force, with a ratio of skilled to unskilled workers that it is 2.5 times larger than in the case of Malawi. Argentina, in turn, is a more capital abundant economy, as pointed by a capital to labor ratio almost 35 times larger than Malawi´s. As a result of these large differences, Argentina scores 0.87 in the Human Development Index (HDI) confectioned by UNDP and Malawi, 0.49.

Table 2 presents other relevant comparative macroeconomic indicators for the 1980-2008 period. Historically, Argentina has had a gross saving rate that was on average twice the rate of Malawi as percent of GDP. However, investment is similarly low in both countries, with a gross capital formation rate of around 20 percent of GDP on average over this period. The economy of Malawi, in turn, has experienced large macroeconomic imbalances, as suggested by an average negative current account balance hovering minus 10 percent of GDP. Finally, inflation has been higher in Argentina than in Malawi, with an annual average annual inflation rate close to 178 percent against a 20 percent rate in the latter between 1980 and 2008.

Table 2: Argentina and Malawi: comparative macroeconomic indicators (annual average rates 1980-2008)

	Argentina	Malawi
Gross capital formation (% of GDP)	21,00	19,52
Gross savings (% of GDP)	19,31	11,16
Current account balance (% of GDP)	-0,80	-9,28
Annual inflation rate (in percent)	178,0	20,4

Source: own calculations based on IFS/IMF (2010)

In spite of these differences, the economic performance of Argentina and Malawi has been, however, similarly disappointing in the long run. Table 3 shows that Argentina´s GDP per capita has grown annually only 0.17 percentage points above Malawi´s (1.39 vs. 1.22 percent per year, respectively) between 1960 and 2000. Over the same period of time, Argentina´s income per inhabitant grew below the Latin American and the world´s averages. On the contrary, Malawi was able to surpass the average African growth performance.

Table 3: Real GDP per capita average decadal growth rates (in 1990 International Geary-Khamis dollars and percent)

Country / Region	1960s	1970s	1980s	1990s	2000s	1960-2000
Argentina	2,70	1,64	-2,20	3,08	1,74	1,39
Malawi	1,69	3,69	-1,69	1,81	0,60	1,22
LAC	2,27	3,24	-0,24	1,19	1,62	1,62
Africa	2,10	1,67	-0,31	-0,08	2,16	1,11
World	3,02	2,20	1,32	1,30	3,11	2,19

Source: own calculations based on Maddison (2009)

Notwhistanding these similarities in the long run, Argentina and Malawi have followed different growth paths over the last twenty years. In the 1990s, Argentina experienced a growth acceleration episode, with GDP per capita growing at a rate that was three times higher than the world average. On the contrary, Malawi was barely able to grow above the world rate. Again, in the first years of the 21st Century, whilst Argentina achieved a better performance than the Latin American region but 60 per cent lower than the world rate, Malawi´s growth was below the regional and global benchmarks.

2.2. THE AGRICULTURAL SECTOR

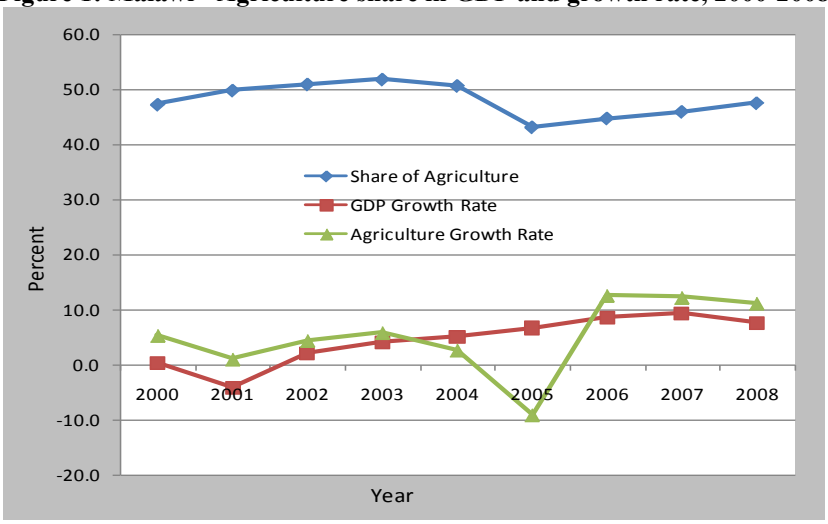
Agriculture plays a crucial role for the economies of Argentina and Malawi. In Argentina, agriculture and agro-based industry account for 18.5% of GDP and 36.5% of

total employment. Around 56% of total exports are also made up of agricultural products. Additionally, more than 40% of total tax revenues of the Central Government are generated by the agricultural sector (Castro and Diaz Frers, 2009; Nogues et al. 2008).

In Malawi, the agricultural sector contributes with more than 35% of GDP. Agriculture is also a major source of livelihoods for more than 85 percent of the population, which is mostly rural. National surveys estimate that crop production accounts for 74 percent of all rural incomes and agriculture is the most important occupation for 71 percent of rural population (Chirwa, 2009).

The significant role of the agricultural sector in Malawi is evident from its contribution to the gross domestic product (GDP). Agriculture accounts for more than 40 percent of GDP and contributed more than 50 percent between 2002 and 2004. Contrastingly, the manufacturing sector only contributes about 9 percent to Malawi´s GDP. The performance of the Malawian economy is also closely linked to the performance of the agricultural sector, except between 2004 and 2005 when the agricultural sector experienced a decline while GDP continued to grow at impressive rates. (See Figure 1)

Figure 1: Malawi - Agriculture share in GDP and growth rate, 2000-2008

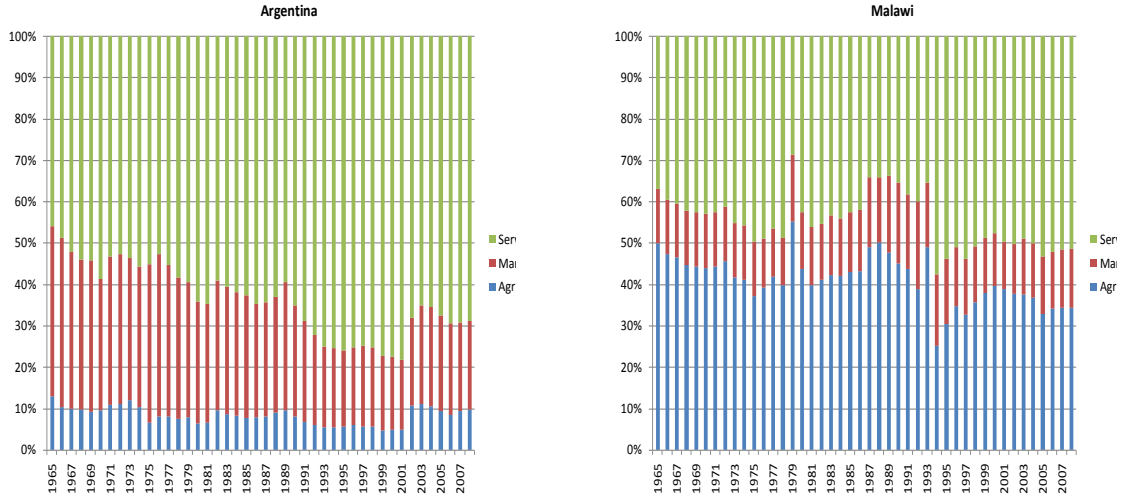


Sources: own calculations based on WDI (2010)

The relative importance of the agricultural sector in the GDP also varies across the two countries, as can be observed in Figure 2. While the percentage share of agriculture hovered 10 percent of the Argentine GDP in 1964-2008, in the case of Malawi accounted for around 35 percent of valued added. Moreover, in Argentina the share of farm

production in the GDP has been consistently declining since the 1960s, whereas it has recovered significantly in Malawi after hitting a historical bottom low at the beginning of the nineties.

Figure 2: Value added as percent of the GDP by broad economic sectors



Sources: own calculations based on WDI (2010)

In turn, while Argentina is one of the larger net exporters of foodstuffs worldwide, Malawi is a net food importer affected by recurrent food security crisis. Similarly, in Argentina agriculture is a capital and technology intensive sector, with productivity levels close to the international frontier. In contrast, agriculture in Malawi is largely a subsistence activity with the majority of the farms operating far below the global production standards. Table 4 summarizes these differences between the two countries´ agricultural sectors.

Table 4: Agricultural sector comparative indicators

Indicator	Argentina	Malawi
Size / Importance	• 7/10% of GDP • 35.2% of labor force (agribussiness) • Only 2% of the population is rural.	• 33/40% of GDP • 71% of labor force • +90% of foreign exchange earnings • 85% of the population is rural.
Structure	• Dominated by a few crops (i.e: soybeans, maize, wheat, beef, corn). • Irrigation based • Largeholders farmers	• Dominated by few crops (i.e: Tobacco, maize and groundnuts) • Rain-fed based. • Smallholders farmers
Production	• Commercial Agriculture • Capital and technology intensive	• Subsistence farming • Labor intensive
Productivity	• Close to the international frontier	• Low

Source: own elaboration based on the sources mentioned in Table 1.

The agricultural export basket of Argentina is dominated by a few commodities and first transformation products, and a relatively smaller proportion of food ready for human consumption. Soybeans are the main exporting crop, accounting for 22 percent of export earnings. Maize, wheat and bovine meat also account for a significant share of agricultural exports. (See Table 5)

Table 5: Argentina – Top ten agricultural exports (in thousands of U$S and percentage share of total agricultural exports) in 2009

Product	Value in thousands of U$S	Percentage share in total agricultural products
Soybeans cake	5.748.011	10,3%
Soybean oil	4.419.050	7,9%
Soybeans	3.435.061	6,2%
Maize	2.253.083	4,0%
Wheat	2.015.981	3,6%
Meat	1.201.542	2,2%
Sunflower oil	630.051	1,1%
Wine	496.837	0,9%
Milk Whole Dried	313.588	0,6%
Pears	271.158	0,5%
Other products	34.994.438	62,7%
Total	55.778.800	100,0%

Source: own calculations based on FAOSTAT (2010) and WEO (2010).

The Malawian agricultural sector is also dominated by a few crops mainly based on rain fed cultivation. The main agricultural commodities are maize, rice, cassava, groundnuts, pulses, sorghum, millet, cotton, tobacco, tea and coffee. The most important crop grown by the smallholder farmers is maize, the main staple crop in Malawi. (see Table 6)

Table 6: Malawi – Top ten agricultural exports (in thousands of U$S and percentage share of total agricultural exports) in 2009

Product	Value in thousands of U$S	Percentage share
Tobacco, unmanufactured	422.685	52,2%
Maize	100.224	12,4%
Sugar Raw Centrifugal	60.546	7,5%
Tea	55.415	6,8%
Sunflower seed	31.967	3,9%
Cotton lint	22.082	2,7%
Peas, dry	11.666	1,4%
Groundnuts Shelled	8.261	1,0%
Nuts, nes	7.089	0,9%
Rubber Nat Dry	5.670	0,7%
Other products	84.395	10,4%
Total	810.000	100,0%

Source: own calculations based on FAOSTAT (2010) and WEO (2010).

Tobacco is the main export crop accounting for about 60 percent of export earnings, 23 percent of the tax base and about 10 percent of gross domestic product in the 1990s. Tea and sugar are the second and third most important export crops, respectively. However, more recently, pulses, cotton, coffee and groundnuts are some of the emerging export crops. Tea and sugar are mainly grown under estate management with a small proportion of output produced by smallholder farmers. Since 1992, smallholder farmers began participating in the cultivation of tobacco. Most of the other crops such as maize, cotton, groundnuts have always been cultivated mostly by smallholder farmers.

Maize is cultivated by smallholder farmers mainly to meet their subsistence needs, with less than 20 percent produced as marketed surplus. According to the World Bank (2003), food crops account for about 70 percent of agricultural value added. Although maize is almost all grown by smallholder farmers in the rural areas, a large proportion of smallholder farmers do not produce adequate food to last them from one season to another and therefore rely on the market to provide food supplies.

Between 2002 and 2008, total exports increased 74% in Argentina reaching an historical record of US$ 70,588 million dollars. Furthermore, in the 2002-2005 period, agribusiness exports grew by 57%, going from U$S 13,410 million in 2002 to U$S 21,088 millions in 2005, and explaining 54% of the outstanding growth in the foreign trade sector. Agriculture also remains as the main generator of foreign currency.

As can be seen in Figure 3, Argentina has experienced an important process of diversification in its agricultural exports in the last 30 years, as measured by the Herfindahl concentration index. In contrast, Figure 4 shows that Malawi has displayed a process of concentration in its agricultural exports from the 1970s up to 1990, with a brief episode of diversification in the nineties, and a renewed product concentration from 2001 on.

Figure 3: Argentina – Herfindahl agricultural exports concentration index (1964-2007)

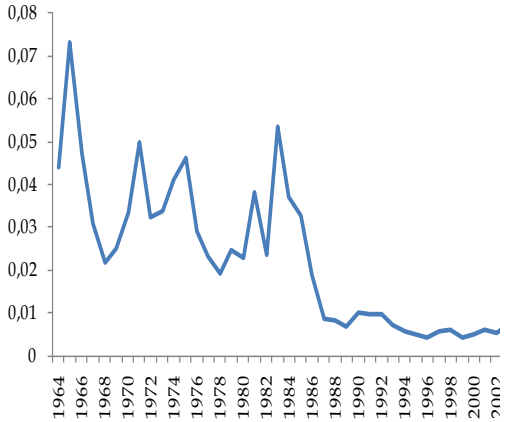
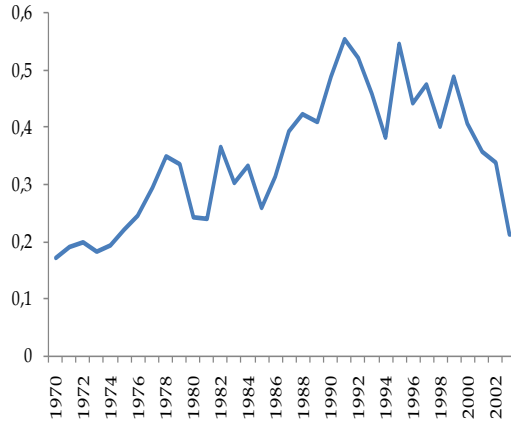


Figure 4: Malawi – Herfindahl agricultural exports concentration index (1970-2007)



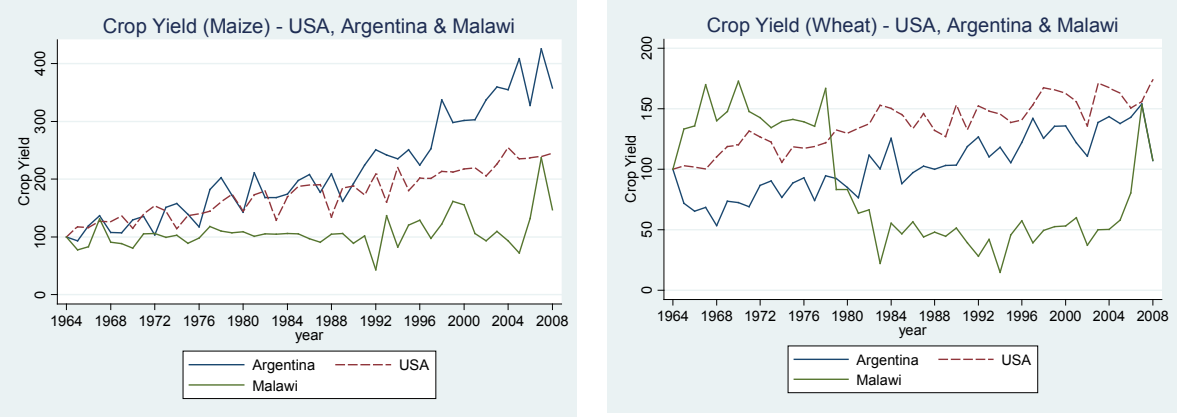
Source: own calculations based on FAOSTAT (2010) and Ferreres (2006).

Note: the Herfindahl index is defined as $H = \sum_{i=1}^{n} s_i^2$, where s is the share of product i in total agricultural exports and N is the number of products.

Figure 5 (a) and (b) shows that growth in crop yields for maize and wheat in Argentina was consistently below the United States up to the end of the 1980s, in coincidence with a peak in export taxes and other discriminatory policies against the agricultural sector (see Galiani and Porto, 2010). Only from the 1990s on, when export restrictions were completely removed, Argentine crop yields started to converge with, and even exceed, the American ones. In the case of soybean, yields are substantially larger than in the United States.

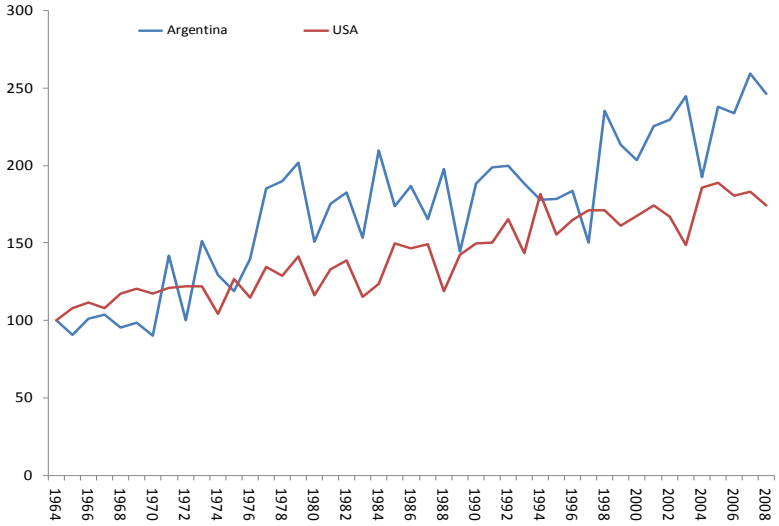
Figure 5: Maize and Wheat yields (Index number 1964=100) in Argentina, Malawi and the US

(a) Maize **(b) Wheat**



Source: own calculations based on FAOSTAT (2010)

Figure 6: Soybean yields (Index number 1964=100) in Argentina and the US (1964-2007)



Source: own calculations based on FAOSTAT (2010)

A more refined measure of productivity, Total Factor Productivity (TFP), illustrates even more neatly the differences between the agricultural sector of Argentina and Malawi. Looking, first, at crop production, Table 9 shows that Argentina enjoyed a TFP growth rate that was twice the regional average in both periods. Contrastingly, Malawi´s crop TPF was half the African rate in 1961-1980. Over 1981-2001, the TFP of the Malawian crop sector was negative, while the region grew annually at a healthy rate of 2.4%.

Table 7: Agriculture Total Factor Productivity (TFP) rate of growth (%)

	Crops		Livestock		Aggregate		
	1961-1980	1981-2001	1961-1980	1981-2001	1961-1980	1981-2001	1961-2001
Malawi	0.6	-1.2	-0.3	-1.5	0.5	-1.2	-0.4
Argentina	3.1	3.9	0.9	0.4	1.8	2.4	2.1
Africa	1.0	1.7	1.5	1.1	1.2	1.7	1.4
Latinamerica	1.5	2.4	1.4	2.2	1.4	2.3	1.9

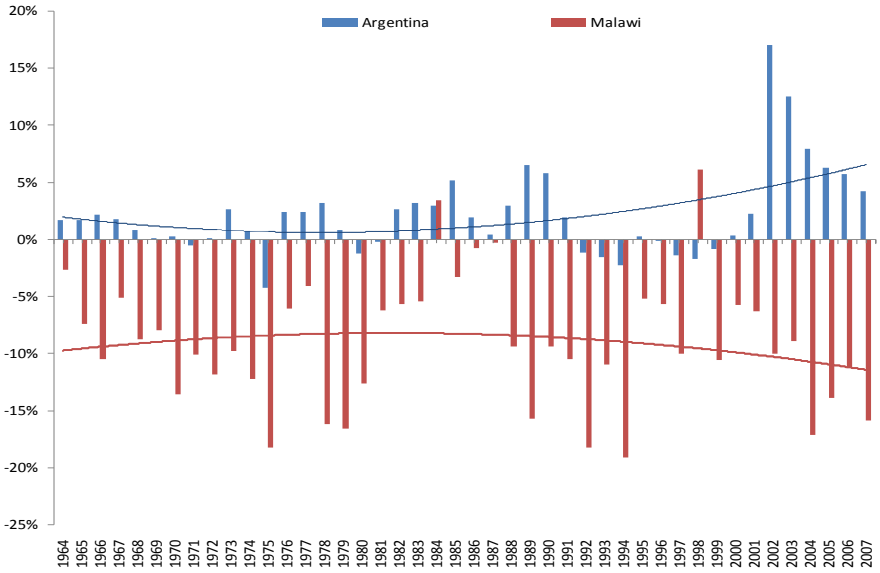
Source: Evenson (2008)

However, looking at livestock TFP rates suggest a somewhat different story as Argentina consistently underperformed with respect to the regional average. Malawi, in turn, displayed negative TFP growth, while the African region exhibited a positive performance.

On the aggregate, the performance of the agricultural sector shows sustained TFP growth in the case of Argentina, with higher productivity rates than the Latin American region. In Malawi, in contrast, agricultural TFP grew at half the African average during the sixties and the seventies. From the 1980s on, productivity growth in the Malawian rural sector has been dismal, with consistently negative TFP growth rates.

Whilst Argentina is usually described as a net food exporter and Malawi as a net food importer, Figure 7 presents a more nuanced picture. As can be observed, while net food exports accounted on average for 5 per cent of GDP for 1960-2008, there have been a few periods were Argentina was a net food importer.

Figure 7: Net food exports as percent of GDP



Source: own calculations based on FAOSTAT (2010) and WEO (2010).

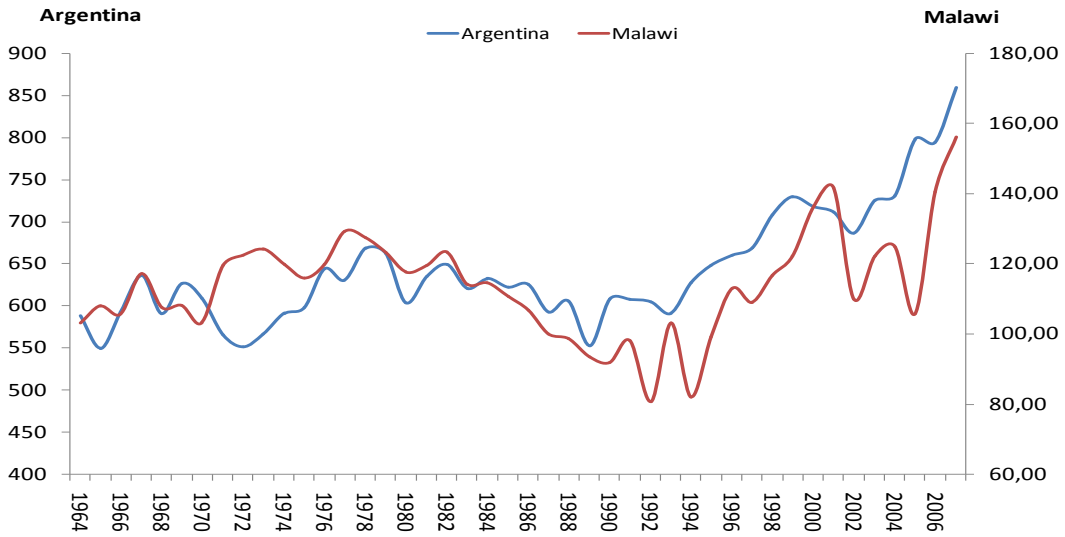
Usually, these episodes coincided with peaks in policy discrimination against the rural sector, sharp reversals in the terms of trade and / or severe real exchange rate appreciations. In fact, the relative importance of net food exports in the GDP reached its historical maximum in the aftermath of the 2002 crisis, when the way out of the most severe recession in the country´s history was mostly driven by a sharp depreciation of the Argentine currency.

On the contrary, Malawi has consistently been a large net food importer; in fact, only in two out of 44 years food exports have been higher than food imports in 1964-2008. Also, food imports are a massive part of the import bill, with an average of 10% of GDP over that period. Coinciding with a serious drought and other significant supply constrains, net food imports have been on average 15 percent of the Malawian GDP in the last four years.

2.3. EVOLUTION OF AGRICULTURAL PRODUCTION SHARE IN GLOBAL MARKETS AND PRODUCTIVITY

Taking a simple measure of productivity, agricultural gross production per capita, Figure 8 shows that the rural sector of Argentina was on average seven times more productive than Malawi´s between 1964 and 2007. While an Argentine worker produced almost U$S 900 thousands of PPP adjusted dollars in 2007, a Malawian worker only produced U$S 170 thousands.

Figure 8: Agricultural Gross Production per capita (in thousands of PPP adjusted dollars), 1964-2007

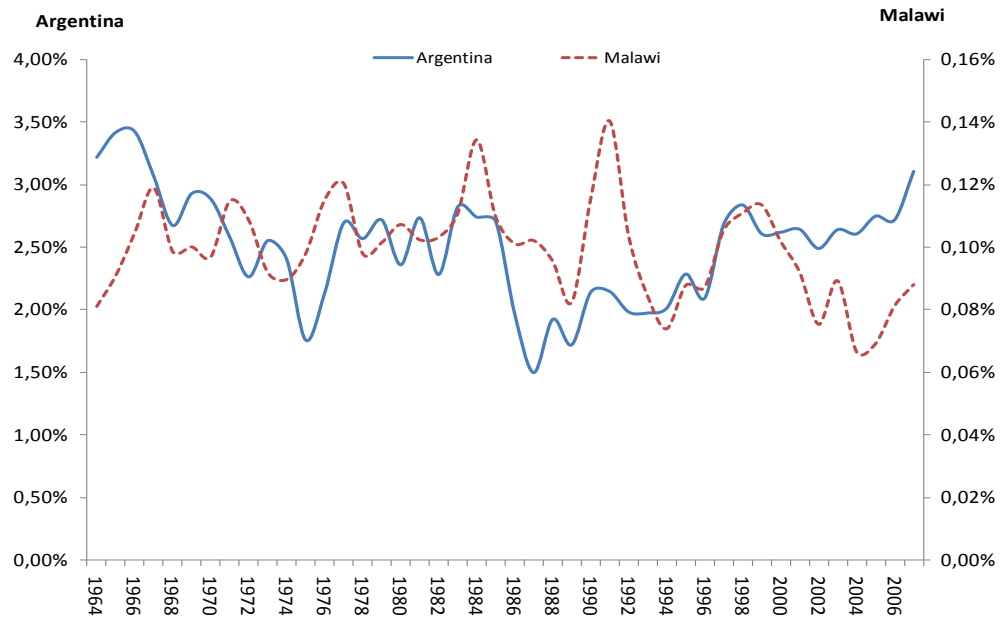


Source: own calculations based on FAOSTAT (2010) and WEO (2010).

Both countries enjoyed a similar improvement in agricultural labor productivity in the sixties and seventies. In the 1980s, agricultural productivity declined stiffly in Argentina and Malawi. Similarly, rural production per worker has experienced a pronounced recovery in the two economies since 1990, partly as a response to major structural reforms implemented during the nineties.

Figure 9 suggests that the decline and recovery of the relative importance of Argentina in the agricultural world markets has been nothing but dramatic. The percentage share of Argentine exports in world exports went from 3.22 percent in 1964 to only 1.5 percent in 1987, a massive 53 percent reduction over a 24 year period. Only in 2007, Argentina´s share in agricultural world exports surpassed its 1967 mark (3.11 vs. 3.05 percent, respectively). From the 1987 historical bottom low onwards, Argentina also tripled its share in world agriculture exports in just 20 years.

Figure 9: Percentage Share in World Agricultural Exports



Source: own calculations based on FAOSTAT (2010) and WEO (2010).

The impressive recovery of Argentina´s position in global agricultural markets is mostly explained by a massive process of technological and organizational modernization that occurred in the Argentine farming sector during the 1990s. Presently, Argentina is one of the leading countries in the adoption of GMOs (genetically modified organisms, mainly thorough seeds) and "zero tillage" planting methods for agricultural production. At the same time, Argentine agriculture, and particularly, the soybean production chain, has adopted a flexible system of production organized around service contractors that allows for significant improvements in the "x-efficiency" of agricultural establishments (Urbiztondo et al, 2009; Sturtzeneger and Salazni, 2007).

In contrast, Malawi remains as a marginal player in the global agricultural market. Over 1960-2007, the percentage share of Malawi in agricultural international exports was on average only 0.10 percent. Historically, Malawian products have never been able to account for more than 0.14 percent of total exports of the global agricultural sector. While Malawi underwent a radical process of structural reforms in the 1990s, the rural sector still remains beset by extremely low TFP levels, mainly as a result of the persistence of highly distortive agricultural policies and the severe underdevelopment or absence of some crucial complementary markets.

3. AGRICULTURAL POLICIES

In this section, we present a brief description of the main features and historical evolution of the agricultural policy regime in Argentina and Malawi.

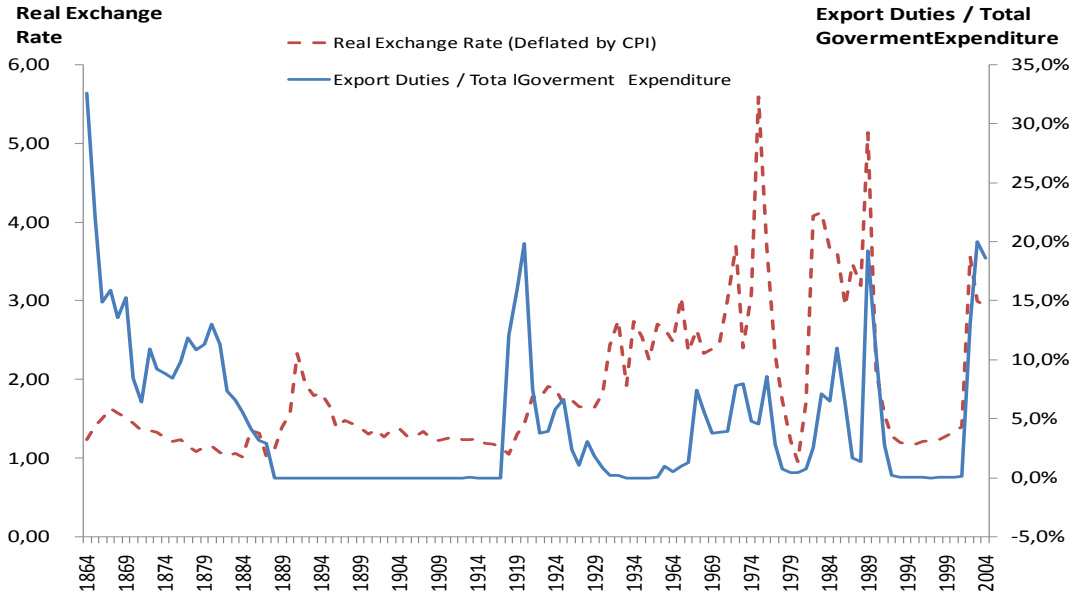
3.1. ARGENTINA

The most striking feature of the Argentine policy regime is the direct, heavy and persistent use of export taxes on farm production. In fact, according to Galiani and Porto (2010), the agricultural sector of Argentina faced positive export taxes for 33 out of 44 years between 1970 and 2007.

Export taxes rates registered its historical peak of nearly 15 percent on average in the mid-1970s. They were further increased with the advent of democracy in 1983. Only in the 1990s, they were completely eliminated. After the 2002 major economic and political crisis, export taxes were utilized again (Castro and Diaz Frers, 2008).

Historically, export taxes were imposed in Argentina after large exchange rate devaluations or sudden and pronounced hikes in international agricultural prices (see Figure 10, which shows the real exchange rate with the US dollar and export duties as percent of total Central Government expenditures for 1964-2006). They were justified by Governments as an import-substitution tool, anti-inflation and/or revenue generator instrument. Usually, export taxes were eventually removed as the real exchange rate appreciated or agricultural international prices declined.

Figure 10: Export taxes and real exchange rate (1864-2006)



Source: own calculations based on Ferreres (2006).

Presently, all agricultural sectors (as well as mining and oil and gas production) face positive export taxes. Also, Argentina is a heavy user of export quotas, prohibitions and price controls for some sensitive farm products such as wheat and beef (Castro and Díaz Frers, 2008). Consequently, the agricultural sector confront negative effective protection rates *vis-a-vis* the labor intensive manufacturing sectors as they also benefit, in turn, of relative high import tariffs (see Galiani and Porto, 2010 and Sturtzenegger and Salazni, 2007).

3.2. *MALAWI*

Three stages can be distinguished in the historical evolution of agricultural policies in Malawi. Since its independence in 1964, the country embarked upon a phase of state-led agriculture characterized by the presence of state-controlled marketing agencies with the monopoly of food products´ commercialization and a heavy intervention in farm input markets.

A second stage began at the end of the 1970s, when the rural sector entered into a serious crisis as a result of higher oil and fertilizer prices –due in turn to the international oil crises of 1979 and 1982-, a transportation bottleneck caused by the civil war in neighboring Mozambique, and agricultural production´s own rigidities.

The third phase can be largely seen as a response to the 1980s crisis and was characterized by the implementation of an ambitious set of far-reaching reforms between 1981 and 1995. These reforms included the deregulation of the agriculture marketing board (1987), the gradual removal of agricultural subsidies (1984-1992), the deregulation of smallholder production (1992), the devaluation and further flotation of the Malawian exchange rate (1994), and agricultural domestic prices´ liberalization (1995/1996).

Until recently, maize exports were banned in Malawi. Malawi has also at times temporarily banned the exports of rice, for food security reasons. Malawi also maintains an export licensing regime. Among the goods requiring an export license are agricultural products like maize and maize products, unmanufactured tobacco, tea, cotton, soya beans, and rice. According to the World Bank (2009), the export licensing procedures for soybeans effectively serve as an export ban to protect Malawi's livestock feed industry.

Policy responses to ensure food security in maize have included tariffs, input subsidies, minimum prices, strategic reserves, and export prohibitions. Formal maize exports are largely based on government-to-government contracts, carried out mainly by the private sector (Grain Traders Association of Malawi) and monitored by the National Food Reserve Agency. The Government has periodically resorted to ad hoc bans on exports by private traders, the last time in September 2008; the export ban was lifted in May 2009.

The Government controls the price of certain agricultural products. Maize producers benefit from price support through guaranteed farm-gate prices, while the selling price is also controlled by the Government. Raw tobacco and cotton prices are also subject to minimum prices.

Malawi has aligned its agricultural development programme with the New Partnership for Africa's Development (NEPAD)'s Comprehensive Africa Agriculture Development Programme (established in 2003) to reverse a general trend of under-investment in agriculture.[1] Malawi's 14% of the national budget was allocated to

[1] The New Partnership for Africa's Development (NEPAD) is an economic development program of the African Union. NEPAD was adopted at the 37th session of the Assembly of Heads of State and Government in July 2001 in Lusaka, Zambia. NEPAD aims to provide an overarching vision and policy framework for accelerating economic co-operation and integration among African countries.

agriculture in 2008/09. Under the Malawi Growth and Development Strategy (MGDS) for 2006/07-2010/11, agriculture has been targeted as an engine of economic growth.

Between 1995 and 1998, Malawi introduced export taxes on tobacco, sugar, tea, and coffee which were equivalent to 0.6 percent to 8 percent of the government revenue. Although these duties on exports were eventually eliminated, the export sector is subject to a foreign exchange retention scheme in which exporters surrender 40 percent of the export proceeds to the Central Bank, which is an implicit tax on exports.

4. THE POLITICAL ECONOMY OF AGRICULTURAL POLICIES

This section analyses the features and historical evolution of agricultural policies in Argentina and Malawi, as an endogenous outcome of a set of intertemporal interactions and exchanges between policymakers and economic agents within the set of formal an informal rules of the political game. Combining historical analysis with the existing literature, the aim is to provide an abridged account of the political economy of agricultural policies in both countries.

4.1. ARGENTINA

Historically, the policymaking process in Argentina has been characterized by the presence of a strong Presidency that tends to legislate and govern throughout the periodic use of special legal instruments (e.g. presidential emergency decrees or "*decretos de necesidad y urgencia*"); a relatively weak Congress with diminished veto capabilities against the Executive initiatives; and a Judiciary with a limited autonomy with respect to the President. Along with a history of recurrent institutional interruptions, this policymaking process has resulted in public policies that are highly volatile, too rigid to adapt to changing circumstances and with notorious enforcement difficulties (Stein et al., 2006).

In this general context, the presence of high and persistent export taxes can be seen as the result of a particular political equilibrium. Traditionally, the manufacturing sector was more concentrated and homogeneous and therefore could lobby the Federal Government more effectively for protection. In contrast, the agricultural sector was more heterogeneous and divided (e.g. beef vs. cereal producers, large vs. small landowners). The farm sector only was able to coordinate collective action against export restrictions in face of extremely

high export taxes; adverse terms of trade and / or severe exchange rate appreciations.[2] However, other factors are also important at explaining the persistent use of export taxes in Argentina. These factors include the fiscal needs of the central government and the ideological preferences of policymakers.

Another crucial element to explain the persistence of export taxes in Argentina lies in the country´s federal revenue sharing mechanism. This system is characterized by a massive imbalance between revenues and expenditures; while provincial governments account for the lion´s share of total national expenditures, local taxes only make up for a small part of provincial governments´ expenditures. In fact, on average provincial governments only finance around 35 percent of their expenditures with their own tax resources. The rest is provided by a common pool of resources, known as "*Coparticipación*", funded by federal taxes and distributed through an extremely complex and rigid transfer scheme. (Díaz Frers, 2008; CIPPEC, 2008).

Critically, this system entails that around 60 percent of national taxes collected yearly must be automatically transferred to provincial governments. This provides a powerful incentive to the Central administration to create non-federally transferable taxes. The discretional resources that these taxes generate allow the Federal Government to control the key for passing legislation in the National Congress: the traditionally fiscally dependent provincial governors (Díaz Frers, 2008).

Under this complex federal fiscal scheme, exports taxes have been historically the instrument of choice for Argentine governments due to three main reasons. First, they are easy to collect as they do not entail costly efforts to tackle tax evasion in the rural sector like alternative tributes (e.g. land taxes). Second, the political costs of using them is lower than recurring to more visibly confiscatory measures like multiple exchange rate systems or state-controlled marketing boards. Last but not least, export taxes are not transferable to the "*Coparticipación*" scheme according to national legislation (Castro, 2010.b; Castro and Díaz Frers, 2008).

[2] For farmers, real rents per hectare are function of international prices, the real exchange rate and export taxes or other similar policy instruments. (Sturtzenegger, 1990; Sturtzeneger and Salazni, 2007)

More broadly, export taxes can be seen as the result of the natural tension between landowners and urban workers in a country with comparative advantage in agriculture. In a very simple Herscher-Ohlin framework, freer trade (no export taxes and or lower import tariffs) is likely to worsen income distribution by raising the returns on agricultural production and reducing the real wages of the urban sector (Porto and Galiani, 2010). Consequently, urban workers and import competing capitalists tend to favor protection, while landowners support free trade. However, since the 1980s, the conflict between exports and "wage goods" (e.g. wheat, maize and beef) has faded with the development of the soybean cluster and the green revolution (Urbiztondo, et al., 2009).

In this view, the complete elimination of export taxes and related restrictions in the 1990s can be seen as an exogenous shock caused by the ideological preferences of policymakers (that favored a general reduction in protection and state intervention in the economy) combined with a substantive exchange rate appreciation.

In the aftermath of the 2002 crisis, export taxes were reinstated by the Federal Government, with the primary aim of containing the pass-through to domestic prices of the massive depreciation of the Argentine peso as well as of appropriating of part of the agricultural rent. In 2006-2007, the Kirchner government also enacted income price polices aimed at fighting the acceleration in inflationary pressures in certain sensitive food products (e.g. beef, wheat and dairy) that weight heavily on the poor´s consumption basket.

Only during the last rural revolt against the Federal Government´s attempt to raise significantly export taxes in 2008, farmers were able to coordinate protests such as road blockades and pickets, in a large extent helped by improvements in communications technology in the countryside (Streb et al, 2008). A historical novelty, the traditionally heterogeneous mosaic of farmers' associations was for the first time able to converge in a single loosely institutionalized entity (the "*Mesa de Enlace*"), opposing policy discrimination against the rural sector (Castro and Díaz Frers, 2008).

4.2. MALAWI

Since independence in 1964, Malawi has witnessed changes in economic policy and political processes, and the PMP has somehow varied leading to different outcomes. In

terms of the policy framework, Malawi has undergone through several phases of economic policies – state-led development with import substitution, a period of structural adjustment and export orientation and the post-liberalization phase.

Malawi uses a hybrid of presidential and parliamentary political system in which the President is directly elected, with members of Parliament also directly elected. Although these institutions have existed since Independence, under the one-party system the President had executive powers and there was little distinction between the ruling political party and government. Such powers constrained the policy space of various stakeholders in Malawi. The new multiparty Constitution of 1994 has limited the Executive powers and emphasized the independence of the Legislature and the Judiciary. This has facilitated the inclusion of various stakeholders into the PMP.

The one party regime in Malawi effectively existed from 1964 to 1992. The 1961 general elections yielded an overwhelming victory for the Malawi Congress Party (MCP) led by Dr. Hastings Banda over other minority parties. These minor parties died naturally as Banda's regime became increasingly popular based on principles to unite the country.

After a cabinet crisis in 1964, dissenting views were not tolerated. Parliament became a rubber stamp of the President's decisions. Kaunda (1992) argues that the party leader's supremacy was indisputable and that the centralized nature of administration in the post-Independence period had borrowed heavily from the colonial system.

Dr Banda became the life president in 1971 and this marked the dominance of the executive over the legislature. By 1981 the President was given powers to nominate unspecified number of members of parliament. These changes weakened the powers of the legislature and undermined public participation in the PMP.

Within the one party system of government there are two phases in terms of the PMP in agriculture and the economy in general. The first phase occurred between 1964 and 1979 which was characterized by an extensive system of patronage and neutralization of any interest group perceived to be a potential source of political dissent (Mkandawire, 2005). The second phase (1980 – 1993) was a period of structural adjustment programmes under the auspices of the World Bank and International Monetary Fund.

During the first phase, economic policies were guided by well articulated documents containing statements of development policies, which in many respects were followed religiously due to the political environment of no dissenting views. These documents were the Development Plan of 1965 – 1969 (GOM, 1965) and the Statement of Development Policies 1971 – 1980 (GOM, 1971). These documents were drawn by civil servants; hence technocrats played an important role in the formulation of economic policies. These policies were a prescription of the Executive arm of government and all development programmes were expected to align with these development policies.

The PMP became more centralized and a small ruling clique emerged dictating policies. The policy focus during this period was promotion of import-substitution industrialization and the increasing role of the agricultural sector. Silumbu (1992) notes that the agricultural policy revolved around the promotion of large scale farming which was designed to commercialize agriculture for export expansion while the small scale sub-sector was designed to perform a dual task of ensuring domestic food self-sufficiency and limited export of cash crops. For instance, the cultivation of burley tobacco, the main export agricultural crop, was restricted to commercial farming while smallholder farmers were only allowed to grow other types of tobacco. Similarly, other export crops such as tea, sugar and coffee were also dominated by commercial estate sector. Smallholder farmers' participation in export crop production was restricted to cotton and groundnuts, through a coordinated system of state marketing and state administered credit system. There was a system of control of agricultural produce prices and subsidization of agricultural inputs. The agricultural sector was under the direct control of the President as Minister of Agriculture. During this period there were no export taxes.

The second phase (1980 – 1993) of the one party regime was characterized by the change in the orientation of economic policies from import-substitution to export orientation. This change in policy followed the adoption of structural adjustment policies following an economic crisis in the late 1970s. This change in policy was later articulated in the second Statement of Development Policies 1987 – 1996 (GOM, 1987). The policy making process during this phase was largely driven by the World Bank and IMF.

The PMP resulted from the bargaining between the bureaucrats and the international financial institutions, whose agreement had to be approved by the President. Policies were made by the IMF and World Bank as conditionalities for structural adjustment loans negotiated with the Ministry of Finance, Ministry of Economic Planning and Development and the Reserve Bank on behalf of the Malawi Government. The trio rarely consulted other ministries in the processes of negotiating structural adjustment programs.

There was very little voice from stakeholders to influence the policy directions, although the teams from the World Bank and the IMF in their country assessments visits consulted with stakeholder groups such as the private sector, particularly in later years. There no real participation of stakeholder groups such as the legislature, farmer groups and the private sector in shaping the policies, and agricultural policies in particular. There was no resistance to the adoption of structural adjustment programs since the Washington Consensus approach to development had already been adopted by the president and the party. Moreover, the presidential system was very powerful and structural adjustment just required the approval by Dr. Banda.

The Banda regime cautiously adopted structural adjustment policies delaying aspects which had direct impact on the majority of the population. For instance, structural adjustment required the government to reduce its expenditure by among other things retrenchment of the civil service and the privatization of state-owned enterprises. Under the Banda regime privatization was not favored; instead government opted for an asset swap among three government corporations.

Furthermore, there was pressure to trim the size of the civil service which was allegedly big and inefficient but within twelve years of adjustment programs there was no serious intention to cut the size of the public sector. The issue of removal of fertilizer subsidies and its distribution which was central to the indigenization of agricultural sector since independence became contentious.

The Banda regime removed the subsidy on fertilizer in 1983, but reintroduced it in the next season after noting that it threatened the food security situation of rural households, in essence destroying what was belt since independence. It is reported that under the fertilizer subsidy removal programme initiated in 1983, the smallholder farmer was

expected to pay the full cost of fertilizer by 1988 (Malawi Government, 1987). However, the time horizon was extended and the subsidy on fertilizer was retained until the end of Banda's rule. The government was also reluctant to liberalize agricultural market and agricultural produce prices.

The worsening economic performance during the period of reforms led to opposition to the one party regime, and for the first time there was public dissent through a series of strikes by private sector and public sector workers calling for better pay and more freedoms. In 1994, a new constitution was enacted and since then the political system has remained a multiparty democracy.

Within the framework of multipartyism the separation of powers of the Executive, Legislature and the Judiciary and upholding the rule of law have been increasingly emphasized. Multiparty politics, with the freedom of expression enshrined in the new constitution, has facilitated the emergence of interest groups that lobby and advocate policy changes. Mkandawire (2005) notes that several interest groups emerged and those that existed in the one party regime began to have a voice in policy issues affecting their interests. These stakeholders include political parties and politicians, private sector associations, smallholder farmers and civil society organizations.

Economic policies during the multiparty period have also been guided by economic strategy documents that have been more consultative in nature that the policy documents prepared during the one party regime. Between 1994 and 2008, there have been more than five policy documents introduced by the government through the consultative process.

One feature of the strategy documents is that most of them have been abandoned before the expiry of their planning horizon leading to policy uncertainty and inconsistencies. The introduction of some of the new strategy documents have been the fruits of lobbying by interest groups.

Although structural adjustment reforms continued to be the driving force of economic policies through massive depreciation of currency, liberalization of agricultural markets and agricultural prices except for maize prices, some of the policies have been influenced by interest groups. For instance, with the lobbying of smallholder farmer and other stakeholders, government under structural adjustment liberalized the production of

tobacco by allowing smallholder farmers to grow burley tobacco which under the one party regime was restricted to the estate sector. The smallholder farmers through their farmer organization succeeded in getting exemption from withholding taxes on all smallholder tobacco sold at the auction market.

During the first phase of multi-party democracy, the government introduced export taxes between 1995 and 1998 which were equivalent to 0.6 percent to 8 percent of the government revenue. Although export taxes were eliminated, the export sector is subject to the foreign exchange retention scheme in which exporters surrender 40 percent of the export proceeds to the Central Bank, which is an implicit tax on exports.

However, Mkandawire (2005) notes that effective participation of various stakeholders in the decision making process is still limited – the influence of opposition parties on policy choices with very little or no debates on policy issues in the legislature apart from commentary on the policies through the budget session. During the period agricultural policies have experienced several reversals and in many cases the policies have been more reactive.

More recently, the agricultural sector has been put under the control of the President and most agricultural policies are made by the Executive with very little input from stakeholders. These include the implementation of the agricultural input subsidy and the green belt initiative of irrigation farming which have been policies made by the Presidency without input from other stakeholders.

The regime of price controls and restricted private trade activity in the agricultural sector are re-emerging in Malawi in spite a decade of economic reforms. However, while the Government is imposing the trade and export bans in maize, it has become very difficult to enforce such policies. Government intervention in the economy has increased in the past six years.

Moreover, although Malawi has managed production surpluses in maize, a staple food crop, state capacity to manage the surplus has been limited. For instance, despite surplus maize production, maize prices in 2008 were the highest in the past five years, and seasonal price volatility remains high.

5. AN EMPIRICAL ASSESSMENT OF THE ECONOMY-WIDE EFFECTS OF AGRICULTURAL PRICE AND POLICY SHOCKS

In this section, we use a vector autoregression model (VAR) to evaluate the effects of agricultural price shocks on the economies of Argentina and Malawi. We also utilize the VAR to examine the impacts of discriminatory and distortive agricultural policies on the main economic indicators of Argentina, the only country for which the required data is available. A description of the technical details related to the VAR estimation can be found in Annex 1.

5.1. RESULTS FOR ARGENTINA

Variance decomposition. We compute the variance decomposition to assess the contribution of the agriculture world price shock to the variance of the domestic variables (see Table 12 in Annex 2). The Table 12 shows the contribution of the price shock to the variance of consumption, investment, aggregate exports, agricultural output and exports, non-agricultural exports, private consumption, government expenditures and revenues and non-tradable output. Note that the agriculture price shock has a significant contribution to the variance of agricultural exports, investment, public expenditures and revenues. Comparing across variances, the world agricultural prices shock has the highest impact on the variance of agricultural exports and public expenditures.

To assess the importance of export taxes and other discriminatory policies against the rural sector, we also compute the variance decomposition associated with the agricultural domestic price shock in Table 13 in Annex 2. Notice the difference in the magnitude of the contribution of the domestic price shock to the domestic variables variation compared to the international price shock.

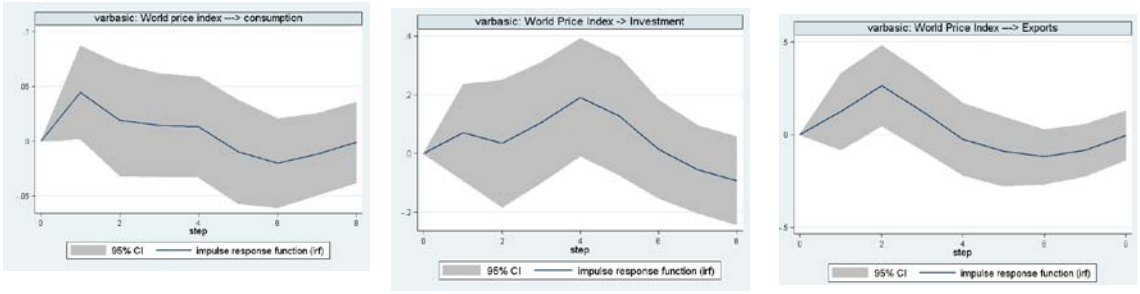
Impulse responses. Figure 11 depicts the impulse responses to a one standard deviation shock to the aggregate agricultural world price index for Argentina. The solid line denotes the impulse response and the shaded area defines the 95 percent confidence interval. The impulse responses suggest that one standard deviation increase in agricultural international prices is associated with increasing consumption and exports. Note that one percent standard deviation shock to the agriculture price index raises

consumption by 5 percent and investment by 10 percent. However, the effects on investment seem to be more persistent over time than for consumption. Interestingly, the results seem also to indicate that rising international agriculture prices are more correlated to public consumption than to private consumption. This could be suggesting that the use of export taxes has allowed the Federal government to partake the benefits of rising world agricultural prices, propelling public expenditures.

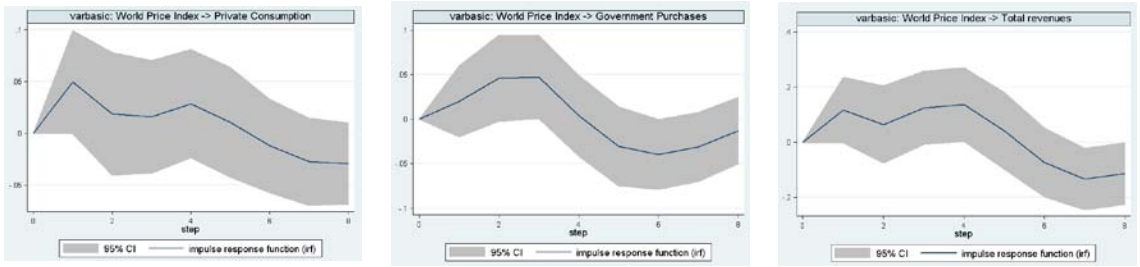
Additionally, the world prices shock produces hump-shaped responses from all the variables in the system. Agricultural production and exports seem also to be highly responsive to variations in international prices. Further, non tradable output appears to respond positively to agricultural price shocks.

Figure 11: Impulse responses to a 1 Standard Deviation in Agricultural World Prices: VAR, Argentina (1909-2007)

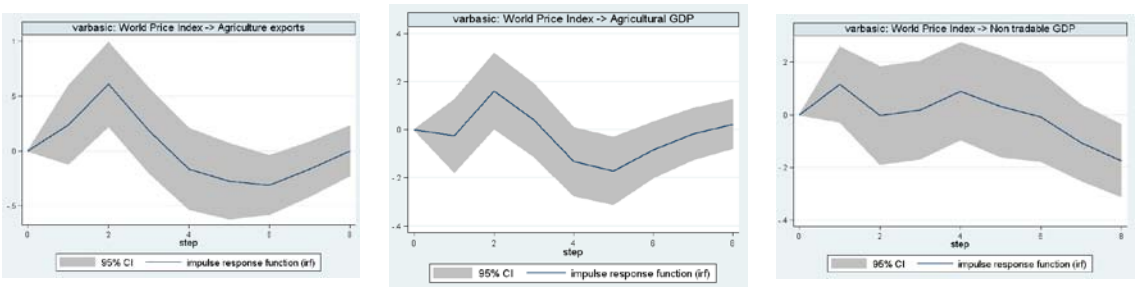
Consumption **Investment** **Exports**



Private consumption **Goverment purchases** **Total revenues**



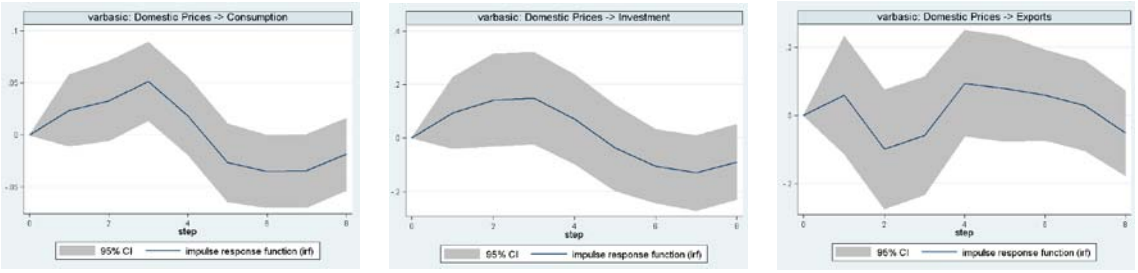
Agriculture exports **Agricultural GDP** **Non-tradable GDP**



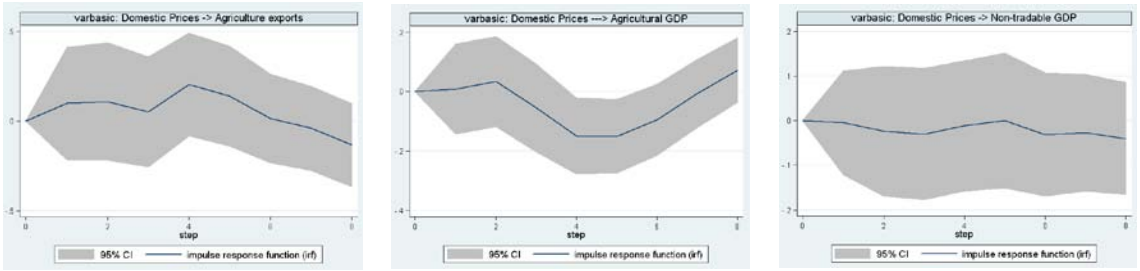
Similarly, Figure 12 presents impulse responses to one standard deviation in the domestic agricultural price index. Even though there is a significant increase in private consumption and a less pronounced boost in investment, aggregate exports, agricultural production and exports and non-tradable output do not rise significantly as a response to the agricultural domestic price shock, as they do with the variation in world prices. Additionally, the positive effects of agricultural price shocks on investment seem to be much short lived in the presence of distortive policy measures. These results suggest that export taxes and other similarly restrictive policies could have diminished the potentially positive effects of world price surges on the agricultural sector and the rest of the economy.

Figure 12: Impulse responses to a 1 Standard Deviation in Agricultural Domestic Prices: VAR, Argentina (1909-2007)

Consumption **Investment** **Exports**



Agriculture exports **Agricultural GDP** **Non-tradable GDP**



5.2. RESULTS FOR MALAWI

Variance decomposition: Like in the case of Argentina, we calculate in Tables 14 and 15 the contribution of tobacco and maize world price shocks to the variance of some domestic economic indicators for which data is available (e.g. real output, agricultural GDP, exports and Central Government expenditures and revenues). It can be observed, first, that the effects of tobacco price shocks on real aggregate and agricultural output are much larger than the effects of shocks on maize world prices. Similarly, an exogenous change in tobacco prices seems to have a much larger bearing upon fiscal revenues and expenditures than maize price shocks. However, the magnitude of these impacts on Government income and spending is relatively small when compared with the results obtained for Argentina in the previous section.

Impulse responses: in Figure 13 we also calculate the impulse responses to a one standard deviation shock in tobacco (the principal cash crop) and maize (the main consumed and produced farm product) prices to the variance in the selected domestic economic variables. Note that while aggregate GDP, agricultural output and exports are positively correlated with a one standard deviation change in tobacco world prices, government revenues and expenditures seem to be largely unresponsive, at least in the short run, as can be observed in Figure 13.

Figure 13: Impulse responses to a 1 Standard Deviation in Tobacco International Prices: VAR, Malawi

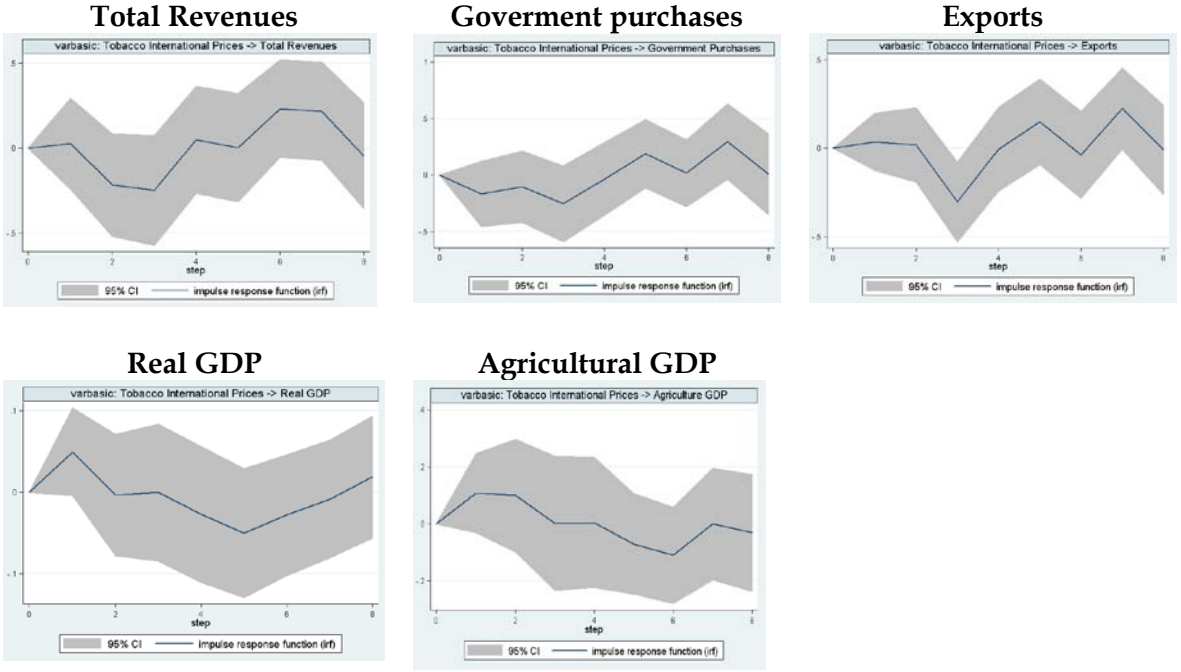
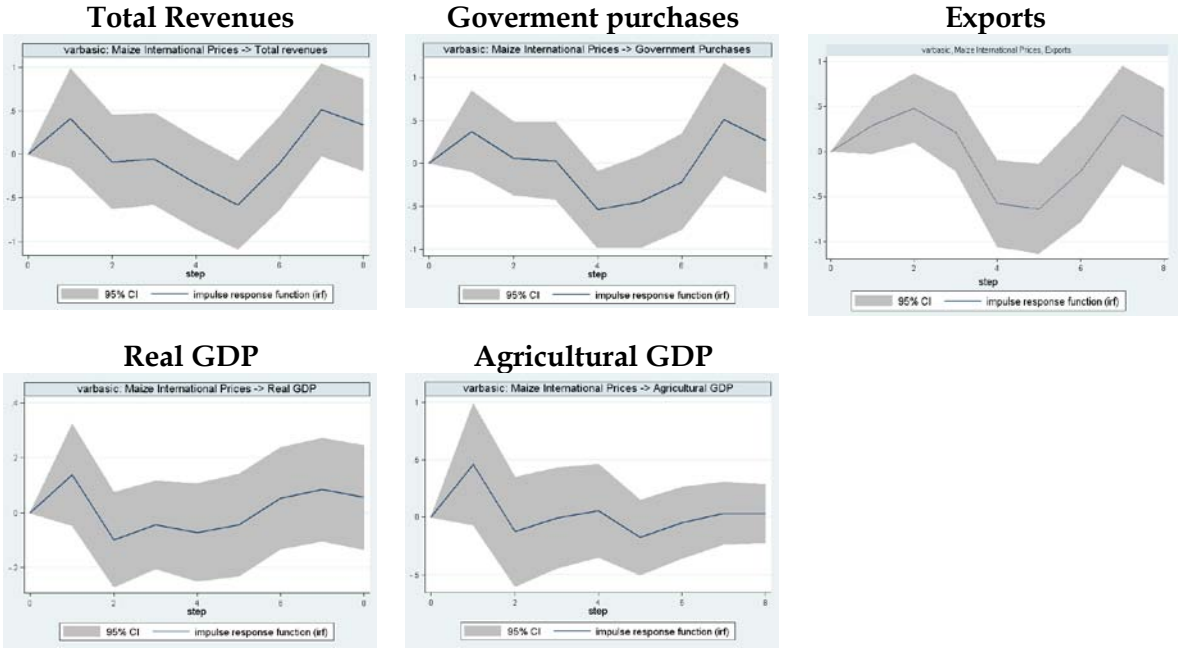


Figure 14 presents similar impulse responses figures but with respect to a one standard deviation change in maize world prices. The results suggest that, likewise for the case of tobacco, maize price shocks have a larger impact upon aggregate and agricultural output and exports than on Government revenues and expenditures.

Figure 14: Impulse responses to a 1 Standard Deviation in Maize International Prices: VAR, Malawi



5.3. COMMENTARY

The results of the VAR analysis suggest, first, that agricultural price shocks seem to have a much larger influence on the fiscal front in Argentina than in Malawi. Surges in the world prices of the main Argentine crops translate into large increases in Government revenues and spending, with more muted effects in the case of the Malawian economy. This result is a reflection of the larger bearing of export taxes on total revenues for Argentina, despite the fact of being a more developed economy than Malawi.

A second observation that stems from the VAR results is that agricultural price shocks seem to have a more significant and lasting effect on the rest of the economy, and, particularly, in the non-tradable sector, in Argentina than in Malawi. There are two possible explanations for this result. First, the farming sector in Argentina has larger backward and forward linkages towards services and manufacturing than in Malawi, where the rural sector is dominated by subsistence farming with relatively poor links with the rest of the economy. Second, the extensive use of export taxes on the agricultural sector provides an incentive to the Federal government in Argentina to embark upon pro-cyclical fiscal policies that, through higher spending on non-tradables, amplify the positive effects of rural activities´ booms on the rest of the economic sectors, at least in the short run.

However, the presence of distortionary agricultural policies also seems to have a negative impact on investment and aggregate output growth rates in the medium and long run.

Third, the economy-wide effects of agricultural world price shocks on aggregate output and agricultural production seem to be more related to cash crops –e.g. tobacco- than with "wage goods" –e.g. maize and wheat- in Malawi than in Argentina. As a net food importer, higher maize prices in Malawi translate almost automatically into a larger net import bill with a first order negative impact on GDP. Contrastingly, an increase in the price of tobacco stimulates local production for exports with a benign effect on the Malawian economy.

A fourth observation that emerges from the VAR results is that there not seem to be any significant "Dutch Disease" effects on non-agricultural sectors of booms in agricultural prices, at least in Argentina. On the contrary, the results seem to suggest that surges in agricultural commodities´ prices are associated with rising aggregate output.

6. CONCLUSIONS

Natural resource abundance can be a curse or a blessing for development depending on the presence of the right set of policies and institutions. The analysis presented in this paper shows that, despite the presence of vast differences in economic development, the history of Argentina and Malawi suggest that there may be some truth in this dictum.

The presence of a fragmented farming sector coupled with a strong Presidency in a context of weak institutions resulted in the recurrent use of highly distortive policies against rural activities in both countries. Historically, a combination of the ideological preferences of the Central Government and frequent fiscal unbalances have been in turn the main motive behind the use of export taxes, export bans, exchange rate controls and equivalent measures on agricultural production.

However, there are significant differences in the type of agricultural policies implemented in both countries that stem from their specific policymaking processes and rural production structures. In Malawi, the one-party system that reign until 1994 coupled with a more concentrated and homogeneous cash crop sector (e.g. tobacco) as well as a

centralized fiscal regime, facilitated the extraction of agricultural export revenues through centralized state-led commercialization agencies by the Central Government.

Contrastingly, in Argentina the presence of a more heterogeneous agricultural export sector with thousands of producers and a more complex federal and multiparty political system make export taxes the only politically viable instrument through which the National Government can partake from rural bonanzas, at least temporally. Interestingly, only with the advent of a multiparty democracy, export taxes were introduced in Malawi, albeit only briefly.

Highly distortive policies against the agricultural sector have had, in turn, a detrimental effect on the long run economic performance of Argentina and Malawi. Specifically, the evidence presented in this paper seems to suggest that policy discrimination against agriculture was an important factor behind the dismal growth record of Argentina and Malawi in the last 50 years.

In fact, only with the partial removal of the more restrictive agricultural policy measures in the 1990s –e.g. export taxes and exchange rate controls- in the context of radical structural reforms, coupled with a massive improvement in the terms of trade in the 2000s, the Argentine and Malawian rural sectors have experienced a notable recovery in the last decade but with significant differences between the two countries.

While the rural sector in Argentina underwent a massive process of technological modernization in the 1990s, that had a massive positive impact on agricultural TFP, the Malawian farming sector is still dominated by subsistence activities with a very low productivity, mainly as a result of the absence or severe underdevelopment of key complementary markets. Consequently, Argentina has been able to almost triple its share in world agricultural exports in the last 20 years, while Malawi remains a marginal player in the agriculture global markets.

Finally, the results of a simple VAR analysis suggest that agricultural world price shocks seem to have a much larger economy-wide impact in Argentina than in Malawi. The presence of more developed forward and backward linkages in the more capital and technology intensive Argentine rural sector only explains to a certain extent this finding. However, it is noteworthy that the relative importance of agricultural export taxes as a

source of revenue for the Federal Government and the largely pro-cyclical nature of government expenditures have also contributed to amplify in the short run the economic impacts of agricultural price shocks in Argentina. Nevertheless, the heavy use of export taxes, quotas and bans have also induced in the Argentine case much shorted lived investment and growth spurts in the medium and long run.

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ANNEX 1. VAR - ECONOMETRIC ISSUES

In this Annex, we present the methodology used to estimate the VAR, the unit root tests and a description of the data utilized to run the model. We also set out the main assumptions guiding our VAR estimations on the effects of agricultural price and policy shocks on the economies of Argentina and Malawi.

Assumptions

Following Pieschacon (2009), we assume that Argentina and Malawi are small open economies (SOE), and hence that they are price takers in international agriculture markets. In the case of Argentina, while the country is a large exporter and producer of some individual agricultural commodities, on the aggregate it remains as a relatively medium sized producer (See Table 8), and therefore, the SOE assumption still holds for the agricultural sector as a whole.

Table 8: Share of Argentina in World Production and Exports for selected products

	Share in World Production (2009)	Share in World Exports (2008)	Ranking
Maize	1,61%	13,11%	5
Soybeans	13,94%	13,05%	3
Sunflower seed	7,76%	2,81%	3
Wheat	1,11%	5,67%	12
Cattle meat	3,67%	0,28%	3
Total four crops	3,09%	9,81%	8
Total four crops and cattle meat		9,23%	10

Source: own calculations based on FAO (2010)

Further, we assume that agricultural world price shocks are transmitted to the domestic economy as follows[3]. First, agricultural price shocks generate a wealth effect, as households and the government increase consumption of tradable and non-tradable goods, as their income rises with higher agricultural prices. Second, the increase in private and public consumption of non-tradables drives its internal price up, causing the exchange rate to appreciate in real terms. Third, the change in relative prices increases the marginal product of labor and capital in the non-tradable sector, inducing a reallocation effect.

[3] See Pieschacon (2010) for a detailed discussion.

Finally, output in the tradable and non-tradable sectors tends to go up due to the change in relative prices. Public consumption also increases as a result of a higher GDP.

Methodology

First, we run a VAR using just the impulse or independent variable – the weighted index of international prices of major crops for Argentina and the tobacco and maize price indexes for Malawi-. This is done in order to check whether food prices are exogenous with respect to domestic variables (e.g. output, exports, public and private consumption, etc.) and it is observed through the R squared. Then, the VAR is run using detrended logarithms and taking the price indexes and domestic variables as independent and dependent (impulse and response) variables at the same time.

The R squared obtained from the regression in which the index of international prices is the dependent variable – and its lags and the rest of the variables are the independent variables-, should be used to compare itself with the R squared from the first regression. If there is a significant change in this measure, then it means that agricultural prices are not exogenous with respect to domestic variables and hence we cannot use the VAR. Luckily for us, we have proven the exogeneity of the international price index with respect to internal variables, as can be seen in Table 9.

Table 9: Argentina - Agricultural price index exogeneity test

Dependent variable: agricultural price index	(1)	(2)	(3)
L1. P_A	**0.791*** **	**0.669*** **	**0.734*** **
	(0.102)	(0.116)	(0.108)
L2. P_A	**-0.420*** **	**-0.233***	**-0.358*** **
	(0.130)	(0.136)	(0.134)
L3. P_A	0.0981	0.0934	0.0684
	(0.130)	(0.138)	(0.135)
L4. P_A	-0.153	-0.0345	-0.0536
	(0.102)	(0.118)	(0.110)
Constant	0.00121	9.12e-05	6.72e-05
	(0.0185)	(0.0168)	(0.0177)
Observations	95	95	95
R2	**0.44**	**0.54**	**0.49**

Note: P_A denotes the agricultural price index (see section 5.1 for a description of how the index is computed) and its lags. Equation (2) includes the following domestic variables: output, consumption, investment and exports. Equation (3) runs the agricultural price index against domestic consumption, investment and exports.

In addition to the R squared comparison, we test the stationary condition of our model´s variables by running the following unit root tests: Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS). The three tests resulted in the acceptance of the hypothesis that all variables are stationary (see Tables 10 and 11). Hence, we are allowed to use the specified VAR model. Having that in mind, our model reduces to the following equation system:

(1) $$p_t^i = A(L)\, p_{t-k}^i + e_t^i$$

(2) $$x_t = C(L)\, p_{t-k} + D(L)\, x_{t-k} + e_t^x$$

Where e_t denotes a series of independent and serially uncorrelated shocks; *A (L)*, *C (L)* and *D (L)* denote matrices of polynomials in the lag operator *L*, defined as: $\sum_{j=0}^{n} A_j L^j$; *p* denotes the international price index; and *x* is a vector of domestic economic variables, which –Granger causality aside - is a function of the international price index, their lags and the lags of the vector's components. Following Pieschacon (2009), we use four lags in the regressions.

Data

We construct an aggregated weighted price index using individual crops´ export and price data for Argentina extracted from FAOSTAT. Following Collier (2007), we obtain the weights by simply calculating the percentage share of each commodity in total agricultural exports in 1990. These weights are then held fixed over time in order to calculate our aggregated international price index. In the case of Argentina, we also construct a domestic price index that we use to simulate the likely effects of distortionary agricultural policies.

We use annual data collected from several sources for 1909 – 2007 in the case of Argentina and for 1964-2007 in the case of Malawi. Domestic macroeconomic variables as total exports, gross domestic product (GDP), agricultural exports and production and non tradables output were obtained for Argentina from WEO/IMF, INDEC and Ferreres (2004) and, apart from prices, all variables are expressed in 1993 constant pesos. Data for Malawi comes from the National Statistics Office and WEO/IMF.

Table 10. Argentina: Unit root tests

Dickey Fuller test for all detrended variables used in the VAR model

VARIABLES	(1) Agricultural price index	(2) Agricultural GDP	(3) Non agricultural GDP	(4) Consumption	(5) Investment	(6) Exports	(7) Private consumption	(8) Government Pruchases	(9) Agriculture exports	(10) Total revenues	(11) Non agricultural exports	(12) Real exchange rate
DF with no trend statistic	-5.029	-6.838	-5.502	-5.026	-4.416	-6.859	-4.775	-5.219	-6.49	-5.349	-6.828	-5.366
MacKinnon approximate p-value	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process

Philip-Perron test for all detrended variables used in the VAR model

VARIABLES	(1) Agricultural price index	(2) Agricultural GDP	(3) Non agricultural GDP	(4) Consumption	(5) Investment	(6) Exports	(7) Private consumption	(8) Government Pruchases	(9) Agriculture exports	(10) Total revenues	(11) Non agricultural exports	(12) Real exchange rate
Phillips_Perron statistic	-5.116	-6.786	-5.509	-5.187	-4.763	-6.763	-4.99	-5.318	-6.478	-5.439	-6.684	-5.432
MacKinnon approximate p-value	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process

Kwiatkowski-Phillips-Schmidt-Shin test for stationarity for all detrended variables used in the VAR model

VARIABLES	(1) Agricultural price index	(2) Agricultural GDP	(3) Non agricultural GDP	(4) Consumption	(5) Investment	(6) Exports	(7) Private consumption	(8) Government Pruchases	(9) Agriculture exports	(10) Total revenues	(11) Non agricultural exports	(12) Real exchange rate
KPSS test statistic	0.0318	0.0271	0.0400	0.0289	0.0408	0.0231	0.0315	0.0288	0.0249	0.0295	0.0231	0.0315

Note: This test differs from those "unit root" tests in common use (such as Dfuller and Pperron) by having a null hypothesis of stationarity. Critical values for 98 observations: 10%: 0.119 5% : 0.146 2.5%: 0.176 1% : 0.216. KPSS test statistic greater than the critical value means the null hypothesis of stationarity around mean is rejected.

Table 11: Malawi: Unit root tests

Dickey Fuller test

VARIABLES	(1) Maize Price Index	(2) International Tobacco Price Index	(3) Total revenues	(4) Government Purchases	(5) Exports	(6) Real GDP	(7) Agricultural GDP
DF with no trend statistic	-2,945	-5,104	-3,766	-4,349	-3,666	-4,012	-5,802
MacKinnon approximate p-value	0,0403	0,0000	0,0033	0,0004	0,0046	0,0013	0,0000

Note: The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process

Philip-Perron test

VARIABLES	(1) Maize Price Index	(2) International Tobacco Price Index	(3) Total revenues	(4) Government Purchases	(5) Exports	(6) Real GDP	(7) Agricultural GDP
Phillips_Perron statistic	-3,004	-5,139	-3,759	-4,377	-3,647	-4,089	-5,773
MacKinnon approximate p-value	0,0345	0,0000	0,0034	0,0003	0,0049	0,0010	0,0000

Note: The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process

Kwiatkowski-Phillips-Schmidt-Shin test

VARIABLES	(1) Maize Price Index	(2) International Tobacco Price Index	(3) Total revenues	(4) Government Purchases	(5) Exports	(6) Real GDP	(7) Agricultural GDP
KPSS test statistic	0,0722	0,0547	0,0877	0,0872	0,0578	0,0514	0,0582

Note: This test differs from those "unit root" tests in common use (such as Dfuller and Pperron) by having a null hypothesis of stationarity. Critical values for 27observations: 10%: 0.119 5% : 0.146 2.5%: 0.176 1% : 0.216. KPSS test statistic greater than the critical value means the null hypothesis of stationarity around mean is rejected.

ANNEX 2. VARIANCE DECOMPOSITION

Table 12: Percentage of the Variance Due to the World Agriculture Price Shock: Argentina

Time	Consumption	Investment	Exports	Agriculture GDP	Non-Tradable GDP	Private Consumption	Agricultural Exports	Public Expenditures	Public Revenues
1	0.021535	0.149407	0.060064	0.00002	0.046075	0.517598	0.680872	0.583277	0.173899
2	0.045499	0.165884	0.060233	0.000217	0.060321	0.716385	0.672562	0.5856	0.408654
3	0.043657	0.152132	0.086269	0.043582	0.055234	0.784735	0.819099	0.582958	0.303596
4	0.041431	0.145482	0.082765	0.040672	0.0533	0.729252	0.803692	0.520576	0.535576
5	0.047754	0.165149	0.076313	0.080489	0.067603	0.696726	0.795524	0.475277	0.717435
6	0.045605	0.156325	0.079582	0.110518	0.069658	0.762862	0.785701	0.589552	0.728397
7	0.05261	0.157425	0.077285	0.115788	0.066655	0.846764	0.756119	0.71008	0.886112
8	0.061653	0.182385	0.07568	0.113723	0.079553	0.844585	0.83122	0.782872	0.888008

Table 13: Percentage of the Variance Due to the Agriculture Domestic Price Shock: Argentina

Time	Consumption	Investment	Exports	Non-Tradable GDP	Agricultural GDP
1	0.037177	0.105217	0.084083	0.06241	0.006804
2	0.043973	0.135419	0.06458	0.067919	0.009778
3	0.04958	0.150893	0.059416	0.065417	0.00716
4	0.06225	0.15226	0.062632	0.061287	0.04183
5	0.058586	0.13866	0.08216	0.054831	0.065316
6	0.065819	0.137747	0.088255	0.051639	0.072943
7	0.075418	0.146448	0.08785	0.052801	0.070492
8	0.08103	0.148896	0.086673	0.054756	0.07155

Table 14: Percentage of the Variance Due to the Tobacco Price Shock: Malawi

Years	Exports	Imports	Real GDP	Real Agri GDP	Public Revenues	Public Expenditures
1	0,011	0,092	0,428	0,256	0,275	0,143
2	0,131	0,133	0,199	0,220	0,210	0,061
3	0,144	0,279	0,233	0,190	0,186	0,244
4	0,158	0,247	0,222	0,165	0,199	0,178
5	0,156	0,223	0,198	0,164	0,245	0,284
6	0,169	0,242	0,187	0,161	0,326	0,315
7	0,166	0,247	0,171	0,160	0,277	0,300
8	0,211	0,246	0,171	0,163	0,316	0,347

Table 15: Percentage of the Variance Due to the Maize Price Shock: Malawi

Years	Exports	Imports	Real GDP	Real Agri GDP	Public Revenues	Public Expenditures
1	0,172	0,001	0,031	0,062	0,030	0,011
2	0,105	0,001	0,054	0,106	0,108	0,198
3	0,088	0,011	0,081	0,108	0,193	0,218
4	0,074	0,037	0,077	0,108	0,193	0,229
5	0,129	0,035	0,119	0,117	0,234	0,225
6	0,129	0,032	0,100	0,115	0,233	0,246
7	0,201	0,048	0,096	0,109	0,230	0,220
8	0,255	0,104	0,103	0,107	0,207	0,208