Implicit Taxation of the Agricultural Sector in Kenya

Eric Ronge
Bernadette Wanjala
James Njeru
Douglas Ojwang'i

Productive Sector Division
Kenya Institute for Public Policy
Research and Analysis

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Abstract

Over the years, a number of policies have been designed and implemented to ensure agriculture continues to play an important role in economic development. This paper discuses the policies that have guided the agricultural sector in Kenya since independence, indicates their impact on the development of the sector and recommends policy changes that can more effectively enhance taxation of agriculture and its role in achieving economic development objectives.

Among the key findings of the study is that while the agriculture sector in Kenya can be taxed directly through use of personal and income taxes, indirect taxation through trade taxes (export and import taxes), consumption taxes and land taxes have historically been favoured owing to their ease in implementation. However, with liberalization, the use of trade and consumption taxes has been on the decline, with most commodities being zero-rated. Agriculture is now taxed implicitly through changes in macroeconomic policies. This means that macroeconomic policy makers need to be aware of the implicit tax effect on agriculture. The study recommends that regular efforts be made by the government to ensure that macroeconomic policies do not unfairly impinge on agriculture. The government should also explore a system of land taxation because land taxation is one of the most efficient methods of not only taxing agriculture but also for providing the motivation for modernization and utilization of idle land.

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1.   Introduction

The vexed question of the appropriate level of taxation of agriculture continues to pre-occupy policy makers today as it did in the mid 1980s at the onset of Structural Adjustment Programmes (SAPs). SAPs sought, *inter alia*, to reduce the bias against agriculture. Because the agriculture sector forms the backbone of most low-income economies, it inevitably has to provide the bulk of the resources to support the industrialization endeavors of these countries—which is normally assumed to be equivalent to development. These government interventions require tax revenues, which must be raised in a manner that will not distort incentives in the economy, including in the agriculture sector. Raising taxes from the agricultural sector is, however, complicated by the fact that a big proportion of the poor in such economies, who constitute the largest proportion of the population, depend on this sector for their livelihood. Any suggestion that the sector be taxed, even if backed by well reasoned evidence, would inevitably be politicized and risk generating very high emotions as has been the case in post-independence Kenya.

Kenya's agriculture sector is the base for economic growth, employment creation and foreign exchange earnings. In addition to being a major source of food, the sector is also a stimulant to the growth of off-farm employment and supports the livelihood of 80 percent of the country's population living in the rural areas. The performance of the agricultural sector therefore directly determines poverty outcomes. As such, the increasing level of poverty in Kenya is a reflection of the poor performance of the sector. The 1998 poverty report by the Ministry of Finance and Planning shows that about 51.6 percent of the Kenyan population and 65.5 percent of the poor depend on subsistence farming.

In terms of sectoral contributions, the agriculture sector accounts for about 27 percent of the Gross Domestic Product and employs more than

two thirds of the labourforce while accounting for about 70 percent of exports earnings (excluding refined petroleum) (Government of Kenya, various). In addition, the agriculture sector is a source of raw materials for agro-based industries and directly generates a significant proportion of family incomes—helping as a result to stem the rural-urban migration. Further, by stimulating the growth of productive off-farm activities in rural areas, the sector also creates off-farm jobs that supplement farm incomes.

Several taxation proposals made by the government over the years (Appendix Table 1), including reduction of duty rates of various agricultural inputs and raising import duties on competing agricultural imports, have sought to increase the productivity of the sector. These measures are complemented by various government policy statements and actions that have been, nominally, supportive of farmers. From these policy measures, keen observers may imagine that succeeding governments in Kenya have been committed against taxing farmers—either directly or indirectly. One of the leading issues that development economists grapple with is how best to achieve the structural transformation of an agrarian economy? The reality is, however, strikingly different. This is not surprising because policy makers who are concerned about the transformation of their economies through raising tax revenues from the dominant sector (agriculture) often wonder how this can be done in an efficient manner. This is because taxes, unless carefully designed, tend to be distortionary and may further compound the effect of existing economic policies that have historically tended to directly and indirectly affect the incentives facing agriculture in low-income countries. The unsettled nature of the academic debate on the right level to tax the sector seems not to offer any respite to these policy makers.

The debate over the appropriate level of taxation of agriculture has attracted different protagonists, who are however agreed on one fact t; that as the dominant sector of the economy, agriculture should play a leading role in transferring resources to other sectors. However, on the one hand, there are those who believe that agriculture must be taxed quite heavily, relative to the other sectors, in order to achieve this process of structural transformation of the economy (Sah and Stiglitz, 1984; 1987). There are also those who believe that agriculture should be taxed just like any other sector. The proponents of this view follow the World Bank propositions that governments need to develop an efficient method of taxing the sector. This view is perhaps based on the premise that many policies pursued by government may actually indirectly tax agricultural activities. Such policies include macroeconomic policies, as well as industrial and trade policies that seek to favour industry over agriculture, and may cause a bias against agriculture.

From the foregoing, it is clear that an analysis of agricultural taxation should be given special consideration for several reasons. First, the agriculture sector is of central importance both in employment and output, the contribution often being in the region of one-half to three-fourths and one-fourth to one-half, respectively. Second, there are strong limitations on the tax tools available to the government to tax agriculture. In particular, this refers to the administrative difficulties in measuring income in the case of agricultural income taxes and the impossibility of taxing transactions between producers and consumers, the difficulty arising both when the 'transaction' is within the household and when sales are between households or in the informal markets. Third, the rural labour market, which is dominated by agriculture, interacts directly and indirectly with labour markets throughout the economy. Fourth, the government, mainly before liberalization, is often the main or only supplier of vital inputs such as water, fertilizer and electricity such that its pricing policy must be integrated into the taxation of

production. Finally, food—its availability, distribution, and price—is of such importance to welfare that all governments need to take responsibility for its price, quality and security. As such, an analysis of the nature and extent of present levels of direct and indirect taxation of the agriculture sector should be undertaken before any attempts are made to explore efficient methods of taxing the sector.

The Kenyan experience shows that over the years, a number of policies have been designed and implemented to improve the contribution of agriculture to the country's economic development. Increasing emphasis has been placed, since the 1980s, in reducing state intervention and increasing reliance on liberalized markets to allocate resources. Further, the government has also extended various tax incentives to the sector. These tax measures have aimed at exemptions as well as zero-rating of all the imported inputs used in the sector, in addition to eliminating duties and zero-rating all taxes on agricultural exports. Nevertheless, the "shifting of taxes" from the non-agricultural sector still impacts negatively on the sector. This is because the sector is not an enclave in the Kenyan economy. As such, it is bound to bear tax burdens shifted on to it by some of the sectors with which it has some relationships, while passing on to various other sectors some levies which it has either borne directly or by incidence.

The main focus of this study, therefore, is to shed some light into how the Kenyan agriculture sector is taxed—either directly or indirectly—and how this can be done in a more efficient manner. The specific objectives of the study are:

- To identify the various taxes used in the agriculture sector and assess the extent to which these have been used in Kenya.

- To empirically analyze the extent to which trade and macroeconomic policies have provided overriding incentives

or disincentives to agriculture and therefore indirectly taxed the sector[1].

- To draw conclusions, based on the findings from the foregoing, and make policy recommendations on the way forward.

The rest of the paper is organized as follows: Section 2 dwells on the conceptual framework on how government policy can impact on the agriculture sector. It also provides a review of empirical studies and an evolution of both macroeconomic policies as well as sector-specific policies that have had the effect of taxing the agriculture sector. Section 3 focuses on the various methodologies adopted to examine the effects of indirect taxation on agriculture—the central question of this paper. Section 4 presents and discusses the empirical results of the analysis. Finally, section 5 makes policy recommendations and the way forward on the issue of taxation of agriculture.

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[1] Agricultural production incentives represent the combined effect of sector and commodity-specific interventions with respect to marketing, and pricing of agricultural inputs and outputs alongside trade, exchange rate, change in tax policy and other general macroeconomic policies.

2. Taxation of Agriculture: Theoretical Background

Broadly defined, taxes comprise the explicit and implicit costs incurred by economic agents in their support of government activities. An explicit tax is a compulsory levy made by citizens to public authorities for which nothing is received directly in return (James and Nobes, 1992)[2]. Taxes are therefore transfers of money to the public sector, but they exclude loan transactions and direct payments for publicly-produced goods and services. Implicit costs to economic activities arise when the economic burden of policies implemented in other sectors falls on another sector that was not the intended target. As such, government-implemented policies can act as a bias against the growth of these activities (sectors). In line with this, Schiff and Valdes (1992) define taxation of agriculture as reduction in domestic prices of agricultural products. Taxation of agriculture is equivalent to an agricultural price policy that influences the decisions of farmers to invest and produce. Taxing agriculture has been found to sacrifice far more in output than is envisioned, leading to the argument that if a country wants to achieve faster agricultural growth, faster economic growth and fewer poor people, it should stop taxing agriculture relative to other sectors.

A typical developing country has an agricultural sector dominating the rest of the economy in terms of contribution to GDP, to employment, and to livelihood incomes. Accordingly, structural transformation of such economies can only occur if agriculture generates and transfers to the non-agricultural sector's economic surplus or investible resources, surplus produce and financial savings. Although most development

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[2] There is of course an implicit contract between the governors and the governed on the use of such monies.

economists generally accept the first proposition, implementation of the same does not have universal acceptance. The dominant view among development economists is that investible resources could be best transferred through taxation of agriculture—sometimes very heavily. This is because unlike industry, which is considered more dynamic, the agriculture sector has weak forward and backward linkages, and is subject to the vagaries of weather. As such, economic development of these countries can only take place if, in the long run, there is a fundamental structural change, in which agriculture declines in relative, then absolute importance. The experience of developed nations supports this view as the decline in agriculture has been associated with a dramatic rise in the productivity of the sector, such that in the long run there is a complementary relationship between the growth of industry and the growth of agriculture (Weeks, 1999)[3].

This view resulted in policy recommendations that emphasized a development strategy that favoured import substitution industrialization, which included diverse policy measures aimed at ensuring its success. These policy measures included: high import tariffs on manufacturing to protect infant industries; export taxes on agriculture; quantitative import controls where tariffs were considered as inadequate for providing the protection desired; and chronically overvalued exchange rates. Further, measures directly affecting agriculture were also included, for example: agricultural marketing boards with monopoly purchasing powers; and centrally-set producer

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[3] Indeed, an influential model by Sah and Stiglitz (1984, 1987) contends that growth in developing economies can be accelerated by taxing agriculture. Commenting on the implications of this model, Sarris (1994) claims that a necessary condition for the structural transformation of these economies is that resources be shifted from agriculture to non-agricultural sectors and as such the crisis in developing countries in the 1980s and 1990s that necessitated the structural adjustment programmes was due to factors other than the explicit or implicit taxation of agriculture.

and consumer prices and input subsidies. Most of these measures had the overall effect of taxing agriculture.

The contrary view, which is of a more recent vintage, is currently considered the mainstream view. According to this view, advanced mainly by the World Bank[4], and to which we will return later, taxation of agriculture through policy manipulation in developing countries was ill-advised not only because it discriminated against one sector but also because such discrimination was often excessive. Discriminatory policies against agriculture in developing countries are largely responsible for the poor performance of these economies and their ultimate decline since the 1970s. According to this view of the decline of low-income economies, taxation of agriculture in developing countries through price distortions and misguided macroeconomic and trade policies was responsible for the large scale misallocation of resources and growing indebtedness of developing countries, which ultimately lowered their economic growth performance and therefore their ability to achieve the fundamental objective of economic development—poverty reduction. For economic development to take place it was necessary for the agricultural sector to be granted the right price and non-price incentives. Some of the proposed necessary reforms included the dismantling of trade and exchange rate restrictions, and liberalization of agricultural input and output markets. Further, it was also necessary to design a more efficient tax system that, though taxing agriculture, would do so efficiently and not in a manner that discriminated against the sector and jeopardized its development relative to that of other sectors. A recent World Bank report on sub-Saharan Africa (World Bank, 2000) proposes four principles that should

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[4] The famous "Berg Report" (World Bank, 1981), set the tone for the critic of the economic policies that were being pursued in agriculture and considered them as the fundamental cause of the deepening economic crisis in sub-Saharan Africa.

guide the taxation of agriculture in developing countries. These are the principles of: non-discrimination, minimization of efficiency losses, effectiveness of fiscal capture, and the capacity to implement.

According to the principle of non-discrimination, agricultural taxes should not be higher than those for other sectors and should be integrated with general value added, profit, income and wealth taxes. To minimize efficiency losses, the second principle suggests that output and input taxes should be minimized, while increasingly land taxes should be used — assigning their collection to local governments who not only have more detailed information about local land ownership but also the incentives to collect it. Further, the Bank proposes that where sufficient administrative capacity exists, commodity export taxes should be replaced by consumption taxes (sales or value added taxes). The principle of effectiveness of fiscal capture proposes increased reliance on income and value added taxes and better designed land taxes. Lastly, the capacity to implement these new systems must be built over many years, during which revenue collection may be low. Reliance on commodity and input taxes, though essential to fill this gap, may have to be at lower rates than in the past.

A careful analysis of the two views leads to the conclusion that the contention is not whether or not agriculture should be taxed at all. Indeed, there is consensus on the need to tax agriculture in order to achieve structural transformation of these economies. The debate is really about the best way to go about it based on the argument that taxation of agriculture is predicated on the assumption that it is a source of surplus extraction.

The literature recognizes three methods through which investible resources can be transferred from the agricultural to the non-agricultural sector. The first method (Lewis, 1963) is by private investment flows from agriculture to the non-agricultural sector. The second and third

methods used to achieve this objective, according to the literature (Lewis, 1963; Krueger, Schiff and Valdes, 1988; Schiff and Valdes, 1998; and Bautista, Robinson and Wobst,1998) are through the use of policies that have direct and indirect effects on agricultural incentives. Policies that have direct effects are those specific to the agricultural sector and serve to drive a wedge between producer and border prices of agricultural products. Such policies include import and export taxes, price controls and production taxes and subsidies specific to the sector, which serve to drive a wedge between producer and border prices of agricultural products.

Policies that have an indirect effect on agricultural incentives include: (i) import tariffs on non-agricultural products, and (ii) price and macroeconomic (especially exchange rate) policies, which affect the economy-wide balance between traded and non-traded goods, in addition to turning the terms of trade against the agricultural sector and in favour of industry. Of the taxes facing the agricultural sector, a further distinction can be made between those that directly affect prices of commodities and inputs and those that do not. The former comprises land taxes, personal and income taxes, while the latter include trade taxes (export and import duties) and consumption taxes (sales, excise and value added taxes). The latter set of taxes is applied on marketed surpluses and they affect the prices of the commodities as do other tax related policies—macroeconomic, trade, and pricing policies. Below we look in more detail at the types of taxes and (incentive affecting) policies that are used to tax agriculture.

Land-based taxes

One of the advantages of land taxation as proposed by its proponents is that it increases land use efficiency and helps in revenue generation, especially for local administrations. In other words, it can be seen as a

form of payment for the infrastructure and other public utilities consumed by farmers during their production process. However, land taxes have historically not been imposed in Sub-Saharan Africa despite the fact that they are considered a more efficient way of taxing the sector and giving incentives for its modernization (Lewis, 1963; World Bank, 2000)[5]. This is mainly because there are administrative and political difficulties faced by such countries that militate against the imposition of these taxes. In Kenya, for example, despite the existence of large swathes of under-utilized productive land existing side by side with labour surplus in small holder farming, the legal and political complexities surrounding land use have frustrated the enactment of a coherent land policy, which would enable the use of a land tax to bring about agricultural development (Odhiambo and Nyangito, 2002).

Personal and income taxes

Income and personal taxes are not politically, administratively, or conceptually easy to impose, although if all income from agricultural pursuits can be included in the tax base, they may have incentive effects approaching those of land taxes (Lewis, 1963). In the absence of standard account-keeping and the prevalence of the practice of payments in kind, the resulting financial information gap renders agriculture a hard-to-tax sector where the modern personal and income tax-based on self-declaration are difficult to implement. In Kenya, personal and income taxes can only be implemented in the large-scale plantations and on commercial crops farming where records are available. Presumptive taxes have been used from time to time.

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[5] It is the widespread use of land taxes in Asia and their effects on agriculture and therefore on the development of these countries that makes it a widely recommended tax for the efficient taxation of agriculture.

Indirect taxes and non-tax policies on agriculture

There is a widespread use of trade taxes, excise and sales taxes in Sub-Saharan Africa. Given the administrative ease of imposing them, indirect taxes and non-tax policies have been used both for revenue generation and protection of domestic industry. As a result, there is excessive use of these taxes and tax-related policies to turn the terms of trade against agriculture.

Export duties

Export duties are used to influence the terms of trade between agriculture and industry, either directly through the reduction of the domestic prices of export products, or indirectly by limiting the production of exports that are used to finance imports. They limit the capacity to import and therefore create a scarcity value of imports, resulting in a more protected and more profitable import-competing industrial sector. Further, to the extent that export duties reduce the domestic price of commodities used as raw materials in domestic industries, they serve to subsidize domestic manufacturing.

Import duties

Although import duties imposed by developing countries have a protective and also revenue-raising function, more often than not the protective function receives more attention. Although historical and administrative reasons initially dictate the use of import duties for revenue functions, the overall importance of this source of revenue declines over time as the tax system is developed and alternative forms of taxation are introduced. As a result, the protective function of import duties increases. Due to their factor endowments, most developing countries have a comparative advantage in the production and export

of agricultural goods because the international terms of trade favour the production of the same. Most developing countries, however, see the development of a manufacturing capacity as an integral part of development, and therefore use import duties to turn the domestic terms of trade in favour of the production of manufactures. These duties in turn drive a wedge between the international and domestic relative prices of industrial and agricultural goods, making relative prices of manufactures higher.

By turning the domestic terms of trade against agriculture, import duties tax agriculture both directly and indirectly. Import duties tax agriculture directly because they provide more favourable terms of trade for domestic manufactures. Subsequently, the share of profits in income rises and therefore the savings rate and the rate of growth of the non-agricultural sector.

Import duties, used in combination with excise and sales taxes on domestic output, can influence the direction of investment activity. The extent to which import duties used in this form act as a tax on agriculture depends on whether or not the items taxed are consumed by the agricultural sector. As such, the importance of import duties as general instruments of "agricultural tax policy" partly lies in their power to influence terms of trade of the agricultural sector as a whole, especially where exports are largely agricultural goods and imports are largely manufactured goods. It also partly lies in their ability to absorb purchasing power from the non-agricultural sector, should it benefit from non-tax policies. Import restrictions or duties will have a more severe impact on agricultural production and growth should they impede the importation of inputs or imports used by the agricultural sector for its capital formation.

Macroeconomic and exchange rate policies

Macroeconomic and exchange rate policies can result in overvalued exchange rates and therefore act as a tax on exports. These policies, even when they are not deliberately pursued to protect domestic industry, may alter the terms of trade in favour of industry and against agriculture. Expansionary fiscal and monetary policies designed to generate employment and expand output may result in higher domestic inflation, which in the event of a fixed exchange rate may lead to currency overvaluation resulting in protection of industry and a loss of earnings for agricultural exports. The real exchange rate, defined as the relative price of tradables to non-tradables, plays a key role in the profitability of import competing and agricultural export industries. It provides a long-term signal for the allocation and reallocation of resources across and within sectors of the economy in addition to being the primary mechanism through which trade, exchange rate and macroeconomic policies affect agriculture.

For small open economies, world markets together with the nominal exchange rate, trade taxes and subsidies determine the domestic prices of trades. A real exchange rate (RER) depreciation represents an improvement in the country's international competitiveness given relative prices in the rest of the world. Conversely, a decrease in the real exchange rate appreciation indicates a decline in the country's international competitiveness. Changes in the RER can occur as a result of policy-induced effects that reflect a misalignment in the RER and as a result of exogenous factors that reflect a change in the equilibrium value of the RER. For instance, tariff protection of industry may result in an appreciated real exchange rate, because it raises the price of protected imported goods *vis-a'-vis* the prices of non-tradables and that of exportables. This penalizes non-protected import-competing and exportable goods in the agricultural sector.

As far as fiscal policy is concerned, budget deficits can impact on the exchange rate through interest rates. According to conventional macroeconomic theory, large government budget deficits crowd out real investment by raising interest rates. However, the Ricardian equivalence proposition posits that large deficits have no real effects because households increase savings to offset anticipated future tax liabilities implicit in today's budget deficits. However, if capital is mobile such that the interest rate parity holds, financial market participants anticipate that higher interest rates will attract capital inflows, thereby bidding up the price of domestic currency. Budget deficits will be reflected in the exchange rate incase interest rates do not change, which will crowd out exports. Further, to the extent that expansionary fiscal policy resulting from an expansion of government expenditure leads to higher expenditure on home goods, whose prices subsequently rise, the real exchange rate will appreciate[6] and have negative incentives on the agricultural sector. Exogenous positive terms of trade shocks, to which many commodity exporting developing countries are prone, may result in export booms and the associated capital inflows may result in a real exchange rate appreciation. Further, because of the "Dutch disease" phenomenon, the spending effect resulting from the additional income may tend to boost the demand for both tradables and non-tradables and raise the prices of the latter and therefore lead to an appreciation of the real exchange rate.

In summary, we can say that agricultural incentives are affected by both sector-specific as well as general economy-wide macroeconomic policies through the influence of the latter on relative prices. Real exchange rate changes emanating from economy-wide policies affect the relative prices

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[6] This result only holds if the change in prices is greater than the change in nominal exchange rate, as is the case for Kenya.

of agriculture. These effects on relative prices faced by agriculture have changed over time. Like many developing countries, development policy in Kenya at the time of independence embraced the logic of the need to transform the economy by supporting the import substitution industrialization, although immediate post-independence policies were partly aimed at redressing the historical injustices attributed to the colonial era. Nevertheless, the realities of operating in a world that was increasingly interdependent soon required a shift in the policy agenda.

Kenya's policy landscape can be sub-divided into three or so periods to reflect the policy changes that have taken place at the economy-wide level and at the agricultural sector level, and which may have some bearing on the taxation of agriculture. As seen in Table 1, these periods are 1963-1972; 1973-1985; and 1986 to the present. The latter period can be further sub-divided to one where there was gradual liberalization of the economy, (1986-1992) and where there were intensive more committed attempts at liberalizing the external sector (1993 to the present). As such, by the year 2000 most agricultural prices reflected market forces. Although there were secondary liberalization measures—mainly involving legal and regulatory reforms that had lagged behind the overall liberalization agenda to free specific markets in the agricultural sector—there was no deliberate policy to unduly tax the sector either using macroeconomic polices or even distorted sector-specific policies. Perhaps the best illustration of this fact can be provided by the real effective exchange rate, which consistently depreciated over this period.

From the foregoing, it is clear that despite the potential of the agricultural sector, the policy regime changes implemented since the mid 1980's focused more on financial and industrial sectors, ignoring the agricultural sector. All the same, the effects of adjustment on intermediate variables and the distribution of goods by tariff bands ensured that agriculture was not taxed directly in Kenya. As such, an

Table 1: Kenya's experience on policy reforms

Period	Policy changes
1963/72	
	Conservative fiscal and monetary policy stance, fixed exchange rate system
	Land policy led to increased access to land by many smallholder farmers in commercial farming. This led to increased agricultural output
	The agricultural policy was characterized by direct government intervention
1973/85	
	The most turbulent period in Kenya's economic history—two negative oil crisis related shocks and one positive coffee boom
	The negative shocks led to the biggest bias against agriculture while the coffee boom led to expansionary policy by the government that led to an increase in the consumption of non-tradables and ultimately to a rise in their prices
	The controls were intensified through a strengthened cooperative movement and production and marketing boards
	Minimal liberalization began in the early 1980s. The period between 1980-84 witnessed gradual price controls, price decontrols and promotion of private trade in marketing of agricultural commodities that were earlier regulated by government controlled marketing boards
1986/92	
	Era of considerable reforms in almost all the sectors of the economy— decontrol of the foreign exchange market, reduction of trade distortions/protections, agricultural sector reforms—price and movement decontrols
1993/03	
	This period witnessed the most sustained attempts at liberalization that the country has undergone in its post-independence period, though characterized by reversals and constant showdown with the donors

Considerable liberalization of foreign exchange markets although disagreements with donors threatened reversals

Capital markets were liberalized with the Central Bank of Kenya being granted full autonomy

Full liberalization of current and capital accounts was characterized by the discontinuation of trade licensing and foreign exchange allocation committees, continued reduction of tariff even at the regional level as the country entered into preferential regional trade arrangements; and the repeal of the Exchange Control Act.

Sources: Authors' summary

examination of the taxation of agriculture must focus on whether macroeconomic policies undertaken by the government over time had any negative effects on agriculture or whether there was any bias against agriculture in the economy-wide policies pursued by the government. As such, we will examine the implicit taxation of agriculture in Kenya.

3.   Methodology

The two approaches adopted to help to effectively answer the questions raised were: the terms of trade approach, which computes simple relative internal terms of trade to show whether there exists any bias against agriculture) and the real exchange rate approach, which attempts to measure the impact of direct and indirect distortions on agricultural growth.

3.1   Terms of Trade Approach

Following the methodology adopted by Diaz-Alejandro (1970) in Argentina, we compare the relative 'internal' terms of trade for agriculture to the 'external' terms of trade Kenya. Our study uses data for the years 1979-2003 and allows us to deduce whether policy distortions have resulted in the internal terms of trade moving against agriculture. Internal terms of trade for agriculture are defined as the ratio of the agricultural price index (Pa) to the non-agricultural price index (Pi). The ratio (Pa/Pi) will decline if the agricultural price index is declining relative to the non-agricultural terms of trade. The external terms of trade, for the same period, is defined as the ratio of export prices to import prices (Px/Pm). A decline in this ratio will mean that the terms of trade are deteriorating as import prices are increasing relative to export prices. Expressing the internal terms of trade as a ratio of the external terms of trade will show whether the relative terms of trade have been declining or not. A decline will show that policy distortions have caused a divergence between the internal and external terms of trade, probably resulting in withdrawal of resources out of agriculture to other uses.

3.2   Real Exchange Rate Approach

This methodology is developed in line with the general framework used by Elbadawi (1992), which attempted to measure the impact of direct and indirect distortions on agriculture. It involves a step-by-step modeling of the equilibrium real exchange rate (ERER) and computation of indexes of direct and indirect taxation of agriculture. Though the approach has shortcomings, it is based on an assumption that macroeconomic distortions in agriculture can be attributed to exchange rate misalignment and therefore aims at computing nominal protection rates at the equilibrium real exchange rate level.

3.2.1   Modeling the equilibrium real exchange rate

The real exchange rate is an important relative price in the economy and influences the price of domestic *vis-à-vis* foreign goods and services. Real currency depreciation: (i) reduces the relative price of domestic goods and services; (ii) encourages production of tradables in agriculture, manufacturing and services; and (iii) discourages production of non-tradables. Conversely, a real appreciation: (i) increases the relative price of domestic goods and services; (ii) discourages production of tradables in agriculture, manufacturing and services; and (iii) encourages production of non-tradables. The empirical estimation of the ERER is complicated by the fact that it is not observable. Following Ghura and Grennes (1993), we find a way out of this by estimating the time path of the equilibrium real exchange rate (ERER) from a cointegrating equation and normalizing it so that it starts from a common base with the actual RER during a period when the economy is largely perceived to have both internal and external balance. According to Mwega and Ndung'u (1999), there is consensus that 1970 was such a year for Kenya. In the 1960s, domestic prices were stable (inflation was about 3-4%), the economy was growing rapidly, external

balance of payments was healthy, and import licensing covered only a few commodities.

Following Mwega and Ndung'u (1999) we model the RER by first computing the Real Effective Exchange Rate (REER) as a first step towards modeling the RER. The REER values are computed on the basis of trade weighted bilateral nominal exchange rates, and appropriate price indices of non-tradable and tradable goods. Therefore the RER was computed as:

$$RER_{i,t} \equiv NER_{i,t}(P_{i,t}^{w}/P_{N,t}) \text{ for i } = 1,2,.................., \text{n}$$

In the above formulation, the NER denotes the nominal bilateral exchange rate expressed as the domestic currency price of the ith foreign country's currency and P^{W} is the world price of tradable goods while P_{N} denotes the domestic currency price of non-tradables. In our case, P^{W} and P_{N} are proxied by the US wholesale price index and the Kenyan consumer price index, respectively.

The volume of trade weights are then computed as follows:

$$W_{i,t} \equiv (X_{i,t} + M_{i,t})/\sum_{i=1}^{n}(X_{i,t} + M_{i,t}) \text{ for t } = 1,2,..................., \text{n}$$

Where W_{i} is the weight of the domestic to the ith foreign country real bilateral exchange rate and $X_{i,t}$ and $M_{i,t}$ denote the home country currency value of exports and imports with respect to the ith trading partner at time t. Finally, the REER is computed as:

$$REER_{t} \equiv \sum_{i=1}^{n}[RER_{i,t}W_{i,t}] \text{ for t } = 1,2,..................., \text{n}$$

The three main trading partners for both imports and exports used were the major reserve currency countries: Japan, United States of America and United Kingdom.

The RER is specified as a function of several variables specified in the theoretical and empirical literature. These variables include the following: (i) external terms of trade (TOT), (ii) net capital inflows (KFLOW), (iii) index of openness of the economy to both trade and capital flows (OPEN), (iv) government expenditure (GOVEXP), (v) technical progress (TECH), (vi) change in nominal exchange rate (DNER), and (vii) an index of macroeconomic imbalances (Z-Z*)[7].

Therefore, the estimatable equation is specified as:

$$RER=f(ToT,KFLOW,OPEN,GOVEXP,TECHPRO,Z\text{-}Z^*,\Delta NER)..........(1)$$

3.2.2 Direct and indirect taxation of agriculture

As stated earlier, agriculture can either be taxed explicitly or implicitly. Implicit taxes on agriculture are imposed through the use of various policies and taxes that do not directly fall on agricultural products but which bring about intersectoral resource transfers. Explicit taxes on agriculture include: (i) direct taxes on income—actual or presumed, and (ii) indirect taxes such as sales taxes, excise taxes, stamp duties, cesses on specific products, customs duties and export taxes. By their nature, direct taxes generate revenues without inducing inter-sectoral resource transfers. Indirect taxes raise revenues and also include inter-sectoral and inter-personal transfers.

Taxation of the agricultural sector comprises mainly indirect taxes, which result from changes in macroeconomic policies that indirectly impact on agricultural production and output relative prices. In Kenya,

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[7] KFLOW (as a proportion of GDP) was derived from the capital account of the balance of payments and a three-year moving average was used to remove the stochastic components of the short run net capital inflows. Government expenditure is also taken as a ratio to GDP and technical progress shows the real income growth. Z-Z* is proxied by DDC/M2 - DLog NER - DLog P_f - DLog y where DC is domestic credit and P_f are foreign prices as measured by the export weighted wholesale price index.

attempts to stimulate industrial growth in the 1970s led to the adoption of protectionism and exchange rate policies that may have resulted in an over-taxation of agriculture as evidenced by the gap between the border and domestic prices.

These price distortions are commonly referred to as the 'rate of protection' and may come about as a result of a set of direct policy interventions that distort prices, for example export taxes, import tariffs, trade quotas, and domestic producer and consumer taxes and subsidies.

If a price distortion results from a sector or product-specific intervention (for example price or market regulations, import/export taxes/subsidies), it is called 'direct protection'. Indirect protection arises if the price distortions, which are the result of macroeconomic policies (for example exchange rate overvaluation) or of interventions in other sectors that have a bearing on direct and indirect protection. Total protection is the sum of both direct and indirect protection.

We apply the Krueger, Schiff and Valde's (1988) framework (as adopted by Elbadawi, 1992) to assess the extent of taxation of agriculture in Kenya. The present study therefore computes the direct and indirect nominal rates of protections and measures of the differences between the relative domestic price and the relative border prices as a ratio to the relative price at equilibrium as shown below:

$$NRP_D = \left(\frac{P^d \big/ P^d_{NA} - P^b \big/ P^d_{NA}}{P^{b*} \big/ P^{b*}_{NA}} \right) \text{and } NRP_I = \left(\frac{P^d \big/ P^d_{NA}}{P^{b*} \big/ P^d_{NA}} \right) - 1$$

The total rate of protection is

$$NRP_T = \ + \ NRP_D \ + \ NRP_I \ = \left(\frac{P^d \big/ P^d_{NA} - P^b \big/ P^d_{NA}}{P^{b*} \big/ P^{b*}_{NA}} \right) + \left(\frac{P^d \big/ P^d_{NA}}{P^{b*} \big/ P^d_{NA}} \right) - 1$$

Alternatively, the total rate of protection can be rewritten as:

$$NRP_T = \left(\frac{P^d / P^d_{NA}}{P^{b*} / P^{b*}_{NA}} \right) - 1$$

Where:

- P^d is the domestic producer price of the aggregate tradable agricultural product adjusted for transport, storage and other marketing costs.

- P^b is the export price index of agricultural tradables.

- P^d_{NA} is the non-agricultural sector price index, proxied by non-food consumer price index.

- P^{b*} is the border price evaluated at the equilibrium real exchange rate.

- P^{b*}_{NA} is the non-agricultural price index evaluated at the equilibrium real exchange rate.

The direct nominal rate of protection index measures the effect of price controls, export taxes or quotas and other policies directly affecting the producer price (P^d) while the indirect nominal rate of protection index takes into account the effects of exchange rate over-valuation and industrial protection using a number of measures. The resultant values from the equation on direct intervention would provide estimates of the percentage by which domestic producers' prices diverge from those that would have prevailed in an environment with no taxes on agricultural tradables. Similarly, the estimates of indirect intervention would include the effect of trade and macroeconomic policies on the exchange rate and the extent of protection accorded to non-agricultural commodities. If the exchange rate is not at equilibrium, the border price against which the domestic price is compared should be adjusted to

remove this distortion. An overvalued exchange rate, $e < e^*$ means that $p^b < p^{b^*}$.

If $NRP > 0$, producers are protected and consumers taxed, i.e. producers receive a price which, after direct interventions, is above the border price, giving them incentives to produce more outputs than if equilibrium prices prevailed. If $NPR < 0$, producers are taxed and consumers subsidized. Whether a commodity is initially taxed *(NRP < 0)* or protected *(NRP > 0)*, a rise in the NRP between two periods indicates increased protection and a fall indicates increased dis-protection.

4.   Empirical Results

4.1   Estimation of Terms of Trade Ratios

Table 2 shows the evolution of the relative terms of trade over time. Looking at the evolution of price indices as a whole, the 'internal' terms of trade index reveal a heavy bias against agriculture save for the period 1979-83. The agricultural terms of trade (Pa) experienced a mixed performance; Pa was higher than Pi between 1979-83 but has since then remained lower though significant improvement was experienced between 1994 and 1998. The 'external' terms of trade have experienced a declining trend. From the table, internal terms of trade were deteriorating even after the trade liberalization episode. This can be attributed to the fact that despite the trade liberalization the terms of trade may have been influenced adversely by exogenous factors such as incomplete reform of all aspects that are important for the sector. Further, adverse weather conditions may have further affected the productivity of the sector and therefore the terms of trade. This is a plausible explanation because unlike agriculture, which is highly rain-

Table 2: Evolution of relative terms of trade

Years	Internal terms of trade (Pa/Pi)	External terms of trade (Px/Pm)	Internal terms of trade/ External terms of trade
1979-83	110.4	107.2	103.0
1984-88	95.6	97.2	98.3
1989-93	80.2	93.0	86.2
1994-98	98.2	94.2	104.2
1999-03	91.9	81.6	112.6

Sources: Authors' commutations

dependant, the manufacturing sector is not. The internal terms of trade are therefore likely to be affected in cases of shocks to the agricultural sector.

The decline in internal terms of trade of agriculture relative to the external terms of trade may perhaps be as a result of domestic policies. Though the period from 1980s up to and including 1993 were reform years, as discussed earlier, these reforms were mainly half-hearted and characterized by reversals due to lack of political commitment. However, the period 1994-1998 witnessed a determined commitment to sustain the reform effort. This ensured a marked improvement in the relative terms of trade. Although an imperfect measure, the above results would seem to clarify (though not separate) the role of domestic policies in acting as a bias (tax on) against agriculture.

4.2   Real Exchange Rate Approach: Results

4.2.1   Unit root and cointegration tests

Using the ADF test with a maximum of four lags, the study found the change in the nominal exchange rate (DNER), the index of macroeconomic imbalances (Z-Z*) and technical progress (TECH) to be integrated of order 0 (I(0) processes), and therefore stationary time series. On the other hand, the real exchange rate (RER), terms of trade (TOT), net capital inflows (KF), government expenditure (GOVEXP) and the index of openness of the economy to both trade and capital flows (OPEN), all in logarithms, were found to be integrated of order 1 and therefore non-stationary series (Appendix Table 4). The results are supported by Phillips Perron (PP) tests. Testing for cointegration was done on residuals from the cointegrating equation. From theory, variables can only be cointegrated if they are integrated of the same order. We therefore tested for cointegration between real exchange rate

(RER), terms of trade (TOT), net capital inflows (KF), government expenditure (GOVEXP) and the index of openness of the economy to both trade and capital flows (OPEN). Long run estimations were carried out using an autoregressive distributed lag model, with each variable being lagged four times to preserve degrees of freedom. The Error Correction Model (ECM) was found to be stationary, with an ADF statistic of –5.499 (against a critical value of –4.96 at 1% significance). The cointegrating equation is given below:

LnRER=2.0289-0.535791*LnTOT-1.15307*LnKF-0.589957*LnGOV+0.974632*LnOP

> *(0.0419)*   *(0.0571)*   *(0.0231)*   *(0.0305)*   *(0.0277)*

-0.0373304*D71-0.0419825*D82-0.0252611*D83-0.0335789*D75

> *(0.0073)*   *(0.0071)*   *(0.0072)*   *(0.0094)*

(Standard errors are in brackets)

The results show a significant negative long run relationship between the real exchange rate and the terms of trade, capital expenditure and capital flows, which is consistent with the findings by Mwega and Ndung'u (1999). This shows that an increase in the terms of trade (implying higher export prices as compared to import prices), more capital expenditure and higher capital inflows lead to depreciation of the shilling in the long run. Openness on the other hand was found to have a significant positive impact on the real exchange rate, unlike the findings by Mwega and Ndung'u (1999) who showed that Kenya had not yet undertaken deep reforms under exchange rate management. This implies that the more open an economy becomes, the greater the appreciation of the shilling in the long run. The results also show that the equilibrium real effective exchange rate is driven by capital flows, as compared to Mwega and Ndung'u (1999) who showed that RER was mainly driven by the contemporaneous nominal exchange rate in the

short run. The dummies were included in order to model structural breaks, and were also found to be very significant. These dummies show that important policy episodes were evident in the years 1971, 1975, 1982 and 1983, which led to the devaluation of the currency. For instance, there was a ban on the movement of Kenyan shillings outside of Kenya (including Tanzania and Uganda) in 1971. During the same year, the Central Bank of Kenya Act was amended to ensure domestic borrowing rather than external borrowing, even though balance of payments support was needed. There was tight foreign exchange control and import licensing to protect foreign exchange reserves, which continued into 1972. A capital issue committee was set up in Treasury to control repatriation of capital. Foreign exchange dealings in Kenya, Uganda and Tanzania were also suspended, while the shilling was pegged to the dollar. Following the extreme loss of reserves as a consequence of expansionary fiscal policy and general international exchange rate instability, import bans, quotas, and licenses were introduced. The shilling depreciated following the depreciation of the US currency as a result of Smithsonian Currency Agreement, which raised the official price of gold and therefore devaluation. In 1982, the shilling was once more devalued following the coup attempt. A crawling peg was introduced on a basket of the main trading partners' currencies. The devaluation continued in 1983 with the printing of the red books during the same year.

4.2.2   Modeling the real exchange rate

An Autoregressive Distributed Lag model with all variables being lagged four times was used. The short run equation was derived from the simplification of the general model, with the non-significant variables being dropped to make it parsimonious. The independent

Table 3: Preferred model results

	Coefficient	Std. Error	t-value	t prob
DLnRER_1	0.98	0.05	18.40	0.00
DLnRER_2	0.47	0.04	11.50	0.00
Constant	0.26	0.02	13.20	0.00
TECH	-0.02	0.00	-8.56	0.00
TECH_1	-0.01	0.00	-9.79	0.00
TECH_2	-0.02	0.00	-9.17	0.00
DNER	-0.03	0.00	-17.00	0.00
DNER_1	0.00	0.00	-2.50	0.09
DNER_2	0.00	0.00	-1.64	0.20
ZZ*	-0.54	0.04	-14.50	0.00
ZZ*_1	0.17	0.02	11.30	0.00
ZZ*_2	0.15	0.02	6.52	0.01
DlnOP	-0.37	0.03	-13.50	0.00
DlnOP_1	0.05	0.03	1.92	0.15
DlnOP_2	-0.55	0.03	-17.90	0.00
DLnGOV	0.16	0.03	4.67	0.02
DLnGOV_1	0.41	0.03	14.50	0.00
DLnKF	-0.26	0.02	-13.20	0.00
DLnKF_1	0.07	0.02	3.60	0.04
DLnKF_2	0.37	0.02	15.50	0.00
DLnTOT	-0.35	0.02	-15.70	0.00
DLnTOT_1	0.51	0.04	12.70	0.00
DLnTOT_2	0.67	0.05	14.30	0.00
ECM_1	-0.16	0.03	-5.69	0.01
D90	0.25	0.01	22.60	0.00
D72	-0.13	0.01	-13.00	0.00
D81	-0.18	0.01	-15.70	0.00
D80	0.11	0.01	9.57	0.00
D70	0.06	0.01	4.64	0.02

Sources: Authors' commutations

R^2 = 0.99905; F (18,3) = 112.7 (0.001); s = 0.0073649; DW = 2.05

RSS = 0.000162725153 for 19 variables and 32 observations

AR 1- 1 F(1, 2) = 0.051820 [0.8411] ; ARCH 1 F (1, 1) = 3.4847e-005 [0.9962]

Normality Chi˝ (2)= 7.9247[0.059]; RESET F (1, 2) = 11.674 [0.0760]

variables were taken to be exogenous. The reduced short run model is given below.

Modeling DLnRER by Ordinary Least Squares

The variables with a unit root were differenced once to make them stationary, while those without were used in their levels. From the diagnostics tests there were no signs of both autocorrelation and heteroskedasticity. The OLS results are shown below.

The short run results above show that the model explains about 99.9% of the variations in REER. The results also show that the REER has to a large extent been driven by the past REER values, the macroeconomic imbalance index, terms of trade, capital flows, government expenditure and openness. Other significant variables are technological progress and the change in the nominal exchange rate even though their impact

Table 4: Solved static long run equation for DLnRER

|	Coefficient	Std.Error	t-value
Constant	-0.57	0.08	-6.85
TECH	0.13	0.02	7.10
DNER	0.07	0.01	7.33
ZZ*	0.48	0.11	4.44
DlnOP	1.89	0.30	6.22
DLnGOV	-1.24	0.21	-6.00
DLnKF	-0.39	0.06	-6.84
DLnTOT	-1.81	0.30	-6.07
ECM	0.36	0.07	5.45
D90	-0.54	0.09	-6.02
D72	0.29	0.06	5.02
D81	0.40	0.07	6.09
D80	-0.25	0.05	-4.79
D70	-0.12	0.03	-4.25

Sources: Authors' commutations

on REER is minimal. The dummies indicate that the positive change in government policy aimed at prudent management of resources experienced in 1970, 1980 and climaxed by the financial sector reforms that began in 1990, led to an appreciation of the shilling. The threats of drought and the implementation of the Smithsonian currency agreement in 1971, and international debt crisis, led to depreciation of the shilling in 1971 and 1981. The speed of adjustment from the short run to the long run is about 16 percent, which implies that on average, it takes about six years and three months for a shock in the real exchange rate to peter out and therefore return to the equilibrium level.

The long run static model also shows that REER is mainly driven by openness, macroeconomic imbalances, government expenditure, terms of trade and a 1990 dummy that captures the beginning of the financial sector reforms. REER is quite responsive/elastic to changes in the degree of openness, government expenditure and terms of trade. The long run effects of the policy/institutional shocks (dummies) reveal that appreciation/depreciation scenarios experienced in the short run model had mixed results in the long run. For instance, the long run effects of the inflationary pressures resulting from the Iraq-Kuwait Gulf crisis, whose impact on domestic prices led to a balance of payments gap, was a depreciation of the Kenyan shilling. In addition, the drought threats of the 70s and 80s seriously affected agricultural output and the balance of payments in turn.

The equilibrium real exchange rate was then derived from the cointegrating equation. Figure 1 shows the comparison between the Real Effective Exchange Rate (REER) and the Equilibrium Real Effective Exchange Rate (EREER). On average, EREER has been higher than REER over most of the years.

Figure 1: Equilibrium real effective exchange rate
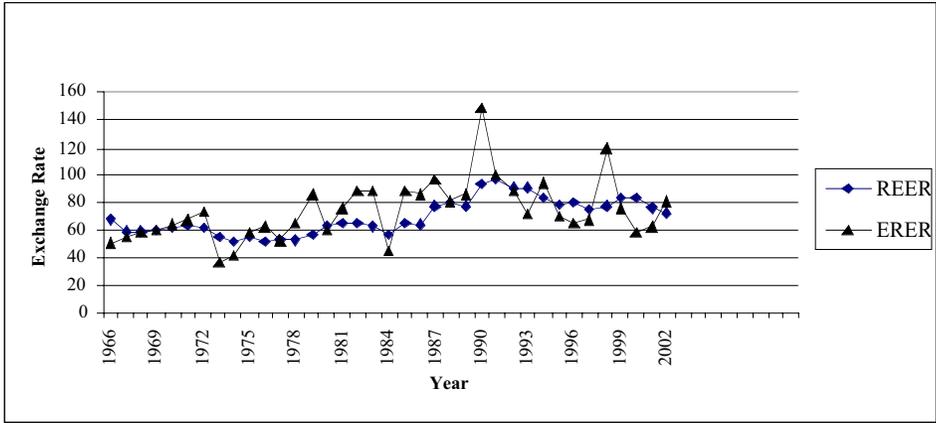
Table 5: Nominal protection rates

Year	Direct nominal rate of protection (1990 prices)	Indirect nominal rate of protection (1990 prices)	Total nominal rate of protection (1990 prices)
1966/1970	2.492	0.982	1.51
1971/1980	1.125	-0.98	-0.142
1981/1990	0.396	-0.98	-0.592
1991/2002	-0.10 -	-0.98	-1.08
1966/1990	1.11	-0.98	0.12
1966/2002	0.729	-0.98	-0.25

Source: Authors' commutations

4.2.3   Nominal protection rates

Using the equations above, we computed the direct, indirect and total indices of taxation or price distortions imposed on the agricultural sector. The average protection rates are shown in Appendix Table 5 for year-to- year protection rates.

The results shown in Table 5 indicate that for the period between 1966 and 1970, the agriculture sector experienced the highest levels of protection, standing at 151 percent. However, the level of protection had been reduced steadily by the end of 1990. The results also reveal that prior to 1990, direct interventions were in favour of the agricultural producers who enjoyed an average protection of about 111 percent. This means that domestic prices were above the border price that could have been experienced had an equilibrium environment prevailed. With liberalization, the 1990s witnessed a change in policy interventions as the government reduced protectionism, as shown by the 8.8 percent disprotection rate in the last decade. This means that agriculture was directly taxed to the tune of 8.8 percent. In the case of indirect policy intervention, resulting from macroeconomic distortions as captured by the exchange rate overvaluation, the producers experienced a disprotection rate averaging 98 percent. That is, agriculture was indirectly taxed through exchange rate overvaluation. On average, agricultural produce experienced relatively higher levels of dis-protection or a taxation rate estimated at about 25.6 percent (when the direct and indirect effects are combined). These results support the proposition that indirect taxation (disprotection) through exchange rate overvaluation is an important determinant of agricultural taxation.

We further decompose the analysis of the nominal direct, indirect and total interventions to the crop level as shown in Table 6. Table 6, derived from Nyangito *et al* (2004), indicates that direct trade policies seemed to have favoured food imports like wheat and maize. The nominal

protection rates for wheat reduced from an average of 61 percent in 1980 to an average of 21 percent between 1990 and 1998. On the other hand, maize production continued to be taxed at an average rate of 18 percent. Though indirect taxation still persists, there has been a reduction of taxation on most of the commodities.

The results for some selected crops indicated in Table 6 suggest that except for wheat, most crops experienced direct taxation but the overall picture showed a significant level of protection. The indirect effect is predominantly negative for all crops. This supports the earlier proposition that there was effective taxation resulting from exchange rate and macroeconomic policies that protected the non-agricultural sector.

Table 6: Nominal direct and indirect protection of selected crops

	Wheat		Maize		Coffee		Tea	
Year	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
1980	0.61	-0.42	-0.11	-0.68	-0.08	-0.67	-0.03	-0.66
1990	0.09	0.38	-0.25	-0.57	-0.06	-0.46	-0.07	-0.47
1991	0.22	-0.27	-0.24	-0.55	-0.13	-0.48	-0.12	-0.47
1992	-0.14	-0.52	-0.22	-0.57	-0.21	-0.56	-0.49	-0.72
1993	-0.52	-0.66	-0.31	-0.51	-0.21	-0.44	-0.07	-0.43
1994	1.08	0.14	0.11	-0.39	-0.12	-0.52	-0.09	-0.50
1995	0.27	-0.35	-0.19	-0.55	-0.02	-0.50	-0.81	-0.58
1996	0.07	-0.43	-0.02	-0.48	-0.02	-0.48	-0.09	-0.51
1997	0.55	-0.22	0.14	-0.43	0.01	-0.49	-0.02	-0.56
1998	0.43	-0.57	-0.61	-0.58	0.01	-0.50	0.06	-0.47
1990-98	0.23	-0.28	-0.18	-0.51	-0.08	-0.49	-0.19	-0.52

Source: Nyangito et al. (2004)

5.   Conclusions and Recommendations

The foregoing analysis shows that it is widely recognized that although agriculture remains the backbone of the economy, accounting for over 25 percent of GDP, it still remains one of the hardest sectors to tax. This is universally the case due to the small scale and spatial spread of the activity, the lack of standard bookkeeping and the continued practice of payments-in kind-to rural transactions. In addressing the question of whether agriculture is implicitly or explicitly taxed, this paper sought to find out whether the direct taxation incentives given to the sector have been cancelled by the indirect taxation measures due to macroeconomic distortions and protective measures over the industrial sector over time. The extent of exchange rate overvaluation can tell us whether macroeconomic distortions had a negative impact on the sector or not. Other factors of interest include: terms of trade (exogeneity of growth factor), protection rates, and intermediate imports for agriculture and investments levels. These factors explain the decline in agricultural GDP growth and the subsequent declining share in GDP in Kenya.

The study found that there is very little explicit taxation of agriculture in Kenya. This is probably because the majority of Kenyan farmers are smallscale holders. Like in other developing countries, the agricultural sector is grouped together with activities in the informal sector and therefore its taxation remains both politically and technically a thorny issue to implement. Nevertheless, the study found that explicit taxation could be implemented through direct taxation via land-based taxes, income and personal taxes or policies that have direct effects that serve to drive a wedge between producer and border prices of agricultural products. Such taxes include import and export taxes, price controls and production taxes and subsidies that are specific to the sector. The tax incentives implemented since the mid 1980s have focused on reducing the explicit taxation of agriculture and therefore led to a major

reduction of direct taxes on agricultural products. However, the sector suffered from policies that had indirect effect on agricultural incentives such as: (i) import tariffs on non-agricultural products, (ii) price, and (iii) macroeconomic (especially exchange rate) policies that affected the economy-wide balance between traded and non-traded goods in addition to turning the terms of trade against the agricultural sector and in favour of industry. These incentive-distorting policies received minimal attention.

The most efficient way of directly taxing the agricultural sector is through land-based taxes as these ensure increased land use efficiency and help in revenue generation especially for local administrations which can then directly utilize the revenues for the infrastructure and other public utilities consumed by farmers during their production process. This method of taxation has, however, not been explored in Kenya due to both logistical and political reasons, yet it could effectively resolve the problem in Kenya where huge tracks of land lie idle.

The terms of trade approach reveals that previous government policies succeeded in creating a bias against agriculture, although liberalization has since reduced the negative effects of such policies on the sector; that is good policy reforms led to a marked improvement in relative terms of trade. However, the continued deterioration of the internal terms of trade even after the trade liberalization episode signifies worsening agricultural terms of trade. This deterioration could be attributed to exogenous factors such as incomplete reform of all aspects that are important for the sector, and adverse weather conditions, all of which affected the productivity of the sector and therefore the terms of trade.

The exchange rate approach involved a step-by-step modeling of the REER, protection rates and their impacts on agricultural growth. The findings of this model reveal that: the REER is mainly driven by

openness, macroeconomic imbalances, government expenditure, terms of trade and a 1990 dummy that captures the beginning of the financial sector reforms. Prior to 1990, direct interventions were in favour of the producer who enjoyed an average protection of about 111 percent but with liberalization, the 1990s witnessed a change in policy interventions as the government reduced protectionism as shown by the 8.8 percent disprotection rate or direct taxation. Overall, indirect taxation on agriculture remained high.

The findings of this study concur with other empirical results that show that policies are biased against agriculture and are in favour of other sectors as the implicit taxes discourage the growth of the sector. The study concludes that policies previously implemented by government somehow discriminated on agriculture. It is therefore recommended:

- That regular effort should be made by macro managers to ensure that macroeconomic policies do not unfairly impinge against agriculture. Further, micro and sector-specific policies should be pursued to ensure that farmers get the right signals and are not unfairly disadvantaged by the policies in place.

- The government makes clear attempts to use more efficient methods of taxing agriculture, as indeed it must, without distorting the relative incentives. A land tax is considered to be a more efficient method of taxing agriculture than output taxes. It is also imperative that in order to improve the competitiveness of agriculture *vis-a vis* products from elsewhere, even as the government liberalizes the sector, due regard should be given to making appropriate productivity-enhancing investments in agriculture, such as rural infrastructure, agricultural extension, irrigation and seed technology.

- In future, research be undertaken to explore the viability of implementing land-based taxes and designing a feasible crop-

specific levy: A land-based levy has necessarily to be crop-specific since returns to cultivation are not equalized by cropping pattern shift, even within a homogeneous agro-climatic region. Any of a number of barriers to entry, ranging from factor-specificity to imperfections in credit markets can prevent factor shifts to the most profitable crop in a region.

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Appendix

Appendix Table 1: Tax incentives to agricultural sector for 1990/91 to 2000/01 fiscal years

Year	No.	Impact area/Affected item	Tax regime	Recommended action	Objective
1990/91	1	Wood pulp	Customs	Duty reduced from 20-10%	Promote agroforestry; Reduce pressure on forests
1991/92	1	Horticulture	Customs	Removal of duty & VAT levied on 50% of airfreight charges of imported cargo	Promote exports by ensuring sufficient air cargo space for exports
	2	Horticulture	Customs	Reduction of jet fuel price for air cargo from US$1.75 to US1.45	
	3	Horticulture	VAT	Tubers, potato seeds and cutting for planting (previously exempted) zero rated	Eligibility for input tax deduction
1992/93	1	Maize, Wheat, Rice, Sugar & Milk powder	Customs	Change from import parity system of domestic setting prices to that of variable prices	Protection of local producers from adverse changes in prices
	2	Packaging material for seeds & seedlings	VAT	Zero rated	Eligibility for input tax deduction
	3	Shade netting for Horticultural Industry	VAT	Zero rated	Eligibility for input tax deduction
	4	Agricultural inputs	VAT		
	5	Milk	Income tax	PIT abolished	Encourage farmers and strengthen the previous incentive, i.e. decontrolling prices and marketing
1993/94	1	Sugarcane and other molasses	VAT	Zero rating animal feeds made molasses	Lower prices through input tax deduction
1994/95	1	Horticulture	Customs	Greenhouses-duty free and local manufacturers to qualify for EPPO remissions	Cost reduction; Promotion of exports
	2	Others-Nematocides & acaricides, tractors, day-old checks & hatching eggs, high density polythene plastic sheeting for lining dams	Customs	Duty free	Cost reduction
	3	Fishing industry	Customs	Duty on sun dried fish and fish meal for preparing fish meal down to 10%	Promote fish meal production
	4	Hand tools eg spades & agricultural folks	Customs	Duty reduced to 30%	Cost reduction
	5	Agricultural machinery	Customs	Duty reduced to 20%	Cost reduction
	6	Horticultural and farm Sectors	Customs	Vegetable seeds zero rated	Cost reduction

Year	No.	Impact area/Affected item	Tax regime	Recommended action	Objective
1995/96	1	Fishing industry	VAT	VAT rate on fishing nets reduced from 18-6%	Lower prices
	2	Animal feeds	VAT	Zero rated	Cost reduction to farmers
1996/97	1	Certain capital equipment, e.g. hand tools and wheel barrows	Customs	Duty reduced from 25-15%	Cost reduction to farmers and the rural informal sector
	2	Horticulture	Customes	Local producers of shade netting or reinforced plastic sheeting to qualify under EPPO for duty remission. To further this the minimum application limit under EGSP lowered from Ksh 1m to Ksh 200,000	Promote local industry and strengthen its competitiveness
	3	Animal feeds	VAT	Oil cakes a primary input to be subject to the lower, 8% VAT rate	Cost reduction since input taxes will be deducted
1997/98	1	Milk, Maize, Rice, Sugar and Wheat	Customs	Currently in the 25% tariff band, but an additional suspended duty imposed	Protect local farmers against cheaper imports
	2	Apples, pears, grapes and oranges	Customs	Suspended duty of 10% imposed	Protect local farmers against cheaper imports
1998/99	1	Horticulture	Customs	Polyvinyl chloride and polyethylene sheeting for green houses - duty free importation	Cost reduction
				Chemical fertilizers - duty free importation for those not previously allowed	Cost reduction
	2	Supply of tea to auction centres	Customs	Zero rated	Simplification of VAT treatment and cost reduction
1999/00	1	Agricultural, livestock and horticultural products, e.g. all fruits and vegetables	Customs	Duty raised fom 15-25%	Protection to local farmers
	2	Barley and malt	Customs	Duty raised by a suspended duty of 25%	Local farmers threatened by a downturn in world prices and export subsidies provided to European farmers on barley and wheat
	3	Soft (local) and gard (imported for blending) wheat	Customs	Tariff on wheat split	To allow for imposition of lower suspended tariff on hard wheat
	4	Specialized cold storage equipment	Customs	Minimum duty rate lowered from 10-5%	Cut costs to local farmers
	5	Supply of coffee to auction centres	VAT	Zero rated	Simplification of VAT treatment and cost reduction
	6	Bread	VAT	Exempted VAT	Lower prices

Year	No.	Impact area/Affected item	Tax regime	Recommended action	Objective
2001/2	1	Imported timber	Customs	Duty free	Promote agro-forestry; Reduce pressure on forests
	2	Meat and meat products, dairy products, poultry and poultry products	Customs	Duty increased to 35%	To cushion the agricultural sector
	3	Animal feeds	VAT	VAT on oil seed cakes and maize germ reduced from 18-0%	To encourage local production of cheaper animal feeds
2002/3	1	Capital goods, fertilizers and chemicals and other inputs	Customs	To be imported duty free, i.e. duty reduced to 0%	The concession relating to capital goods will encourage more investment in agro-processing industries to take advantage of the available raw materails, enhance value addition and sub-sebsequently increase earnings for farmers.
	2	Fishing industry	VAT	Fishing nets zero rated	To support the industry and improve the welfare of those whose livelihood depends on the industry
2003/04	1	Macadamia and cashew nuts	Customs	Removal of export duty	To encourage farming of these nuts
	2	Livestock farming	Customs	Reduction of export development levy from 20-15%	Encourage value addition on hides and skins
	3	Poultry farming	Customs	Removalof import duty on fertile hatching eggs imported by specified hatcheries	To promote domestic poultry farming and production of poultry products
	4	Coffe farming	VAT	Zero rating of raw coffee to enable them claim tax paid on inputs used in the coffee industry	To assist coffee farmers and encourage investments in quality improvements
	5	Floriculture (flower farming)	Income tax	Removal of 20% withholding tax on commissions paid to non-resident agents in overseas auctions	To make Kenyan flowers more competitive in the international flower market
	6	Producer cooperatives	Income tax	Restructuring taxation of all cooperatives. All payments to members, both primary and corporate, will be allowed free of taxes	To increase the potential role of cooperative in rural development. Consequently make cooperatives more effective towards economic recovery and poverty alleviation

Source: Government of Kenya budget speeches (various years)

Appendix Table 2: Effects of adjustment on intermediate variables, 1976-91

Intermediate variables	Crisis period	Adjustment Period	
		Phase I	Phase II
	(1976-81)	(1981-84)	(1985-91)
Changes in fiscal deficit/GDP (% points)	5.7	-5.8	4.5
Inflation rate (change in rate)	3.3	-11.1	4.7
Real average interest (loans)	-2.1	-0.3	4.6
Real effective exchange Rate (% change)	-16.9	5.7	-42.3
Change in current account/GDP (%points)	9.9	-8.2	4.0
Debt service/Exports average (%)	8.0	26 -28	30.0

Source: Swamy (1997) and authors' computations

Appendix Table3: Distribution of goods by tariff bands, 1987-96 (%)

Tariff Rates	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96
0	6.9	7.0	5.8	6.1	3.7	2.9	3.1	3.2	3.3
1-10	0.3	0.9	1.6	1.6	4.0	4.6	5.2	4.9	1.8
11-30	30.7	29.6	37.6	37.4	47.6	47.6	56.5	67.8	71.8
31-50	45.4	43.7	23.8	21.6	17.7	20.9	35.2	24.1	23.1
51-60	3.9	5.6	6.0	6.3	3.0	24.0			
61-70	3.8	4.1			24.0				
71-	9.0	9.1	25.2	27.0					
Total	100	100	100	100	100	100	100	100	100

Source Ministry of Finance as cited in Ikiara and Ndung'u (2002) and Bigsten and Kimuyu (2002)

Appendix Table 4: Tests of data stationarity

			ADF	**PP**
LnRER			-2.37017	-2.59995
DLnRER			-5.57738	-5.57654
DNER			-5.51848	-6.45950
LnTOT			-1.53114	-2.46546
DLnTOT			-6.58904	-6.68063
LnKF			-2.82600	-2.53603
DLnKF			-3.97800	-5.97659
LnOP			-2.41187	-2.53393
DLnOP			-5.36898	-5.36198
TECH			-5.58251	-5.55540
ZZ			-4.26798	-4.18005
LnGOV			-0.95097	-1.83058
DLnGOV			-4.47663	-4.36921
With Constant	ADF		PP	
1%	-3.75		-3.6228	
5%	-3.00 -		2.9446	
10%	-2.62		-2.6105	
With constant and trend				
1%	-4.38		-4.2324	
2.5%	-3.60		-3.5386	
5%	-3.24		-3.2009	
ADF: Augmented Dickey Fuller Test				
PP: Phillips Perron				

Appendix Table 5: General model results for DLnRER

	Coefficient	Std. Error	t-value	t-prob
DLnRER_1	0.96	0.06	15.30	0.00
DLnRER_2	0.49	0.05	10.60	0.01
Constant	0.27	0.02	11.90	0.01
TECH	-0.02	0.00	-8.14	0.02
TECH_1	-0.01	0.00	-8.23	0.01
TECH_2	-0.02	0.00	-8.06	0.02
DNER	-0.03	0.00	-15.70	0.00
DNER_1	0.00	0.00	-2.50	0.13
DNER_2	0.00	0.00	-0.93	0.45
ZZ*	-0.54	0.04	-13.60	0.01
ZZ*_1	0.17	0.02	10.20	0.01
ZZ*_2	0.16	0.03	5.30	0.03
DlnOP	-0.37	0.03	-12.50	0.01
DlnOP_1	0.07	0.04	1.93	0.19
DlnOP_2	-0.53	0.04	-12.60	0.01
DLnGOV	0.12	0.05	2.39	0.14
DLnGOV_1	0.41	0.03	13.70	0.01
DLnGOV_2	-0.05	0.06	-0.83	0.50
DLnKF	-0.26	0.02	-11.00	0.01
DLnKF_1	0.05	0.04	1.39	0.30
DLnKF_2	0.36	0.03	13.50	0.01
DLnTOT	-0.33	0.03	-10.60	0.01
DLnTOT_1	0.52	0.04	11.70	0.01
DLnTOT_2	0.68	0.05	12.70	0.01
ECM_1	-0.16	0.03	-4.85	0.04
D90	0.24	0.01	18.00	0.00
D72	-0.13	0.01	-12.00	0.01
D81	-0.18	0.02	-11.10	0.01
D80	0.12	0.02	7.96	0.02
D70	0.05	0.01	3.56	0.07

sigma 0.00778541 RSS 0.000121225222
R^2 0.999293 F(29,2) = 97.41 [0.010]*
log-likelihood 154.332 DW 1.47
mean(DLnRER) 0.0111748 var(DLnRER) 0.00535467

AR 1-1 test: F(1,1) = 27.004 [0.1210]
ARCH 1-1 test: $Chi^2(1)$ = 0.00000 [1.0000]
Normality test: $Chi^2(2)$ = 0.85439 [0.6523]

Appendix Table 6: Nominal protection rates

Year	Direct nominal rate of protection (1990 prices) %	Indirect nominal rate of protection (1990 prices) %	Total nominal rate of protection (1990 prices) %
1966	272.1	-98.0	174.0
1967	299.3	-98.2	201.1
1968	269.0	-98.3	170.8
1969	219.4	-98.3	121.0
1970	186.3	-98.4	87.8
1971	220.5	-98.5	122.0
1972	167.2	-98.7	68.5
1973	134.1	-97.3	36.8
1974	173.4	-97.6	75.7
1975	144.0	-98.3	45.8
1976	74.7	-98.4	-23.7
1977	3.2	-98.1	-94.9
1978	59.8	-98.5	-38.7
1979	65.4	-98.8	-33.5
1980	82.7	-98.3	-15.7
1981	84.9	-98.7	-13.7
1982	66.0	-98.9	-32.9
1983	38.2	-98.9	-60.7
1984	31.2	-97.8	-66.6
1985	31.9	-98.9	-66.9
1986	9.7	-98.8	-89.2
1987	52.5	-99.0	-46.5
1988	41.9	-98.8	-56.9
1989	39.3	-98.8	-59.6
1990	0.0	-99.3	-99.3
1991	-11.9	-99.0	-110.9
1992	-6.2	-98.9	-105.1
1993	-18.7	-98.6	-117.3
1994	-9.6	-98.9	-108.6
1995	-9.1	-98.6	-107.7
1996	-25.5	-98.5	-123.9
1997	-17.2	-98.5	-115.7
1998	4.6	-99.2	-94.5
1999	-0.1	-98.7	-98.8
2000	1.1	-98.3	-97.2
2001	-3.8	-98.4	-102.2
2002	-9.4	-98.8	-108.1