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AN IN-KIND TAX ON AGRICULTURAL PRODUCTS, AGRICULTURAL LAND AND LIVESTOCK: A PRELIMINARY STUDY IN THE COMPARATIVE ECONOMICS OF TAXATION

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Abstract

This paper provides a preliminary demonstration of the salient features of *Zakat* mainly as an in-kind tax. The author draws attention to certain optimal properties of *Zakat* on agricultural products, agricultural land and livestock. Starting from a fundamental juristic background, the author addresses the relevant issues of tax incidence and welfare cost for *Zakat* in comparison with property tax, payroll tax and profit tax. He also examines the impact on government revenues as well as some elements of a good tax, involving comparison with Western experience.

1. Introduction

This paper is presented for three main reasons. First, it introduces the reader, especially one who is not familiar with the economic teachings of Islam, to the taxation system of a different economic system. Second, and more important, it shows some of the economic implications of that system, especially when contrasted with some of those existing in Western countries. Third, the literature on public finance is replete with papers that discuss in-kind transfers and subsidies[1], yet papers on in-kind taxation are quite rare. *Zakat* is a major form of Islamic taxation, a form of worship, and the third pillar of the Islamic faith. This paper is only a prelude to agricultural and livestock taxation under the Islamic economic system.

In order to discuss the economics of *Zakat* it is necessary to give the reader some idea about the Islamic jurisprudence on that matter. This is provided in Section I. Unless otherwise indicated, Section I represents a very condensed summary of what Yusuf Al-Qaraḍāwī, a great contemporary Muslim scholar, has concluded as the

accepted rules on *Zakat*, in his monumental study, *Fiqh Al-Zakat* (The Jurisprudence of *Zakat*), Vol. 1, 1969. For the sake of brevity and manageability, I have avoided many details and controversies raised in that book. Section II of the paper discusses some of the economic efficiency implications of the revenue side of *Zakat*. No attempt is made to discuss the expenditure side.

II. The Jurisprudence of *Zakat*

II.1 General Requisite Conditions for Zakatable Wealth[2]

In general, there are six requisite conditions for the collection of *Zakat* from any Muslim:

1. *Absolute Ownership:* which implies acquirement, disposition, and the exclusion of others' interest. This condition implies also the exclusion of any form of wealth that cannot be attributed to a private entity, trusts, any form of wealth that is illegally[3] acquired and debt[4].
2. *Accretion:* The accretion of wealth has to be either of its own kind, such as livestock, the result of growth such as agricultural products, or growable in value via exchange such as money, gold, silver and other tradables. Consequently, things that are intended for personal use such as one's personal house, car, books and professional equipment such as those of a physician or an engineer, are all examples of *Zakat*-exempted forms of assets.
3. *Nisāb* or the minimum level of wealth below which no *Zakat* is collected. There is a *Nisab* for each kind of Zakatable asset (to be discussed later in the paper).
4. *Excess over basic needs (subsistence):* The basic needs of a household must be met first before any *Zakat* is collected. The definition of basic needs changes according to the change in time, place and economic and social conditions.
5. *Absolvency from debt:* Which implies that if the individual's debts are such that they reduce the value of his actual wealth below the *Nisāb*, then he is exempted from *Zakat*.
6. *The elapsing of twelve lunar months* on the ownership of the particular form of wealth. This condition is applicable, however, only on livestock, money, gold, silver and tradable items. It is not applicable on agricultural products, honey and minerals. Qaraḍāwī (p. 162) reasoned that the first group of wealth needs time to grow, while the other group is the result of growth and cannot be grown further. The discussion in this paper will be limited to *Zakat* on livestock, agricultural products and agricultural land.

II.2 Zakat on Livestock

Livestock, including camels, cattle, sheep and goats, are all taxed in-kind through *Zakat*. The requisite conditions for *Zakat* on livestock, in addition to the

above-mentioned general ones, are the following. First, no less than the *Nisāb* should be owned before *Zakat* is levied. The *Nisāb* of camels is five, for sheep and goats it is forty, and for cattle it is thirty. Second, one lunar year of ownership must elapse. Third, the livestock must be *Sāemah* (grazing in an open range) for most of the year, and has to be intended for breeding and milking. Implicitly, livestock that is intended for personal use is *Zakat*-exempted. Fourth, a livestock should not be laborious, such as those used for transportation and irrigation. There is an important difference of opinion among Muslim scholars about *Zakat* on livestock that are fed by the owner (i.e. that is not *"Sāemah'*). Qaraḍāwī and the majority of scholars seem to be of the opinion that it is *Zakat*-exempted[5]. But if a (*non-Sāemah*) livestock is intended for trade, it has to be treated like commercial goods and to be taxed at 2.5 percent of its pecuniary value. This point is discussed in **II.3** below. The breakdown of *Zakat* brackets and the discussion of the economics of *Zakat* shall be elaborated on in Section III of this paper.

II.3 *Zakat* on Commercialized *Sāemah*

Another important difference of opinion among Muslim scholars is on *Zakat* on commercialized *Sāemah*: should it be treated as a commercial item and hence taxed at 2.5 percent of its pecuniary value, or should it be treated as a *Sāemah* and taxed in the usual manner of an in kind *Zakat*? Qaraḍāwī (pp. 530-3) does not seem to favour one over the other but it is clear that double taxation should be avoided. In other words, a livestock in this case is either treated as a livestock and taxed in-kind, or treated as a commercial item and taxed at 2.5 percent of its monetary value, but not both. I am more inclined towards the idea that, whenever possible and practicable, an in-kind tax should be enforced because the original treatment is so, and because of the efficiency implications (to be explained later) that go with an in-kind tax.

II.4 *Zakat* on Agricultural Produce

Qaraḍāwī contends that all kinds of agricultural products are Zakatable. *Zakat* is collected in-kind in case of durables and storable products such as wheat, rice, corn, dates, barely and raisin. Perishable products, such as fruits and vegetables, are Zakatable in their pecuniary values. The tax rate in both cases is a flat proportional 10 percent if land is irrigated by rain or springs or if the plant is water self-seeking by its roots. Products that are irrigated at some cost by digging wells, for example, are taxed at 5 percent. A weighted average of the two rates is applied if both methods of irrigation are used.

It is worth noting that the stock of durable agricultural product is measured in terms of volume, not weight. Such measurement is a standard for evaluating all kinds of agricultural products. *Nisāb* for these products is five *wisqs* and each *wisq* is three standard *sā'*. It is not clear what are the volume equivalents of these measures in todays terminology, but Qaraḍāwī estimates that a *sā'* of wheat weighs 2.176

kilograms and that is equivalent to 2.75 liters of water. The *Nisāb*, then, is equivalent to 652.8 kilograms of wheat (p. 372). The same volume of other products shall have, of course, different weights. The *Nisāb* for perishable products that are measured by weight is obtained as the pecuniary value of five *wisqs* of some medium-valued durable product such as wheat or rice.

It is important to note that the estimation of *Nisāb* and *Zakat* is to be done only after the durable products have actually been refined and dried up, debts are deducted, and one fourth to one third of the produce is left for the household's consumption (depending on the family size). Perishable products are taxed right after their sale whereas the monetary equivalent is to be paid. The *Zakat* rates for both perishables and durables are the same (Qaraḍāwī, p.359).

II.5 *Zakat* on Products from Animals

Products from animals such as dairy products (of non-*Sāemah* livestock), honey, milk, eggs are zakatable at 10 percent of their net pecuniary revenue (i.e. after deducting costs). The general rule, as Qaraḍāwī explains (p. 431), is that items that are not zakatable in-kind, such as bees, silk-worm, and non-*Sāemah*, are taxed indirectly through their products. *Nisāb* and the *Zakat* base in general are estimated at the pecuniary equivalent of medium-valued durable agricultural product[6] (Qaraḍāwī, p.428). If these animals are commercialized, however, (i.e. being objects of trade themselves), they shall be taxed in the same way as commercial items - i.e. at 2.5 percent of their pecuniary value (Qaraḍāwī, p. 431).

II.6 *Kharāj*

Kharāj is an in-kind land tax when land is captured by force or through settlement and was not allocated among the fighters of the capturing army[7]. Such a land becomes a national property, but its inhabitants may still cultivate it as long as they pay the tax (*Kharāj*) to the state (Qaraḍāwī, pp. 405-410). If the occupant is a non-Muslim he pays *Kharāj* but not *Zakat*; if he becomes a Muslim, however, he pays both. The reason for such a distinction is that *Zakat* is a form of Islamic worship in addition to its being a fiscal duty; *Kharāj* is essentially a tax on (rent from) land. *Zakat* is estimated, however, after the deduction of *Kharāj* (Qaraḍāwī, pp. 415-9). In other words, *Kharāj* is treated like a debt or an expense that reduces the *Zakat* base. There is an important difference as to how to dispose of government revenues from each type of taxes. The expenditure of *Zakat* is earmarked by *Qur'an*, for eight categories of people. It states: "Alms are for the poor and the needy, and those employed to administer (the funds); for those whose hearts have been (recently) reconciled (to Truth); for those in bondage and in debt; in the cause of God; and for the wayfarer: (thus is it) ordained by God, and God is full of Knowledge and Wisdom". (S.IX, verse 60). *Kharāj*, on the other hand, can be spent on any government programmes. The economics of *Zakat* and *Kharāj* are discussed in **Section IV**.

III. Some Economic Efficiency Implications of *Zakat* on Livestock and Agricultural Products

III.1 *Zakat* on Livestock

As we indicated earlier, *Zakat* is levied in-kind on livestock such as cows, buffaloes, sheep, goats and camels. However, the *Zakat* rate-structure is more complicated than taxes on all other forms of wealth. The source of complexity is not only that payment in terms of animals is a combination of different ages and thus different relative values, but also that each age is given a different name.

The rates on livestock have the features of both progressive and proportional taxes. It is progressive in the sense that the average tax rate increases at some brackets with the tax base. However, under progressive tax, a person's income is divided into several brackets, and a different rate is applied to each income bracket. Under *Zakat* system, the realized stock is not divided into brackets, but treated as one bracket and the rate changes as the volume of realized stock changes. In other words, a *new, single* tax rate is applied on the whole tax base at different sizes of the tax base.

It is also notable that marginal and average tax rates change together, but they are equal to each other at each level of taxable stock. To illustrate this point, assume one's livestock is the worth of 200 *Dirhams* (an old Islamic currency) of camels, the tax rate on which is 2.5 percent. Should his stock rise to the worth of 1,000 *Dirhams*, the rate will be 4 percent. The 4 percent rate is applied to the entire stock and not only to the increase in stock. The fact that the marginal tax rate is always equal to the average tax rate implies that this tax has a feature of a proportional tax. The average tax rate, however, is *not* the same at all levels of the tax base. Thus, we can call it progressive-proportional, or for simplicity quasi-progressive or quasi-proportional tax.

III.1.1 *Zakat* on Camels

This is the most complicated category of all*. If the stock is less than five camels, it is tax-exempted. At five camels and up to nine, the tax in kind is one *sheep* or *goat*, not a camel. At ten camels and up to fourteen, the tax is two sheep or goats; at fifteen camels and up to nineteen, three sheep or goats; and at twenty camels and up to twenty four, four sheep or goats. The tax in-kind does not increase between the brackets below twenty-four. It is only when the stock reaches twenty-five camels, the in-kind tax has to be paid in terms of camels, and here we need to give the following glossary in Table 1 to help us read Table 2, since each age has a different name (see Shehata, p. 167).

*Their complexity is attributable to the exceptional lumpiness, i.e. indivisibility of wealth when it is in the form of camels. (Editor)

Table 1. Description of Payable *Zakat* on Camels

Name of the Animal (camel)	Value in terms of goats or sheep	Value in Currency terms in the early days of Islam	Age Group
Bint Makhad (she) I	8	40 (Dirhams)	1 year old and entered the second.
Ibn Laboon (male) II	10	50 (Dirhams)	2 yr. old and entered the third
Bint Laboon (female) II	10	50 (Dirhams)	2 yr. old and entered the third
Higgah (she) III	12	60 (Dirhams)	3 years old.
Jath'a (she) IV	14	70 (Dirhams)	4 years old.

To avoid these unfamiliar names, we may refer to each age group by a Roman numeral, as in Table 2, and use the Arabic numerals to refer to the number of camels to be paid out of each age group. In the first column of Table 2 the number of camels, or the size of the stock, is given where the asterisk refers to the beginning of a new *Zakat* bracket, and where the in-kind rate changes. Column 2 indicates the tax in-kind to be paid. For example, at 25 camels 1 I or II (a male) has to be paid, which means one she-camel of one year old or one male camel of two years old to be paid. At 130 camels, for example, it says 2 II and 1 III. This means two camels of two years old and one she-camel of three years old to be paid. In order to compare these taxes we have to convert them into money equivalents. These are given in columns 3 and 4. The *Zakat* rate (column 5) is obtained by dividing the entries of column 4 by those of column 3. Column 6 indicates the equivalent money value for camels payable as *Zakat*. The *Zakat* on money holdings is a flat proportional tax of 2.5 percent. The purpose of doing this is to compare the *Zakat* on money holdings with the money value of the in-kind *Zakat* on camels[8].

Table 2: *Zakat* on Camels

1	2	3	4	5	6
No. of Camels	*Zakat*	Value of the stock of Camels	Value of *Zakat* measured in currency units	*Zakat* Rate	Equivalent Money Value of Camels Payable as *Zakat* (at 2.5%)
1	0	40	0	0	0
2	0	80	0	0	0
3	0	120	0	0	0
4	0	160	0	0	0
5*	1 sheep/goat	200	5	2.5*	5
6	1 sheep/goat	240	5	2.0658	6
7	1 sheep/goat	280	5	1.79	7

Table 2 (Cont'd): *Zakat* on Camels

1	2	3	4	5	6
No. of Camels	*Zakat*	Value of the stock of Camels	Value of *Zakat* measured in currency units	*Zakat* Rate	Equivalent Money Value of Camels Payable as *Zakat* (at 2.5%)
8	1 sheep/goat	320	5	1.56	8
9	1 sheep/goat	360	5	1.39	9
10*	2 sheep/goats	400	10	2.5*	10
11	2 sheep/goats	440	10	2.27	11
12	2 sheep/goats	480	10	.065	12
13	2 sheep/goats	520	10	1.92	13
14	2 sheep/goats	560	10	1.79	14
15*	3 sheep/goats	600	15	2.5*	15
16	3 sheep/goats	640	15	2.34	16
17	3 sheep/goats	680	15	2.21	17
18	3 sheep/goats	720	15	2.065	18
19	3 sheep/goats	760	15	1.97	19
20*	4 sheep/goats	800	20	2.5*	20
21	4 sheep/goats	840	20	2.38	21
22	4 sheep/goats	880	20	2.37	22
23	4 sheep/goats	920	20	2.17	23
24	4 sheep/goats	980	20	2.065	24
25*	1I or II (a male)	1000	40	4.00*	25
35	1I or II (a male)	1400	40	2.86	35
36*	1 II (a female)	1440	50	3.47*	36
45	1 II (a female)	1800	50	2.78	45
46*	1 III (a female)	1840	60	3.26*	46
60	1 III (a female)	2400	60	2.5	60
61*	1 IV (a female)	2440	70	2.87*	61
75	1 IV (a female)	3000	70	2.33	75
76*	2 II (a female)	3040	100	3.29*	76
90	2 II (a female)	3600	100	2.78	90
91*	2 III (a female)	3640	120	3.29*	91
129	2 III (a female)	5160	120	2.33	129
130*	2 II & 1 III	5200	160	3.065*	130
139	2 II & 1 III	5560	160	2.87	139
140*	1 I & 2 III	5600	170	3.04*	140
149	1 I & 2 III	5960	170	2.85	149
150*	3 III	6000	180	3.00*	150
159	3 III	6360	180	2.82	160

Table 2 (cont's): *Zakat* on Camels

1	2	3	4	5	6
No. of Camels	*Zakat*	Value of the stock of Camels	Value of *Zakat* measured in currency units	*Zakat* Rate	Equivalent Money Value of Camels Payable as *Zakat* (at 2.5%)
160*	4 II	6400	200	*3.13	160*
169	4 II	6760	200	2.95	169
170*	3 II & 1 III	6800	210	*3.09	170*
180*	1 II & 3 III	7200	220	*3.06	180
190*	1 II & 3 III	7600	230	*3.03	190
200*	5 II & 4 III	8000	240	*3.00	200
300*	6 III or 5 II & 2 III				
Then in each additional 40 camels, an additional 2 year old, and in each additional 50 camels, an additional 3 year old					

In Figure (1), the *Zakat* rate on the money value of *Zakat* on camels (column 5) is plotted against money value of the base stock (column 3). Figure (2) compares the pecuniary value of the tax on camels (column 4) to the equivalent money value of camels payable as *Zakat* (column 6). The peaks in Figure (1) refer to the turning points where the physical amount of the in-kind *Zakat* changes. The amount of the *Zakat* between any two peaks remains constant. Qaraḍāwī (p. 209) argues that the reason for such relief is the existence of many small (baby) animals between these numbers of livestocks. Consequently, the *effective* tax rate decreases between any two peaks as the tax base increases. It is also noted that the tax rate alternates below and above 2.5 percent (the tax rate on money holdings). Beyond 130 camels the tax rate is always above 2.5 percent but almost steady. Had camels been taxed at 2.5 percent flat rate the tax would have been one *Dirham* per camel (column 6). The alternation in effective tax rates has a carrot-and-stick impact on investment. The decrease in effective tax rate between every two peaks encourages investment. When the stock is large enough, the effective tax rate increases suddenly, reducing the stock by a larger amount and providing an incentive for further breeding and investment.

III.1.2 *Zakat* on Goats and Sheep

Similar analysis for sheep and goats is projected in Table 3 and Figure (3). Figure 3 relates the effective tax rate on sheep and goats against the *value* of the in-kind *Zakat* base of those animals. The *Zakat* rate alternates until the number of sheep is 400. Afterwards, it becomes steady at one percent at each peak. The *Zakat* rate is always (except at 40 sheep) below 2.5 percent. Compare this graph with Figure 1 for camels. Since each unit of camels is usually more expensive, and each she-camel is not as

Figure 1

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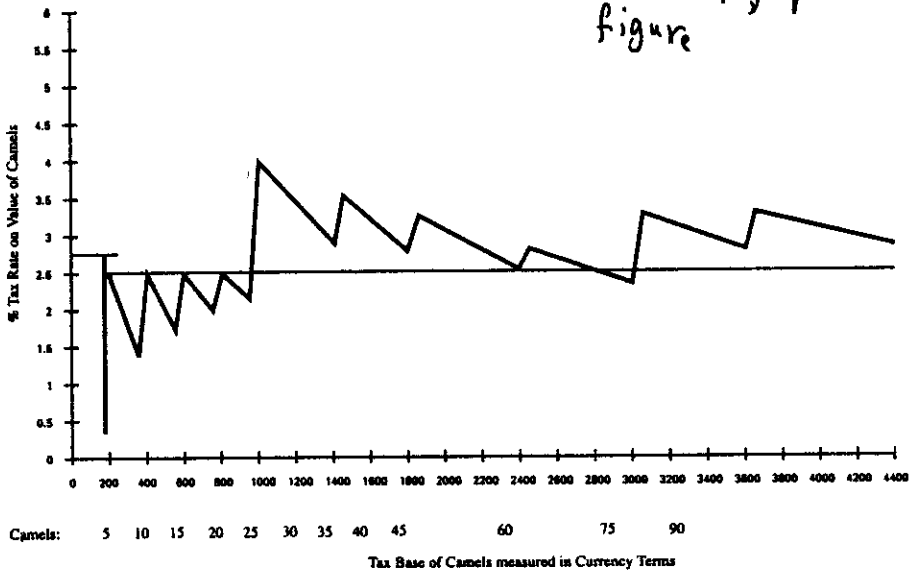

Figure 1 (Continued)

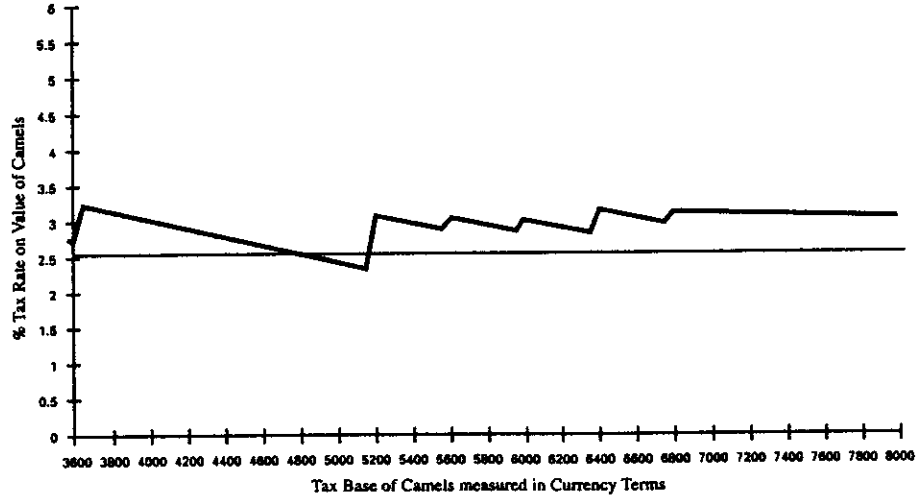

Figure 1 Effective Tax Rate on The Value of Camels

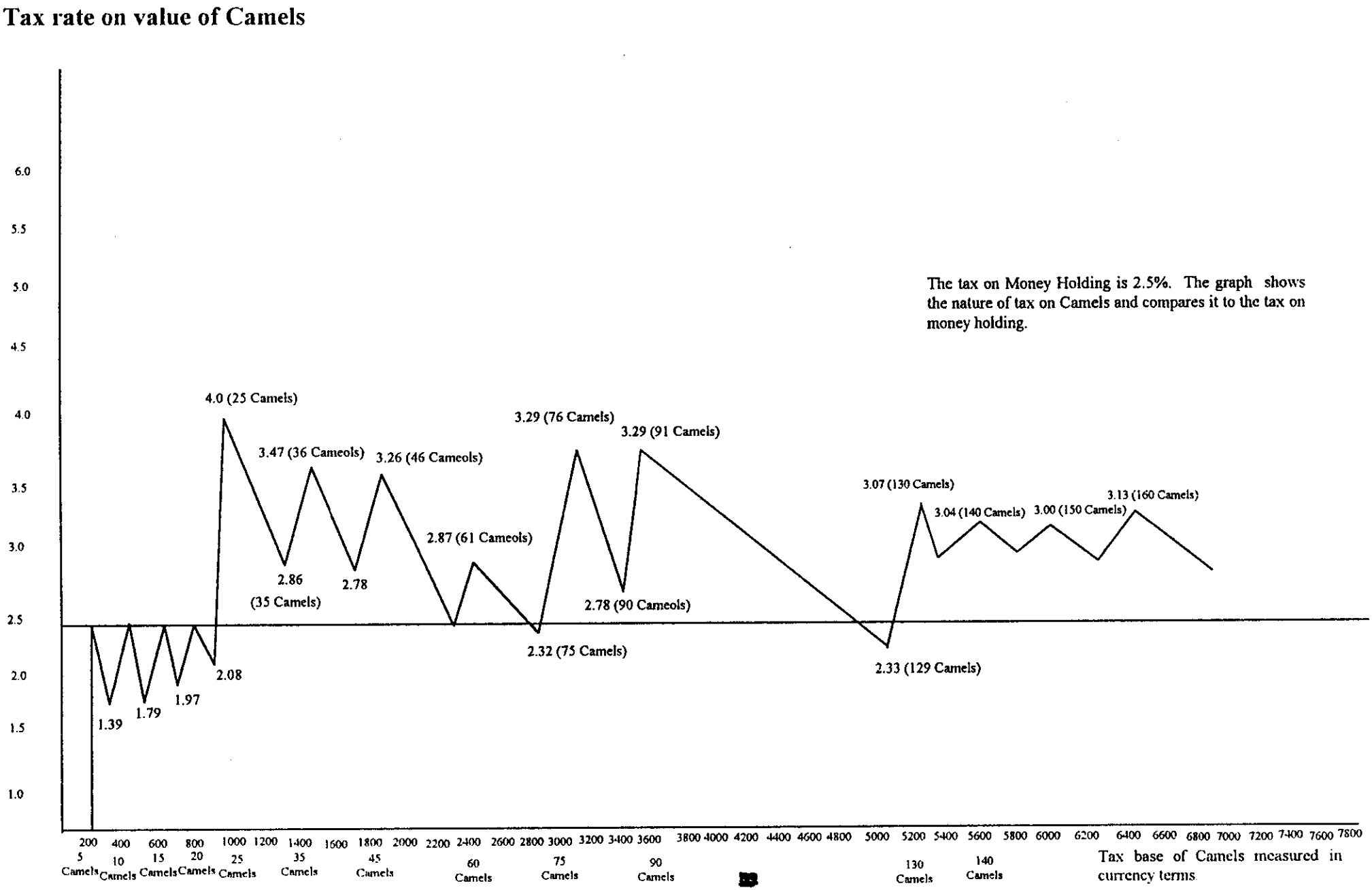

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Figure 2

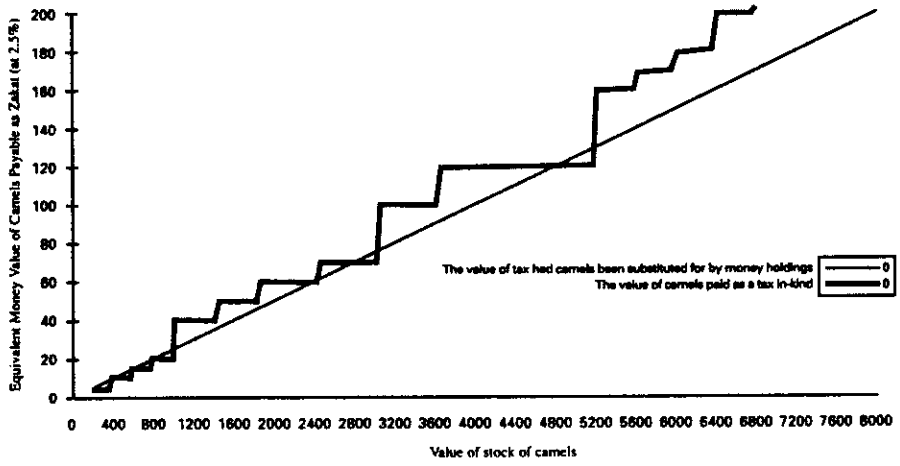

Figure 3

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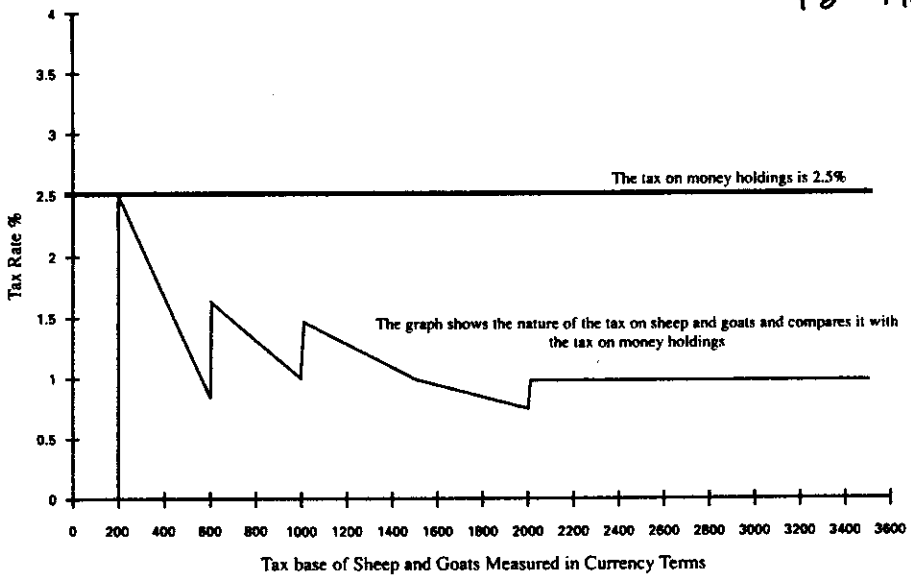


Figure 2 Comparing The Value of in-kind tax on Camels to The Tax on Money Equivalents

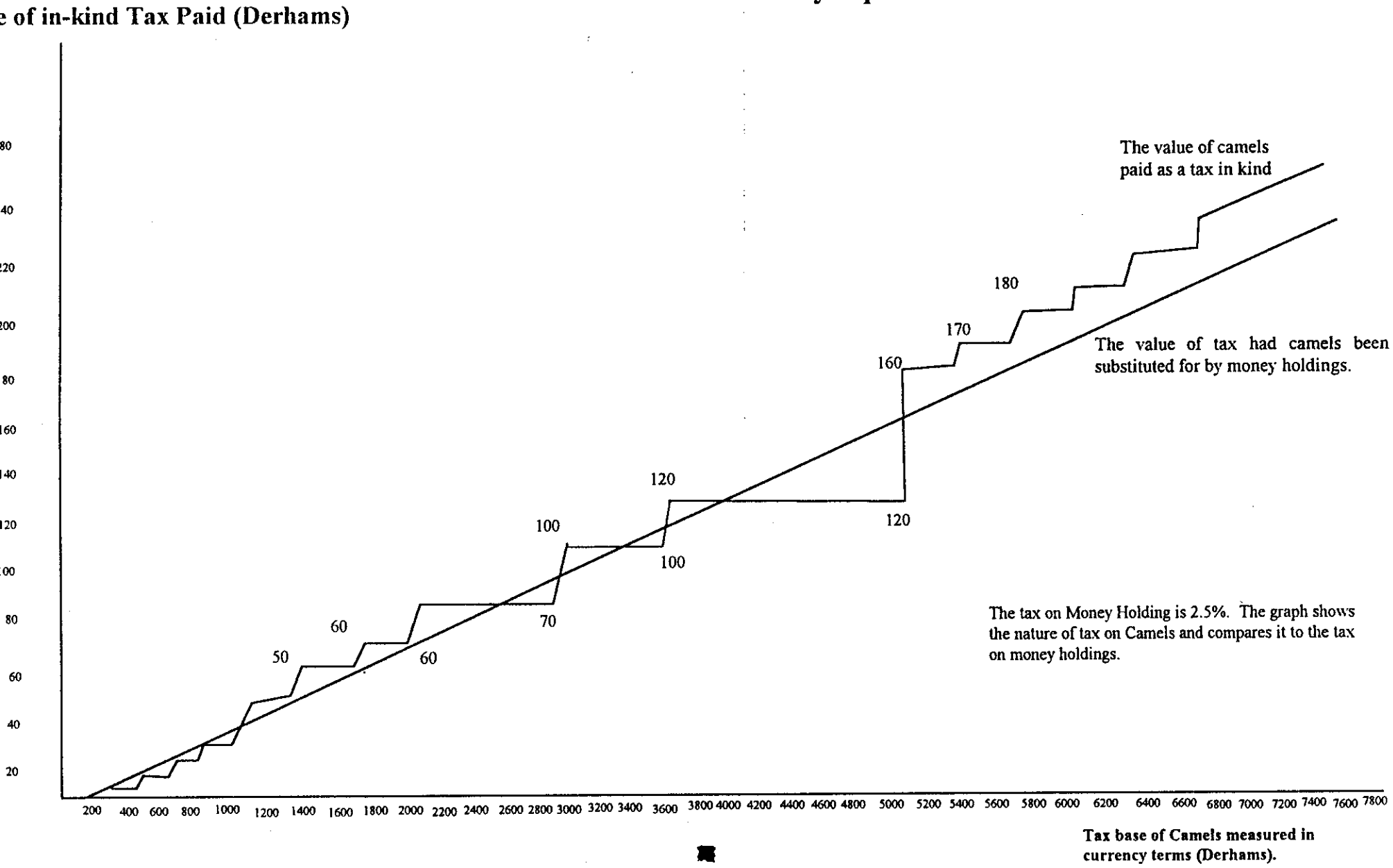
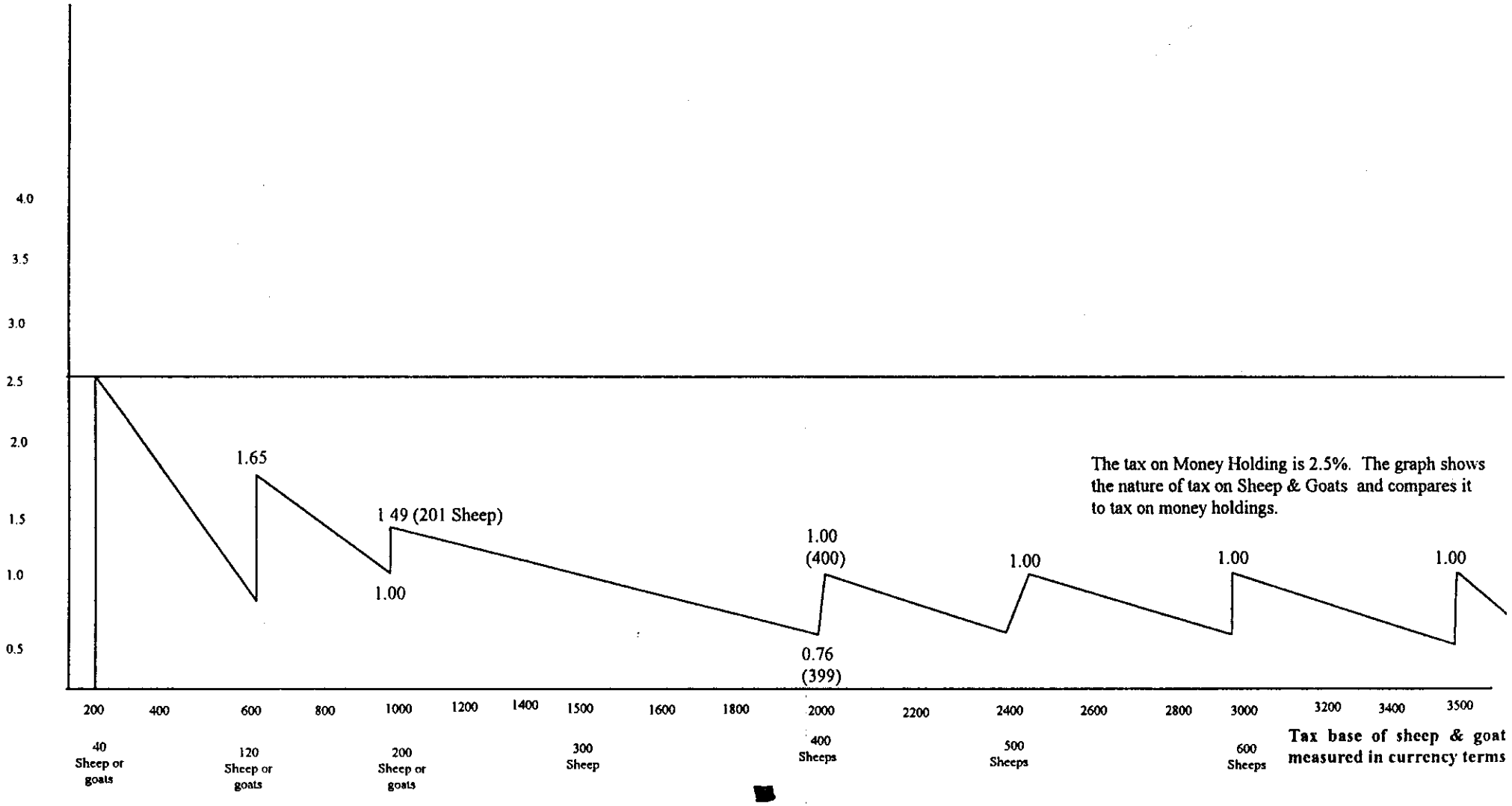


Figure 3 Effective Tax rates on Sheep & Goats Compared to the Tax Rate on Money.

rate on the value of Sheep & Goats



physically productive (in terms of the number of animals she can breed every year), there is less need in the case of sheep and goats for a carrot-and-stick treatment. No such analysis is conducted for cows due to my inability to assess their money or sheep equivalent. The breakdown on *Zakat* on cows, however, is given in Table 4.

Table 3: *Zakat* on Sheep and Goats

1	2	3	4	5	6
No. of Sheep and Goats	*Zakat*	Value of the stock of Sheep and Goats in Dirhams	Value of *Zakat* measured in currency units	*Zakat* Rate	Equivalent Money Value of Sheep/Goat Payable as *Zakat* (at 2.5%)
40*	1 sheep/goat	200	5	*2.50	5.00
120	1 sheep/goat	600	5	0.83	15.00
121*	2 sheep/goats	605	10	*1.65	15.25
200	2 sheep/goats	1000	10	1.00	25.00
201*	3 sheep/goats	1005	15	*1.49	25.125
300	3 sheep/goats	1500	15	1.00	37.500
399	3 sheep/goats	1995	20	0.75	49.875
400*	4 sheep/goats	2000	20	*1.00	50.00
500*	5 sheep/goats	2500	25	*1.00	62.50
600*	6 sheep/goats	3000	30	*1.00	75.00
700*	7 sheep/goats	3500	35	*1.00	87.50

A change in the monetary value of a livestock will change the position of the curve along the abcissa. However, the amplitude of the curve will not change, which means that the tax rate on the value of the livestock (in Fig. 1 and Fig.3) will not change. This implies that a change in the own price and/or a change in the general price level will not push the owners of the livestocks into higher tax brackets. Consequently, *Zakat* as *an in-kind tax is inflation-neutral.* This should be expected as both the tax base and the tax payment are measured in real (physical) terms. This is one of the important features of an in-kind tax.

Table 4: Zakat on Cattle

No. of Animals	Zakat
0 - 29	0
30 - 39	One *Tābī'ah* (a one-year old cow)
40 - 59	One *Musinnah* (a two- and an almost three-year old cow)
60 - 69	Two *Tābī'ah* (a one- and almost two-years old cows)
70 - 79	One *Musinnah* and one *Tābī'ah*
80 - 89	Two *Musinnah*
90 - 99	Three *Tābī'ah*
100 - 109	One *Musinnah* and two *Tābī'ah*
110 - 119	Two *Musinnah* and *Tābī'ah*
120 - 129	Three *Musinnah* or four *Tābī'ah*
.....etc.	

N.B.

The addition of a *Musinnah* or a *Tābī'ah* alternates every additional twenty cows. If the value of a cow goes proportionally with age, then we may note from Table 4 that the rate on cattle follows the same carrot-and-stick fashion noticed about the *Zakat* on camels and sheep.

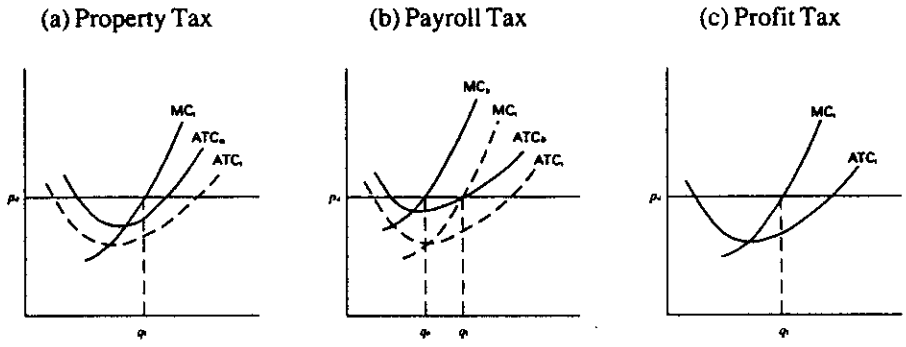
III.2 Tax Incidence and Welfare Cost

An important issue that is quite often discussed when it comes to the economics of taxation is the issue of incidence and welfare cost. This section discusses how *Zakat* may affect incidence and welfare. But before we tackle that issue some digression will be needed. Most taxes are thought to disturb the optimality conditions in terms of prices and output and generate, at the same time, a deadweight loss in social welfare. A specific (per unit) tax, for example, shifts the marginal cost of output upward, while an *ad valorem* tax shifts the marginal revenue (or price) downward. This is the source of the distortionary effects of these taxes. There are some taxes, however, that are known to have no deadweight loss and hence are not distortionary. Among those are the lump-sum tax, the profit tax and the property tax. This is true, of course, under certain assumptions. A change in assumptions and extensions of models may yield different results. Musgrave and Musgrave (1989) (hereafter referred to as M&M) explain that deadweight loss can be avoided if the surplus can be isolated out as a base of taxation without imposing a tax at the margin, but unfortunately it is difficult in practice to determine the amount of surplus involved (pp. 282-3). In other words, although the above-mentioned taxes are theoretically plausible and desirable, they are practically sub-optimal.

An in-kind tax, it is believed, yields at least the same desirable properties as those of a profit tax in the sense of preserving the pre-tax optimum conditions. Why? Before we answer this question we may have to address the following alternative question: What makes a profit tax different from other taxes such as a sales tax or a severance

tax, for example? The reason lies in the point of inflicting the tax. A severance tax, and a sales tax, have a direct, pre-emptive impact as they are inflicted on (and during the time of) economic activity, be it production itself, or buying and selling. Both are *in rem* taxes and thus distortionary. A profit tax, however, is only indirect in the input-output mix and is inflicted only after the point in time when the economic activity has actually been completed. This is why a profit tax does not disturb marginal conditions. M&M (1989, p265) explain that the monopolist (or any other producer) must absorb the tax (on profit). The reason is that the: "monopolist will have maximized profits prior to tax and hence can do no better after the tax is imposed. Since the tax is imposed so as to equal x percent of profits, the firm will remain best off by having the largest possible gross profits. With a tax rate of 34 percent, 66 percent of $100 million is better than 66% of below $100 million."

Figure 4: Impact of Property Tax, Payroll Tax and Profit Tax



Source: Schiller (1991)

Now I come to answer the question of why an in-kind tax should yield at least the same desirable properties as those of a profit tax. It may be argued that an in-kind-tax is a tax on both the input and the output of the firm, hence it should raise the cost curves and disturb the optimum conditions. But the fact that the in-kind tax is, like a profit tax, imposed only at the end of the production period (the sixth requisite condition for the payment of *Zakat*), implies that inputs are neither taxed at the input stage nor during the production period. Inputs have done their jobs in the production process, and thus an in-kind tax is not actually taxing them. An in-kind tax is not a profit tax since its tax base is not profits. So what kind of a tax is it then? Collection of *Zakat* requires the allowance of a one-year period of accretion (requisite condition No. 2) while general personal consumption is not taxable (requisite condition No. 4). Since we count and tax the number of heads or volume of crop at the end of the year, regardless of profit, an In-kind Tax is an inventory tax[9].

Like a profit tax, it is inflicted only at the point in time after the economic activity has been completed. Both are not *in rem* taxes. Since the in-kind-tax is imposed so as to equal x percent of the inventory, the firm will remain best off by having the largest possible gross inventory stock (that maximizes profit). A tax rate of 10 percent, say, 90 percent of 10 million heads of livestock is better than 90 percent of below 10 million. The in-kind will not be distortionary because the firm will have maximized its stock prior to the tax and hence can do no better after the tax is imposed. Like a profit tax, since *Zakat* is estimated and paid only after production has actually taken place, it is neither a fixed cost nor a variable cost. Consequently, neither MC nor ATC is affected by *Zakat* and the pre-*Zakat* stock is unaffected.

We may argue, then, that under both taxes the producer cannot shift the tax burden to the consumer and the full incidence of tax falls on the producer. The only difference between the two taxes, as far as incidence is concerned, is that under a profit tax, profits are taxed directly and shall have to be estimated beforehand, of course, while under an in-kind tax, profits are taxed indirectly and need not be estimated for tax purposes. Whilst the measurement of profits from an economist point of view is difficult, it should not be difficult to measure the size of a crop or a livestock produced [see the mathematical formulation in Appendix (A)].

I should emphasize once again that an in-kind tax is not another form of profit tax. The comparison with profit tax is offered only as an auxiliary device. As a matter of fact, since *Zakat* proved to be an inventory tax, it is not inflicted on the flow of profits. In this sense *Zakat* does not discourage the profit motive. A profit tax is an income-statement tax, while *Zakat* (in general) is a balance sheet tax. The former is inflicted on the flow of income, while the latter is inflicted on the stock of assets. This is a major difference between modern and Islamic taxes in general. A tax on a flow may retard it, while a tax on a stock may mobilize it. More differences shall be explored in the next pages. Since the in-kind tax has at least the same optimality results of a profit tax, if not better, it can reasonably be compared with it in terms of impact on government revenues.

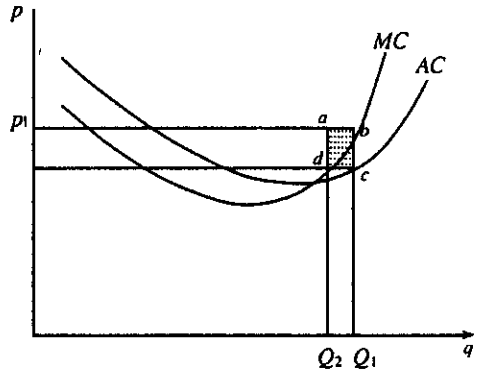
III.3 Impact on Government Revenues

Because a profit tax and an in-kind tax are imposed on two different tax bases, we should expect the tax revenues from each to be different. Under a profit tax, the government parts with a revenue equal to the slice of profit foregone by the producer. The value of the government revenue under an in-kind tax, however, is equal to the quantity of output collected, times the market price. Applying the same tax rate in each case, revenue from an in-kind tax is, of course, larger than that from a profit tax. In terms of Figure (5), a profit tax may generate revenue to the government equal to the *abcd*, while an in-kind tax (at the same rate) yields a value equal to $(Q_1 - Q_2).P_1$ [Mathematical formulations are shown in Appendix (B)]

The important point here is that an in-kind tax imposes a lower tax rate on a larger tax base than many other taxes. The incentive for tax evasion under an in-kind

tax is expectedly lower. Further good elements of *Zakat* as a tax shall be discussed in the following section.

Figure 5: Tax Revenue Under Profit and Ink-Kind Taxes



III.4 Some Elements of a Good Tax

The goodness of a tax may be discussed from, as below, several points such as efficiency, equity, compliance, easiness of administration and evaluation, investment incentives, the impact on tax payers and tax recipients. As far as efficiency is concerned, we have already explained that an in-kind tax is inflation-neutral and that a change in the general price level does not push tax payers into higher tax brackets (II.1.2). Also, we have already shown that an in-kind tax does not disturb the optimality conditions in terms of output and prices. The full incidence of the tax falls upon producers with no welfare loss due to *Zakat* (see Section II.2).

III.4.1 Tax Administration, Evaluation and Compliance

Profit estimation in day-to-day business is not a simple matter as it is the result of business practice and accounting conventions. This point makes profit-tax estimation more difficult than an in-kind tax based on physical output. In this sense an in-kind-tax (i.e. *Zakat*) is practically superior.

Measurement of the *Zakat* base is not affected (at least not directly) by the methods of depreciating assets. This should provide for taxation neutrality as to the method of depreciation followed. Such neutrality makes investment less prone to government rules and regulations and more in-line with market conditions. Since *Zakat* is inflicted on a balance sheet stock, as we indicated earlier, we may argue that neither profits reported will be affected by taxation, nor taxation is affected by profits. The implications (some already discussed) may go much beyond the weakening of tendencies to under-report economic activities. In a modern tax system, profits are affected by taxes, and taxes are affected by (reported) profits.

Furthermore, a profit tax may not be equitable. A large company reporting a relatively modest rate of profit may pay relatively much less tax than a smaller company making a larger rate of profit. It would be inadmissible to argue that the smaller company's ability to pay is larger just because it is making a larger rate of profit. In a way, this may be regressive in relation to the size of networth. McLure (1992) suggests expensing (the deduction of all expenditures in the first year) as an alternative to subjective depreciation methods. Taxes may be inflicted, according to McLure's proposal, on cash flow. But expensing is actually a special form of depreciation. Cash flow taxation may be superior to profit flow taxation in some respects, but it shares the same problems mentioned above. Tait (1992) observes that McLure's Simplified Alternative Tax (SAT) avoids inflation accounting in principle. But in case, "inflation is high, the SAT still does not cure the problem, because within the annual accounts, asset valuations (for balance sheet purposes I guess) will not be comparable and some inflation adjustment will be needed." An in-kind tax, though a balance sheet tax, avoids stock valuation and inflation accounting problems, simply because both the tax base and tax payments are evaluated in physical (real) terms. Also, and as I have indicated in II.1.2, a change in the price level will not push asset holders into a different tax bracket and hence an in-kind tax is inflation-neutral.

It was explained earlier (II.3) that the lower tax rate and the larger tax base under in-kind tax relative to other taxes weakens the incentive for tax evasion.

III.4.2 The Relative Impact on Households, Taxpayers and Tax Recipients

Since the tax burden under an in-kind tax is fully absorbed by the producers (and not passed on to the consumers), it follows that an in-kind tax has no impact on the expenditure, or the uses side of a household account. To see this, assume that disposable real income (DRY) of a household is (M&M, p. 240):

$$DRY = \frac{E - T_y}{P + T_s} = \frac{DY}{GP}$$

Where:

E = earnings	T_s = sales tax addition to price
T_y = income tax	GP = gross or (market price) after tax
P = price (at factor cost) of products bought	DY = disposable money income

Since $T_s = 0$ under an in-kind tax, it follows that:

$$DRY = \frac{E - T_y}{P} = \frac{DY}{P}$$

One has to remember that an in-kind tax is not an income tax. The point shown here is that an in-kind tax leaves the household with a higher level of real disposable income. An in-kind tax gives a relief to the needy on the downside of output due to a supply

shock or when inflationary pressures ensue. Taxpayers are relieved by an in-kind tax in recessionary periods or shortage of liquidity. Producers will be paying their "debts" to the government in kind at whatever market price it could command. As far as the needy people are concerned, since these taxes are out of goods that are necessities for the average household in society, the payment of the monetary equivalent will probably not do them much more service[12]. For if more stock will have to be sold in order to generate money for tax payment, the extra amount will have to be picked up by those who are well-off, but at a lower price. The expected reduction in revenue from products, the demand of which is usually inelastic, may make it somewhat difficult for producers to pay their dues.

III.4.3 Tax Avoidance and Incentive to Investment

Zakat is recurrent every year on the same stock of output (in-kind in the case of livestock or in market value on commercialized crops[13] and other commercialized goods) as long as the stock is not sold or consumed and if the remaining stock is above this minimum exempted level (*Nisāb*). As a result, hoarding or speculative tendencies are discouraged since the size of the stock shall be decreasing every year[14]. Speculative storage, however, can take place only to the extent that capital gains, through price appreciation, are expected to exceed the value of the tax payments. To illustrate this, assume for simplicity that the producer's cost is zero. Also assume that the price of the product grows in real terms (i.e. relative to the general price level) at a rate of r percent in any year n. The revenue function in any year *n* is $R_n=P_0 (1+r)^n Q_0$. Also assume that his stock decreases at a rate of 2.5 percent a year, i.e. at the *Zakat* rate. His revenue function then becomes:

$$R_n = P_0 (1+r)^n \frac{Q_n}{(1+.025)^n}$$

The equation tells us that although a larger output, Q, may lead to larger revenues, it also means a larger *Zakat* base and payment. The *Zakat* rate acts as a discount rate of the physical stock and total revenue. Also, since price appreciation is not always the norm, the deterrence of *Zakat* against hoarding and speculation becomes more powerful over the years, inducing sales and may be lowering prices in the course of time. Such pressure is more obvious in the case of non-self-reducing stocks (such as grain), and non-earning-income assets such as non-cultivated, commercialized land.

If it is accepted that investment is the process of delayed future consumption, then it does not make sense to tax the means of growth that themselves are not capable of growing, such as land and buildings[15]. Taxing growable or realized incomes from non-growables may be called the principle of specifity. *Zakat* and *Kharāj* preserve this principle.

Unlike the modern property tax, the fact that *Zakat* is imposed not only on current output but also on previously accumulated stock of wealth that are directly taxable,

such as livestock, commercialized goods[16] and money, implies that the more early in the past an income is earned, the more often it will be subject to tax (*Zakat*), year after year. This motivates wealth owners to consume more and/or invest more. But since consumption is not taxable in an Islamic economic system, at least not by obligatory religious legislation, wealth owners have the incentive to redistribute the-further-in-the-past income towards present consumption, and the-closer-to-the-present income towards future consumption i.e., investment. It is often the case that not all past accumulated output can be consumed at the present, which implies that some of that output will be redistributed towards the future too, i.e., invested.

III.4.4 A Digression: Comparisons and Contrasts with the Western Experience

For the sake of contrast and comparison, it may be useful to discuss briefly an experience from a Western country. Lindert (1986) reports that in 1982-83 the United States had great difficulty exporting more grain and cotton due to tough competition from highly subsidized products from Britain and France.

> "Government bins were nearly filled to capacity with crops purchased from the farmers in earlier years. The Reagan administration devised the "payment in kind" (PIK) program as a temporary solution. Farmers were told that for each acre they switched away from growing grain or cotton they would be given, roughly, the estimated grain or cotton crop *free* from government storage. This allowed them to slash farming costs, of course, and they were to sell the surplus crops on the market instead of selling freshly grown crops. The farmers' response was enormous. ..... That is, *the government needed more wheat so that it could get farmers to produce less wheat* (emphasis added) .... So a new arrangement was quickly devised whereby the farmers took less grain and cotton from the government and more cash payments from taxpayers instead. ..... The United States reversed gears as quickly as possible, scrapping PIK within a year and resuming aggressive subsidized exporting" (pp. 244-45).

Direct in-kind subsidies that are used to stabilize the incomes of producers (and sometimes consumers) are not new. But what could be new is an insight that an in-kind *tax* may subsidize producers' incomes! For if we assume farmers have produced far beyond the competitive equilibrium, an in-kind tax at the rate of 10 percent, say, lifts some of the excess supply and is expected to boost prices (and incomes) by more than 10 percent for products of an inelastic demand. An in-kind tax, here, acts like an *indirect subsidy!* Since farmers, under *Zakat*, are not being paid cash in return for their in-kind payments to the government, overproduction is not being encouraged by the

government - an opposite arrangement to the American one. To put it differently, an in-kind tax sounds as if the government is "buying" from the farmers specific percentage of their output by forgoing the cash equivalent of their tax dues. The government's "liability" of purchase is limited, however, to what could have been pecuniary tax liability of farmers. In contrast, implicit in the American PIK programme is an infinitely elastic demand curve on the part of the government for farmers' grain. There is an important lesson here for us to learn: a very old taxing scheme (i.e. *Zakat*) may provide a very viable solution for some contemporary policy problems.

In pecuniary taxes such as a sales tax, the government will have to wait until sales receipts are realized. Not only this, but waiting for sales will generate a greater uncertainty as to the time and value of the tax to be collected. The in-kind tax does just the opposite as no waiting of sales[17] is allowed and the tax is collected and disposed of in kind.

Should need arise, the understanding of the economics of *Zakat* should help us to design new taxes in the best possible way. This is the fourth reason, in addition to the three mentioned in the introduction of the paper, why the study of the economics of *Zakat* is important.

III.5 A More Appropriate Property Tax?

Another point of comparison between the system of *Zakat* and the Western tax system has to do with the taxation on agricultural land. Ciriarcy-Wantrup (1952, pp 178-9) writes:

> "Recurrent (annual) taxes on the *present value* (emphasis added) of resources may be regarded as a special type of taxes on net revenues. If present value is the sum of discounted future net revenues, then in each interval (year) in which the tax is paid, net revenues of all future intervals are taxed. The further, therefore, net revenues are distant from the present, the more often they are subject to the tax. This provides an incentive to redistribute net revenues in the direction of the present in order to reduce the number of times they are taxed. This process continues as long as discounted savings in tax payments are larger than the decrease in present net revenues that would have occurred with such redistribution under pre-tax conditions. Redistribution of net revenues in the direction of the present can be accomplished only through redistribution of use rates in the same direction. This means depletion..... Property taxes, therefore, affect the utilization plan in much the same way as the interest rate."

Zakat, as a property tax, is not levied on the present value of the land but rather on its actual output. *Kharāj* (the Islamic tax on agricultural land) has two schemes. One

scheme is called an *Area Kharāj*, under which the tax is levied according to the area and type of crop. This is *fixed* in amount and could be paid in cash, in kind, or a combination of both, much in the nature of a regressive lump-sum tax. However, the tax can be amended if it can be proven that farmers cannot afford it. The other scheme is called a *Partnership* (Sharing) *Kharāj*, where some percentage (a proportional tax) of the crop is to be paid[18]. The authorities can switch back and forth between the two schemes depending on equity and efficiency considerations [Al-Nu'aim, p. 422-7]. Obviously the partnership scheme is a more flexible one. However, both schemes would alleviate the distortionary effects of a property tax levied on the present value of the land. *Kharāj* and *Zakat* for a given year are not levied on the present value of land, which can hardy be objectively measured, but on whatever services the land actually renders in the year. Implicitly, future income streams are taxed only once and only when they actually materialize and thus discouraging depleting practices. This preserves the principles of timeliness.

Aaron (1974) argues that, "the property tax cannot reasonably be regarded as an excise on housing services and other commodities produced with taxed capital." He decomposes the incidence of the property tax into three effects: (a) a capital tax effect, which is related to the proportion of capital ownership; (b) an excise effect, which may lead to capital movements among regions and industries and may affect the labour share of income; (c) an immobility effect which may influence the prices of local goods and services which may not be subject to competition from other localities, such as housing and some labour services. Hence, if we apply Aarons analysis to *Kharāj*, we find that an *area Kharāj* will produce both capital tax effect and the excise tax effect. A partnership *Kharāj* would produce only the excise tax effect. None of the two *Kharāj* schemes would produce the immobility effect as long as the *Kharāj* base and rate are the same everywhere. This is especially true since *Kharāj* is subjected on the actual output from land not on land *per se*. Of course, the capital tax effect can be eliminated by applying a partnership *Kharāj* everywhere, and the excise tax effect can be reduced by varying the tax rate. Mieszkowski (1980) explains that, "the decline in the proportion of the population engaged in agriculture and in the importance of the inherited farmland (in the United States) have worked to make wage income, or the return to human capital, increasingly important." By contrast, an in-kind tax (and payment) helps to maintain the importance of the agricultural sector, not only because of its efficiency and equity to the taxpayers, but also because an in-kind payment, especially of livestock, represents not only an income-consumption subsidy, but also a means of investment. This kind of arrangement, coupled with a legislation that *Zakat* cannot be transferred anywhere before the needs of the poor are met in the localities where *Zakat* is collected, helps to prevent the immigration of the poor people from rural to urban areas. Incidents of farmers in the Western countries killing large numbers of the living stocks, either because of excess supply or drought, are quite known. If in-kind taxation, along with other measures, were allowed, the direction of immigration in many countries would have been reversed.

III.6 Equity in *Zakat* and the Principles of Taxation

The benefit principle of taxation has little relevance to *Zakat* for two reasons. First, there is the well-known criticism regarding the difficulty of measuring the benefits received by individuals and their unwillingness to reveal their true preferences especially when it comes to public goods (Aronson, 1985, pp. 306-7). Second, and more important, *Zakat* revenues are earmarked for categories of people who, for various reasons, may be called "needy". There is no occasion here to talk about the measurement of benefits to people who cannot pay taxes*. As Browning and Browning (p. 299) put it, "if some people are taxed to provide funds to redistribute to other people, we cannot tax the recipients according to the benefits they receive, for that would completely negate the effects of the redistribution." The benefit theory of taxation *may* have some relevance when it comes to the discussion of *Kharāj* for which there is no jurisprudence earmarking. But since we are not analyzing the expenditure side of Islamic taxation, we are not going that far.

There are three different concepts of equal sacrifice in the ability-to-pay principle. These are equal absolute sacrifice, equal proportional sacrifice and equal marginal sacrifice. It is important to note here that the word "sacrifice" does not refer to income, but to utility for income. The subjective utility-based analysis of these equity concepts is not operational simply because the whole discussion rests on the necessary assumption that, "interpersonal utility comparisons are admissible. Yet it is an assumption generally rejected by the 'new' welfare economics." (Musgrave, 1959). But let us suppose, for the sake of argument, that personal utility curves can be assigned and compared. Since utility is a function of comprehension, it follows that an infant, who is somehow wealthy, should be taxed more than an equally wealthy, grown-up person. Also, an insane person should be taxed more than an equally wealthy, sane person. Thus the view of equal marginal sacrifice implies that taxes should be regressive with age and sanity too. The idea of minimum aggregate sacrifice may endanger economic incentives by taxing some people at much higher *progressive* rates than others, and thus may create a compliance problem, especially as the tax rate reaches confiscatory levels (Aronson, p. 310).

The *Zakat* system avoids *in rem* taxes, since taxes are imposed on asset-holders (persons), not on the activities or objects as such. M&M (p.215) explain that such avoidance relates the payments of taxes to the taxpayers ability to pay and provides for more equity in the tax system. It may be reasonable to conclude, then, that the *Zakat* system is more in line with the ability to pay theory of taxation. Since each type of wealth has its own treatment in terms of *Zakat* in Islam, it can be said that people who hold the same type of wealth shall receive the same tax treatment. This provides for horizontal equity which, "requires that people who are deemed to be in an equal economic position should pay the same amount in taxes" (Aronson, 1985, p. 305).

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* "*Zakat*" differs from "tax" mainly from the viewpoint that "taxpayers" are also indirectly the real beneficiaries of the tax system, while beneficiaries in the *Zakat* system, i.e. the *Zakat*-recipients (i.e. the needy) are different from *Zakat*-payers. (Editor).

Also, those who have more shall pay more. This provides for *vertical equity*. It may be more appropriate to look at taxation in Islam (that is proportional) as more in line with the idea of equal proportional vertical sacrifice. Under normal circumstances, individuals are treated individually. The index of the ability to pay is neither income nor consumption. Instead, it is the inventory stock of what can be consumed (but is not) or what is intended to be traded (but is not), or what can be spent (but is not).

The reader may have noticed that there is some *uniformity* in the *Zakat* rates, where all agricultural products are taxed at the same rate (5 to 10 percent) and all commercialized goods are taxed at 2.5 percent.

> Atkinson and Stiglitz (1980, p. 366) explain that:
>
> [According to conventional wisdom, there is a definite preference for a uniform rate structure, and this view appears to influence government policy-making. The British Government, when announcing the introduction of a value-added tax claimed that: "a more broadly-based structure .... by discriminating less between different types of goods and services, would reduce the distortion of consumer choice .... Selective taxation gives rise to distortion of trade and of personal consumption patterns, and can lead to the inefficient allocation of resources." (HMSO,1971,p.)]

The standard textbook analysis, however, is in contrast to the view of the British Government. When excess burden is to be minimized subject to a government revenue restraint, it is argued that the optimal tax rate on any good is inversely related to its price elasticity of demand (p. 369). Atkinson and Stiglitz note that this finding, "is often regarded with considerable skepticism." When the problem is posited in an indirect utility-function (of prices and wages) subject to a production constraint, we are warned to be careful not to conclude the optimality of uniform taxes from the first order conditions of the model. Two reasons are given to us. "First, the specification of the tax rates may not uniquely determine the behaviour of the system. Second, there may be more than one solution to the first order conditions." (p. 374).

Atkinson and Stiglitz's (1980) conclusions are based on the assumption that proportional taxes cause market prices to rise. However, if our demonstration in this paper that an in-kind tax does not affect market prices is taken as valid, then the Atkinson-Stiglitz conclusions do not follow.

If the problem of taxation is looked at from the viewpoint that each producer is also a consumer, then the uniformity in taxing all goods should intuitively make sense from an equity perspective. It could very well happen that a person's production and consumption bundles are taxed differently from those of another person if uniformity in taxation is not maintained. The case should be more apparent if we remember that it is much easier to think of a "representative" consumer than a "representative"

producer. There is usually much more heterogeneity in production than there is in consumption. This is specially true the more advanced the economy is.

Summary

Zakat is a special form of Islamic taxation, a form of worship, and one of the pillars of Islam. There are six general requisite conditions for *Zakat* to be collected. These are: Absolute ownership, accretion, *Nisāb* (or some minimum level of wealth stock) that differs from one type of wealth to another, excess over one's basic needs, absolvency from debt, and the elapsing of one lunar year of the stock to be taxed. Livestocks of camels, cattle, sheep and goats are all taxed in-kind.

Agricultural products that are durable and storable, such as wheat and rice, are charged in-kind, while perishables are charged in their value. The treatment for both, however, is the same in terms of *Nisāb* and rates. The rate is 10 percent if land is irrigated by rain, springs, or if the plant is self-seeking of water by its roots. Products that are irrigated at some cost, by digging wells, for example, are charged at a rate of 5 percent.

Kharāj is another form of in-kind tax levied on land that was captured by force or through settlement but was not distributed among the individuals of the capturing army, and thus becomes a national property. Its inhabitants may still cultivate it as long as they pay tax (*Kharāj*) to the state. There are two schemes of *Kharāj*, one is a fixed lump sum that varies with the area of land, and another that is proportional to the produce of land.

The effective *Zakat* rate on livestocks is quasi-progressive (quasi-proportional) in the sense that greater amounts are collected at higher intervals of the stock, the amount being charged is on the whole stock and not on the increment of the stock. Marginal and average *Zakat* rates change together, but they are equal to each other at each level of wealth. The rates on livestock are inflation-neutral since both of the *Zakat* base and payment are measured in real (physical) terms.

It has been shown that an in-kind tax is an inventory tax and is just like a profit tax, a lump-sum tax or tax on rent in the sense that it has no distortionary effects on output and prices and hence there is no deadweight loss associated with it. An in-kind tax, however, is practically superior since it is much easier to measure the size of the crop or livestock than to measure the actual surplus under the money taxes. The incidence of taxation falls entirely on the producers.

A profit tax and an in-kind tax have different impacts on the government's revenue since they are imposed on two different tax bases. For the same tax rate the latter is larger than the former. For a revenue-neutral change of tax schemes and rates, a profit tax rate must be larger than that of an in-kind tax. Higher profit rates reduce the required profit tax rate. Conversely, it was shown that at higher profit rates an in-kind tax needs to rise (for a neutral revenue), but at a decreasing rate.

Some elements of good tax are discussed. The *Zakat* system avoids *in rem* taxes,

since it is imposed on asset-holders (persons), not on activities or objects as such. As a result the payment of *Zakat* is related to the taxpayer's ability to pay and provides for more equity in the *Zakat* system. Since the in-kind *Zakat* burden is fully absorbed by producers, it has no impact on the expenditure, or uses, side of a household account. A household is left with higher real disposable income when compared to his income under a sales tax, for example. Speculative tendencies are discouraged by the fact that *Zakat* is recurrent every year on the same stock of livestock, and commercialized crops and goods, as long as the stock is not sold or consumed. The financial pressure is felt more and more over the years, inducing sales and may be lowering prices in the course of time. Such pressure is stronger in the case of non-self-reproducing and non-earning-income assets, such as grain and non-cultivated commercialized land. An in-kind *Zakat* gives a relief to the needy on the down-side of output due to a supply shock, or when inflationary pressures ensue. *Zakat* payers are relieved in recessionary periods or shortage of liquidity.

Zakat is more in line with the ability-to-pay principle of taxation than it is to the benefit theory since the recipients are generally needy and cannot pay taxes. Horizontal equity is provided for by the fact that people who hold the same type of wealth shall receive the same tax treatment. Vertical equity is provided for by the fact that those who have more pay more.

The Atkinson-Stiglitz caution about inference on the optimality of uniform taxes may not be applicable in the case of *Zakat* (and *Kharāj*) since their analysis assumes that proportional taxes raise prices. If our analysis that *Zakat* does not influence prices is valid, then the Atkinson-Stiglitz skepticism may not be applicable in the case of *Zakat* and *Kharāj*.

APPENDIX (A)

Mathematically, a profit tax can be represented by the following profit equation:

$$\pi = R(q) - C(q) - t[R(q) - C(q)] = (1 - t)[R(q) - C(q)] \quad (1)$$

where $0 < t < 1$. Setting the derivative of (1) equal to zero[10]

$$\frac{d\pi}{dq} = (1-t)[R'(q) - C'(q)] = 0$$

since $1 - t \neq 0, R'(q) - C'(q) = 0$. Hence, $R'(q) = C'(q) = 0$. In other words, the producer sets marginal revenue equal to marginal cost, as if no tax were imposed[11] (Henderson and Quandt, 1980, pp. 186-188).

APPENDIX (B)

Mathematically, the government tax revenue from a profit tax is:

$$GTR_p = t_p\pi \quad (2)$$

and the government tax revenue from an IKT is:

$$GTR_i = t_i\pi + \frac{C}{q} t_i q \text{ where } \frac{C}{q} \text{ is average cost} \quad (3)$$

$$= t_i(\pi + C) \quad (4)$$

Conclusion: for an $t_p = t_i$, $GTR_i > GTR_p$.
Question: Find the tax rate t_p that will equate GTR_i and GTR_p

$$t_p = \frac{t_i(\pi + C)}{\pi}$$

$$t_p = t_i + t_i \frac{C}{\pi}$$

If $\frac{\pi}{C}$ is called the gross profit rate, g, then:

$$t_p = t_i(1 + \frac{1}{g}) \quad (5)$$

It is obvious that t_p needs to be (much) greater than t_i for the tax revenues to be the same under both schemes. Differentiating t_p with respect to g in (5) we get:

$$\frac{\delta t_p}{\delta g} = -\frac{ti}{g^2} < 0$$

Obviously, the higher the profit rate, g, the lower the t_p value required to generate an equal tax revenue generated under an in-kind tax. Or, stated differently, a higher profit rate, g, is required to lower the t_p value necessary to generate an equal tax revenue. Taking the second derivative,

$$\frac{\delta^2 t_p}{\delta g^2} = \frac{2ti}{g^3} > 0$$

which implies that g has to increase at an increasing rate to lower the t_p value, or that t_p can be reduced at an increasing rate as g rises. Alternatively, (5) can be re-written as:

$$t_i = \frac{t_p g}{1+g} \tag{6}$$

$$\frac{\delta t_i}{\delta g} = \frac{t_p(1+g) - t_p g}{(1+g)^2} = \frac{t_p}{(1+g)^2} > 0 \tag{7}$$

$$\frac{\delta^2 t_i}{\delta g^2} = \frac{-2t_p(1+g)}{(1+g)^4} = \frac{-2t_p}{(1+g)^3} \lesseqgtr 0 \tag{8}$$

From (7) we conclude that as g *rises*, t_i needs to rise too. The reason for this is that an increase in g also implies an increase in GTR_p. Since $t_p > t_i$ (for a revenue neutral change of the tax scheme), t_i needs to rise as GTR_p rises. But equation (8) indicates that t_i has to rise at a decreasing rate.

Footnotes

1. See, for example, Ghavari, Firouz, "In-Kind Versus Cash Transfers in The Presence of Distortionary Taxes", *Economic Inquiry*, Vol. XXXIII, January 1995, 45-33.
2. This is not to say that *Zakat* is a wealth tax. The specific nature of *Zakat* is discussed and explained in Section II.3.
3. Since *Zakat* is a manifestation of worship, in addition to it being a fiscal duty, illegal wealth cannot serve that purpose. It has to be given up altogether.
4. There are many details under the *Zakat* of debt such as who should pay its *Zakat*, the debtor, the creditor or both and when should it be paid and how often.
5. Some Muslim scholars disagree with this opinion, and I disagree too. The difference in cost of raising *"Sāemah"* and *"non-Sāemah"* does not justify a different treatment, especially when costs are tax deductible.
6. By the same measure we may conclude that perishable animals, such as poultry, should be taxed in the same way as their products.
7. Arryyes (1985, p.8) explains that there are two meaning of the word *Kharāj*. A specific meaning which is the one explained above, and a general meaning which means the governments revenues in general. Discussion in this paper is limited to the first meaning.
8. In fairness, I have to indicate here that I learned the idea of converting physical amounts of livestock into their money equivalents from Shehata (1977), yet his tables did not include columns 4 and 6 that I have above. Column 5 in my table is more detailed. My graphs are different from his.
9. This is actually true of all types of *Zakāt*, whether it is in-kind or otherwise.

10. Alternatively, (1) can be represented as $\pi = R(q) \cdot C(q) \cdot t \prod = \frac{1}{(1+t)} [R(q) \cdot C(q)]$. Although the same f.o.c condition are maintained, but this shows the tax rate as a discount rate.
11. The model above is a very simple one. Extensions of the profit tax model may yield different results. Phelps (1986), for example, tries to establish a case for a profit tax by showing the welfare effects of a profit tax on labour when the tax revenues are used as an employment subsidy. In this paper, we are interested mainly in the impact of taxes on producers and governments.
12. It may be noted that wealth forms that are taxed in-kind give the following features: divisibility (to a great extent), portability (in case of agricultural products), storability, reproducibility, durability, acceptability and stability. These features are similar (some to a lesser extent and others to a larger extent) to the attributes of money. It is interesting that Enichner (1991, p.809) argues that in theory, "the physical output of any industry can serve as money". Rima (1993-1994), objects that, "this borders uncomfortably on the Walresian view that any commodity can serve as money so long as it can be used to pay any tax due to the government."
13. Agriculture products are zakatable only once no matter how many years they are stored because they do not grow by themselves like livestocks. If they are intended for trade, however, they shall be taxed at 2.5% of their value afterwards.
14. The cash receipts from sales shall also be taxed at 2.5 percent.
15. If land and buildings are to be used as tradable items, then they are subject to *Zakat* on commodities intended for trade, which is 2.5% of their value.
16. Is *Zakat* on commercialized items the same as a sales tax? The answer is no! A sales tax is imposed at the time of sale. It is thus a tax on the activity of buying and selling *per se* (an *in rem* tax), resulting in raising prices and lowering quantity sold. But *Zakat* on commercial items is imposed and collected at the end of the year on items that were not sold. Thus, it is a tax *on inventory*, not on sale. It is recurrent every year on whatever stock is still in hand, lowering prices with no apparent reduction in the quantity sold.
17. But there is a waiting of production of course.
18. The reader may notice that I am ignoring here some details such as how much is paid and on what.

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