UGANDA COMMUNICATIONS COMMISSION

REVIEW OF SECTOR TAXATION POLICIES AND DETERMINING THE ELASTICITY OF PENETRATION AND PRICE OF THE VARIOUS TELECOMMUNICATION SERVICES IN UGANDA

Prepared by

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Executive Summary

The telecommunications sector in Uganda has become a major source of tax revenue for the government treasury. The current usage tax on pre-paid mobile services in Uganda is 30 percent (18 percent VAT and 12 percent excise duty). The 30 percent tax on services is certainly very high by any standard. In fact this ranks Uganda as the country with the second highest service taxes on mobile phone usage internationally, placing it only behind Turkey! The usage tax on fixed line services presently stands at 23 percent.

It is usually the case that such high and increasing taxes end up getting reflected in the actual tariffs that consumers pay for services. Other things remaining unchanged, high tariffs should in turn result in a slow down in demand and uptake of services, a decline in investment, and interestingly a decline in revenue for the government treasury. This study sought to shed some light on the possible effects of the current telecommunications sector taxation policy. The main results and findings can be summarized as follows:

• There has been a slow down in uptake of mobile phone services over the recent past, suggesting that tax increases result in a significant discouraging effect on uptake and consumption of services. This has been manifested in a consistent decline in minutes of use over the past five years. Indeed the minutes of use per marginal user have declined from 7 minutes per user per day in 2001 to around 3 minutes in 2006. The penetration growth rates have also started to slow down. In addition there has also been an increasing substitution tendency away from mobile phone services to pay phone services which are deemed to be relatively cheaper. This means that the current sector taxation policy is inefficient.

• High taxes have also resulted in a slow down in growth of the telecommunication industry by reducing sector investment. This has been occurring through a number of channels. The sudden changes in tax policy and rates have affected the companies’ ability to prepare reliable business plans and revenue forecasts, making it difficult to raise funding and increasing the risk factors to their lenders. In addition high taxes have reduced profit margins of the operators as they strive not to transfer all the tax to consumers.

• The current sector tax policy is to a large extent based on the type of technology. For instance, mobile transmission equipment attracts an import duty of zero whereas importation of landline transmission equipment is subject to a levy of 10 percent. In addition, mobile phone
handsets are subject to a zero percent tax rate whereas fixed line sets are subjected to a 10 percent import duty.

• The current sector tax system is also unfair and discriminatory. The tax rate on services is uniform. This, coupled with a decreasing share of income devoted to telecommunications as income increases means that poorer households bear a higher burden than their higher income counterparts.

• The relatively high taxes have also resulted in relatively lower levels of penetration in Uganda when compared to other countries in the region such as Kenya that has a penetration rate of around 15 percent and Tanzania whose penetration rate stands at around 11 percent.

• The own price and penetration sensitivities are quite low meaning that consumers bear most of the burden of increased taxes (and tariffs). Another interesting finding is that increases in tariffs of either mobile or fixed line services result in reduction in usage of both services (instead of substitution, as theory would predict), possibly as households attempt to “work within a given telecommunications budget”. This finding is also in line with the overall declining trends in the sector.

• In view of the negative consequences of high taxes, we also undertook a simulation exercise to determine how modest changes in tax policy can enhance outcomes in the telecommunications sector. Our findings suggest that:

• A one percent per year reduction in taxes on mobile telephone airtime over the period 2007 to 2010 would reverse the current declining trend in demand for telecommunications services and turn it into a positive and upward trend. In particular, such a tax policy would translate into a 30 percent increase in minutes of use as opposed to a 9 percent reduction over the same period under the current tax policy. On the other hand, a gradual reduction and eventual elimination of excise duty on mobile telephone airtime would result in a 56 percent increase in demand over the period 2007 to 2010, compared to a base case reduction of 9 percent over the same period.

• A one percent per year reduction in taxes on fixed line telephony airtime over our forecast period (2007 to 2010) would result in 4.24 percent increase in demand for fixed line services as opposed to a 38.4 decline over the same period under the current tax policy.
• A one percent per year reduction in the cost of telephone airtime over the period 2007 to 2010 would result in an increase of penetration levels by 17.3 percent over as opposed to a 6.7 percent increase predicted by the base case scenario whereas, a gradual and eventual elimination of excise duty by the year 2010 would result in a 34.3 percent increase in penetration as opposed to a 6.7 percent change predicted by the base case scenario over the same period.

The results suggest an urgent need to rethink the current telecommunications sector tax policy. This is because telecommunications is just not any other sector, it plays a vitally important role in enhancing productivity in other sectors and thus important for overall economic growth. Thus policies that impede its rapid growth are not only bad for the sector itself but for overall economic performance. In fact, research findings elsewhere suggest that in a typical developing country, a rise of ten mobile phones per 100 people boosts GDP growth by 0.6 percentage points.
1 Introduction and the Research Concern

It has been shown in the growth literature that investment in information and communication technologies (ICT’s) and their adoption (and diffusion) induces high levels of productivity growth and economic performance (Nordhaus, 2002). Access to information and communications technologies can impact on economic outcomes through a number of channels including lowering the costs of doing business, provision of timely and accurate information about markets and market situations and speeding up the process of knowledge creation (Antonelli, 1991). The pace of adoption and diffusion of information and communications technologies in general and telecommunication services in particular therefore remains a matter of great policy concern. Indeed, many countries especially in the developing world that had tended to lag behind the ICT revolution have in the recent past moved fast to implement reforms and create an enabling environment to hasten the spread and adoption of ICT’s to major productive sectors and to attain wider geographical coverage.

The major reforms that have been commonly implemented have revolved around the dismantling of state monopolies that previously dominated the provision of telecommunication services so as to encourage competition and expand the variety of available telecommunication services. In Uganda, an independent regulator of the communications sector, the Uganda Communications Commission was set up in 1998 to among others; enhance national coverage of communication services and products, to develop and improve rural communication services and to encourage the development of the private sector in the development of the communications sector and to encourage competition.
However, the ever increasing fiscal revenue requirements in order to fund government spending in a sustainable manner coupled with the narrow tax base in Uganda has increasingly resulted in a situation in which the tax burden falls disproportionately on a few ‘easy to tax’ sectors. These have traditionally included tobacco and cigarettes, alcoholic and soft drinks and petroleum products. Of late this has been expanded to include the telecommunication sector. The current usage tax on mobile services has reached a rate of 30 percent (18 percent VAT and 12 percent excise duty), making it the highest in the region and the second highest internationally. On the other hand, fixed line services attract a tax rate of 23 percent, of which 18 percent is VAT and 5 percent is excise duty. A well known effect of a tax increase in the absence of other ‘neutralising’ measures is a rise in price of the commodity or service against which the tax is levied. This is in turn expected to affect the demand and consumption patterns of the good or service.

Economic theory posits a number of possible relationships between tax and tariff increases on the one hand, and demand (sales) on the other. The exact nature and size of the response will largely depend on the elasticity of demand. In the particular case where the elasticity of demand is equal to minus unity, the tax/tariff increase will not affect demand and by implication tax revenue. In cases of low elasticities, then increases in taxes and prices will have a small impact on the demand and consumption patterns. In other words, the excess burden of taxes, that is, the reduction in demand and consumption patterns induced by increases in taxes is low in such cases. On the other hand, a high elasticity of demand will imply a high excess burden.
Clearly then, the precise and exact nature of the response of demand and consumption (and penetration) can not be known a priori but the declining penetration rates in Uganda over the recent past have started to cause serious concern in some circles. There are concerns that the increasing prices emanating from high level of taxes on the telecommunication services might work to discourage consumption of some of the services. There is thus need to assess the impact of Uganda’s ICT sector taxation policies on the demand and penetration patterns of telecommunication services.

2 Objectives of the study

The overall objective of the study was to assess the impact of Uganda’s ICT sector taxation policies and prices on the demand and penetration patterns of telecommunication services. The study specifically aimed to:

i) review Uganda’s tax policy with particular interest to the telecommunication services;

ii) assess the impact of tax related price increases on penetration, traffic volume, total turnover and investment;

iii) determine the price and penetration elasticities of the various telecommunication services; and,

iv) simulate a scenario of how some modest adjustments in tax rates can impact on outcomes in the telecommunications sector.

3 An overview of the telecommunications sector in Uganda

This section presents an overview of the structure and performance of the telecommunications sector over the past decade. The presentation in this section
is rather brief; a more detailed exposition of trends and directions in the sector can be found in the UCC Comprehensive Sector Analysis Report (2005).

The main policy thrust with respect to the telecommunication sector over the past decade has been to promote its rapid growth and expansion to cover most parts of the country. This has perhaps been a reflection of government’s recognition of the synergies and positive feedback effects that exist between a well developed information and communications sector and productivity growth and overall economic performance. In the early years that followed attainment of political independence, Uganda pursued a system with a proactive state. Indeed, until the early 1990s the telecommunications sector was comprised basically of the incumbent state monopoly, the Uganda Posts and Telecommunications Corporation (UPTC). The period after 1996 witnessed implementation of measures that sought to reduce state dominance in the sector and to attract investment to promote its rapid expansion.

The key hallmarks of the telecommunications sector reform programme have included measures to increase reliance on market forces. The incumbent state monopoly was dismantled and subdivided into three smaller and more specialised units, namely Uganda Post Ltd, UTL and Post Bank Uganda Ltd. Other private companies have also since been licensed in order to promote competition. Competition usually forces firms to become highly innovative and to set prices that are competitive. This in turn is expected to be reflected in increased consumers’ welfare\(^1\) as they share in the ensuing productivity gains. Productivity growth is usually expected to trend at a much higher rate in the telecommunications sector relative to other sectors of the economy due to the

\(^1\) This can take the form of lower prices and better quality services.
higher than usual rate of technological innovations in the sector and lower input price inflation due to decreasing unit costs of processing, switching and transmission. The benefits of increased productivity should ideally, at least in part be passed on to the consumers.

However, due to imperfections in the market firms will not have sufficient incentives on their own to pass on the gains in productivity to final consumers, especially at the early stages of transition. In fact in the case of Uganda, government decided to initially put in place a limited competition regime in order to encourage rapid investment growth and reinvestment of the retained profits. These necessitated the need to regulate the sector. The Uganda Communications Commission was as a result established in 1998 to oversee the sector. The sector has evolved quite tremendously over the reform period with considerable expansion in the subscriber base. The mobile phone subscribers have, however, expanded at a much faster rate than their fixed line counterparts, a development that can partly be attributed to convenience associated with mobile phone usage (Figure 1).
At present there are two national telecommunication operators working on a license that allows provision of all telecommunication services. There are three cellular operators, twelve operational internet access service providers and a couple of public pay communication providers reselling the services of locally licensed operators. There are three licensed third party network providers that provide private data and voice services. Plans are underway to liberalise the sector further. The Uganda Communications Commission also provides rural communication licences to operators that provide services to those areas in which MTN and UTL gave up their exclusivity rights.

The sector’s contribution to GDP currently stands at 8.2 percent and it contributes 5 percent of total tax revenue to the government treasury. Sixty five
percent of the land area is covered by fixed and or mobile telephone coverage using a whole range of technologies including GSM, CDMA, fibre-optic networks etc. All districts and 80 percent of sub-counties in the country have a point of presence of telecommunication services. The telephone penetration levels have increased from a dismal 0.26 per 100 inhabitants in 2001 to 10.34 per 100 inhabitants to date. The number of internet subscribers, although still small, has increased to 13,000 from 6,500 in 2002. Internet access points in the country have increased and it is now estimated that the number of people accessing internet at least once a month is around 2,000,000. In addition, internet capacity has increased with the current total bandwidth being estimated at 126 mbps. However, declining sector trends over the past few years have started to cause serious concerns. Average revenue per user per month (ARPU)\(^2\) has continued to decline, decreasing from UGX 39,563.45 in 2002 to UGX 25,140.52 in 2005 (Figure 2).

**Figure 2: Monthly average revenue per user 2002-2005**

![Chart showing monthly average revenue per user from 2002 to 2005](image)

**Source:** Computed

\(^2\) **Average Revenue Per Unit (ARPU)** - Measures the average monthly revenue generated for each customer unit, such as a cellular phone or pager that a carrier has in operation.
The uptake of services has as well been growing at a declining rate. The recent trends also depict an increasing tendency of substitution away from using mobile phones to pay phones and fixed line telephones (Table 1).

**Table 1: Telephone subscribers, 2001-2006**

<table>
<thead>
<tr>
<th>Service</th>
<th>2001</th>
<th>20002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Telephone</td>
<td>56,147</td>
<td>59,472</td>
<td>65,793</td>
<td>71,568</td>
<td>100,777</td>
<td>129,863</td>
</tr>
<tr>
<td>Cellular Phone</td>
<td>276,034</td>
<td>505,627</td>
<td>893,035</td>
<td>1,165,035</td>
<td>1,525,125</td>
<td>2,697,616</td>
</tr>
<tr>
<td>Pay Phone</td>
<td>3,310</td>
<td>3,200</td>
<td>3,456</td>
<td>4,634</td>
<td>10,263</td>
<td>12,889</td>
</tr>
</tbody>
</table>

*Source: Uganda Bureau of Statistics*

One candidate explanation of these trends is declining affordability emanating from the current sector taxation policy. The subsequent sections explore this possibility in greater detail.
4 Telecommunications sector taxation in Uganda: nature, structure and possible consequences

This section presents information pertaining to the telecommunications sector taxation policy in Uganda. It outlines the specific taxes (and tax rates) that can influence outcomes in the telecommunications sector and how they have evolved over time. It then attempts to assess the possible effects of tax policy variables on some key telecommunications sector performance indicators such as penetration, usage and investment. In order to be able to draw out some preliminary implications for policy, we also undertake an assessment of the current tax system in light of some vitally important tenets of a good tax and tax system, specifically efficiency and equity.

This section starts by setting the scene upon which the relatively high level of telecommunications sector taxes in Uganda can be possibly be explained and understood. A tax is a mandatory transfer from private agents to government. Taxes largely arise out of the need to obtain revenue to fund government spending programmes. In an ideal setting, the tax revenue collected domestically should be sufficient to fund government operations. A budget (fiscal) deficit is then said to arise whenever the actual revenues realised fall short of government expenditure requirements. Uganda has been operating a fairly large and apparently unsustainable fiscal deficit over the past decade or so. In fact the fiscal deficits minus grants as a percentage of GDP have increased from about 2% of GDP in 1991 to about 13% of GDP in 2004.

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3 A more quantitative and conclusive analysis is undertaken in the subsequent sections. To an extent therefore, this section also helps to develop a justification for the econometric analysis undertaken subsequently and also sets the scene within which the results from quantitative analysis can be interpreted and understood.
Given the need to fund its numerous obligations, government has had to find mechanisms of funding this ever bourgeoning deficit. Public finance theory suggests four major avenues through which revenue to fund the deficit can be realised, viz;

i. borrowing from the public and domestic banking system;

ii. printing money;

iii. borrowing from abroad; and,

iv. increasing taxes.

Perhaps the most ideal financing mechanism would entail raising the required revenues through taxes. Indeed, since the early 1990s, government undertook to reform the tax system with the object purpose of raising more revenue locally. However, owing to the apparently low revenue productivity of Uganda’s tax system these first generation reforms of the tax system appear to have failed to raise enough revenue to close the fiscal deficit. In light of this and given that borrowing from the Central Bank (printing money) is inflationary, government has had to rely mainly on borrowing from abroad (donor aid).

Whereas increased donor aid inflows have been welcomed and even encouraged in some circles to help increase the pace at which some social targets can be attained, others have strongly argued that they complicate short run macroeconomic management and may generally not be sustainable in the long run (Brownbridge, 2004). Donor inflows can have many adverse consequences

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4 Of course this is worsened by the very high cost of public administration.
5 The most fierce debate in this area in Uganda has been largely between the Ministry of Finance and the Bank of Uganda on the one hand who have continued to point out that the present trend is not sustainable,
including putting pressure on the domestic price level and domestic currency appreciation. These in turn can hurt export competitiveness and stifle the role of the private sector in economic activity. It is these undesirable consequences of over reliance on donor inflows that help us appreciate the current second generation attempts by government to realise more revenue domestically. The current tax to GDP ratio of 12.78 percent in Uganda is still far below comparable countries in sub Sahara African whose tax to GDP ratio stands at an average of 19 percent. Attempts to raise more revenue domestically has owing to the narrow tax base, however, resulted in a quite unfortunate trend of events whereby a few “easy to tax” sectors have had to bear a disproportionate tax burden. These have traditionally included the cigarettes and tobacco sub-sector, petroleum products and alcoholic and soft drinks.

More recently, the telecommunications sector has become one “good” candidate source of tax revenue. Figure 3 presents trends in total tax revenue of the telecommunications sector between 2001 and 2006

**Figure 3: Telecom Tax Revenue, 2002-2006**
The key fiscal revenue-generating instruments that are applicable to the telecommunications sector in Uganda include corporation tax, duties on imported hand sets and equipment, the value added tax and excise duty. Corporation tax is income tax payable on income earned by corporate bodies such as limited liability companies and statutory bodies. Corporation and income tax in general is charged under the income tax act 1997. Presently, companies are required to pay 30 percent of corporation income as taxes to government.

In addition, there are statutory levies on importation of telecommunications sector equipment of a capital nature as well as mobile telephone handsets and handsets for the landline. The telecommunications sector equipment can be distinguished depending on whether the mode of transmission is by radio signals or the traditional cable system. It can also be distinguished according to whether the equipment is for mobile transmission or land line transmission. In the present system mobile transmission equipment attracts an import duty of
zero percent whereas the import duty on land line transmission equipment is 10 percent. Both types of equipment are also subject to payment of a value added tax at the existing rates. The actual timing of payment of value added tax on telecommunication equipment is quite flexible. The payment can either be made at the time of importation or can be deferred depending on the cash flow position and also depending on whether there are other pressing needs that need to be addressed in the short term.

There are proposals under a new harmonised system to classify base station equipment for both mobile and land line telephony together for tax purposes in order to enhance the complementarities between optical fiber networks and radio link systems. This is expected to promote investment in dual interface technology which should in turn work to minimise communication interruptions in case of failure on the radio link.

Apart from import duties and the value added tax on mobile and line transmission equipment, the importation of mobile telephone handsets and sets for the landline are also subject to payment of taxes. Importation of mobile telephone handsets is presently zero rated whereas land line telephone sets are subjected to a 10 percent import duty. Both mobile telephone handsets and fixed line sets are also subject to payment of value added tax at the prevailing rates. Perhaps owing to the realisation of the difficulty to build an effective country wide fixed line network the present tax regime appears to promote the use of mobile phones. It should Fixed phone line users however appear to receive some offset from the relatively high import duty in form of relatively lower service
taxes. A summary of the most important taxes and their rates as applicable to Uganda’s telecommunication sector is presented in Table 2.

Table 2: Uganda’s telecommunication sector tax regime, 2006

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAT on mobile and fixed line airtime</td>
<td>18 percent</td>
</tr>
<tr>
<td>Excise Duty on mobile phone services</td>
<td>12 percent</td>
</tr>
<tr>
<td>Excise duty on fixed line services</td>
<td>5 percent</td>
</tr>
<tr>
<td>Corporation tax</td>
<td>30 percent</td>
</tr>
<tr>
<td>Import duty on mobile phone transmission equipment</td>
<td>0 percent</td>
</tr>
<tr>
<td>Import duty on land line transmission equipment</td>
<td>10 percent</td>
</tr>
<tr>
<td>Import duty on mobile phone handsets</td>
<td>0 percent</td>
</tr>
<tr>
<td>Import duty on fixed line sets</td>
<td>10 percent</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance, Planning and Economic Development

For the purpose at hand it is imperative to focus particular attention on those tax instruments that bear a more explicit relationship to some vital outcome indicators in the telecommunications sector. In particular we focus on the value added tax and excise duty on telecommunications services. These, *ceteris paribus* are expected to depict a more direct impact on the price that consumers will ultimately pay for the services and hence penetration and uptake of services.

The value added tax (VAT) was first introduced in Uganda starting July 1996 to replace the then existing sales tax and the commercial transactions levy (CTL). It was largely intended to solve problems of evasion and low tax yields. The present policy is that any individual business entity or firm with an annual turnover threshold of at least 50 million shillings is eligible to pay and should register as a VAT payer. In the year 2005/06 VAT rate was increased from 17% to
18%. Table 3 presents value added tax revenue from telephone airtime for the 2000/01-2005/06 period as well as the ratio of telecommunication sector VAT revenue to total VAT revenue. The telecommunication sector VAT revenue has started to decline starting the year 2005/06.

Table 3: Telecommunication VAT revenue and total VAT revenue

<table>
<thead>
<tr>
<th>Period</th>
<th>Tel VAT Revenue (a)</th>
<th>Total VAT Revenue (b)</th>
<th>a/b</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000/01</td>
<td>13400000000</td>
<td>3.39E+11</td>
<td>3.952802</td>
</tr>
<tr>
<td>2001/02</td>
<td>18200000000</td>
<td>3.93E+11</td>
<td>4.631043</td>
</tr>
<tr>
<td>2002/03</td>
<td>27700000000</td>
<td>4.66E+11</td>
<td>5.944206</td>
</tr>
<tr>
<td>2003/04</td>
<td>30800000000</td>
<td>5.18E+11</td>
<td>5.945946</td>
</tr>
<tr>
<td>2004/05</td>
<td>40920000000</td>
<td>5.92E+11</td>
<td>6.912162</td>
</tr>
<tr>
<td>2005/06</td>
<td>45690000000</td>
<td>7.08E+11</td>
<td>6.45339</td>
</tr>
</tbody>
</table>

Source: Uganda Revenue Authority

Excise duty is generally levied under the Excise Management Act of 1970 as amended, on locally manufactured goods and services. Excise duty on mobile cellular phone airtime was first introduced in the 2001/02 financial year and was levied at a flat rate of 7 percent. The rates were revised upwards in 2002/03 to 10 percent and to 12 percent in 2005/06. Table 4 presents excise duty revenue from telephone airtime for the 2001/02 -2006/07 period.

Table 4: Revenues from phone airtime (2001/02 – 2006/07)

<table>
<thead>
<tr>
<th>Mobile phone</th>
<th>Land line</th>
<th>Total Tax Revenue (Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001/02</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td>2002/03</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>2003/04</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>2004/05</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>2005/06</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>2006/07</td>
<td>12%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance, Planning and Economic Development
The current usage tax on pre-paid mobile services in Uganda is 30 percent (18 percent VAT and 12 percent excise duty). This has turned the telecommunications sector into an important source of fiscal revenue in Uganda. The 30 percent tax on services is certainly very high by any standard. In fact this ranks Uganda as the country with the second highest service taxes on mobile phone usage internationally, placing it only behind Turkey! It is usually the case that such high and increasing taxes end up getting reflected in price increases.

One can not, however, tell a priori the full implications such price increases will have on demand and consumption patterns, investment, revenue for the government treasury and ultimately for growth of the economy as a whole. The ultimate effects and how they are transmitted to other variables will largely depend on the nature of the relationship between quantity demanded (sold) and price changes. Clearly these need to be empirically understood, if not for anything else, then for purposes of informing policy.

Economic theory posits a number of possible relationships between tariff increases on the one hand, and sales quantity on the other. The exact nature and size of the response will largely depend on the elasticity of demand. In the particular case where the elasticity of demand is equal to minus unity, the tariff increase will not affect sales revenue. In cases of low elasticities, then increases in prices will have a small impact on the demand and consumption patterns. In other words, the excess burden of taxes, that is, the reduction in demand and consumption patterns induced by increases in taxes is low in such cases. On the other hand, a high elasticity of demand will imply a high excess burden. The price and penetration elasticities of the telecommunication services in the
Ugandan market will be estimated in the subsequent section. Nonetheless, we present some simple relationships in this section that give us an insight of the possible impact price increases have had on the demand and uptake of services.

Figure 4 presents the relationship between mobile phone usage and tariffs over the period 2001 to 2006.

Figure 4: Mobile minutes of use tariff (2001-2006)

Source: Uganda Communications Commission

The Figure shows that proportionate mobile services tariff increases have been met by more than proportionate reductions in demand for mobile services (measured as minutes of use in this study). The relationship that tariff increases reduce demand for services is also borne out for the case fixed line services (Figure 5).
Both cases appear to point to the possibility that the tax induced tariff increases are more than proportionately borne by consumers of the services. This possibility is investigated in further detail in a subsequent section by estimating elasticities.

Table 5 presents regression estimates of the trend growth of mobile phone subscribers over the period December 1996 to December 2006. It is intended to show the nature of growth of mobile phone subscribers over the sample.
Table 5: Trend growth analysis of mobile phone subscribers (1996-2006)

Dependent Variable: LNMOBILE
Method: Least Squares
Date: 01/27/07   Time: 06:39
Sample: 1 20
Included observations: 20

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>9.348211</td>
<td>0.363445</td>
<td>25.72115</td>
<td>0.0000</td>
</tr>
<tr>
<td>@TREND</td>
<td>0.689682</td>
<td>0.088664</td>
<td>7.778602</td>
<td>0.0000</td>
</tr>
<tr>
<td>@TREND^2</td>
<td>-0.024382</td>
<td>0.004505</td>
<td>-5.412442</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared 0.880282  Mean dependent var 12.88907
Adjusted R-squared 0.866198  S.D. dependent var 1.631734
S.E. of regression 0.033465  Akaike info criterion 1.943249
Sum squared resid 6.056335  Schwarz criterion 2.092609
Log likelihood -16.43249  F-statistic 62.50046
Durbin-Watson stat 0.421755  Prob(F-statistic) 0.000000

The coefficient on the linear trend term is positive and significant whereas the coefficient on the quadratic trend term is negative. This can be interpreted to mean that the subscriber base has been increasing but at a decreasing rate. This may loosely point to the discouraging effects of the high prices.

The fixed phone lines have also depicted an upward but much smaller trend growth (see Table 6).

Table 6: Trend growth analysis of fixed line subscribers (1996-2006)

Dependent Variable: LNFIXED
Method: Least Squares
Date: 01/27/07   Time: 06:42
Sample: 1 20
Included observations: 20

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>10.78968</td>
<td>0.033465</td>
<td>322.4195</td>
<td>0.0000</td>
</tr>
<tr>
<td>@TREND</td>
<td>0.033483</td>
<td>0.003011</td>
<td>11.11918</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared 0.872914  Mean dependent var 11.10777
Adjusted R-squared 0.866198  S.D. dependent var 0.212019
S.E. of regression 0.077654  Akaike info criterion 1.943249
Sum squared resid 0.108543  Schwarz criterion -2.078891
Log likelihood 23.78464  F-statistic 123.6361
Durbin-Watson stat 0.421755  Prob(F-statistic) 0.000000
More recent trends suggest that the subscriber base, most notably for the mobile cellular phones has been growing at a declining rate (see Table 7).

Table 7: Telephone subscribers and growth rates, 2000-2006

<table>
<thead>
<tr>
<th>Service</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed phone</td>
<td>56,147</td>
<td>59,472</td>
<td>65,793</td>
<td>71,568</td>
<td>100,777</td>
</tr>
<tr>
<td>Subscription growth</td>
<td>5.92</td>
<td>10.62</td>
<td>8.78</td>
<td>40.81</td>
<td>-</td>
</tr>
<tr>
<td>Cellular phone</td>
<td>276,034</td>
<td>505,627</td>
<td>893,035</td>
<td>1,165,035</td>
<td>1,525,125</td>
</tr>
<tr>
<td>Subscription growth</td>
<td>83.17</td>
<td>76.62</td>
<td>30.45</td>
<td>30.90</td>
<td>-</td>
</tr>
<tr>
<td>Pay phone</td>
<td>3,310</td>
<td>3,200</td>
<td>3,456</td>
<td>4,634</td>
<td>10,263</td>
</tr>
<tr>
<td>Subscription growth</td>
<td>-3.32</td>
<td>8.00</td>
<td>34.08</td>
<td>121.47</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Uganda Bureau of Statistics

This slackening uptake of mobile phone services has coincided with the period over which taxes and cost per call have been increasing, suggesting a somewhat significant discouraging effect of tax rate increases. Interestingly the patterns also appear to depict an increasing substitution tendency away from mobile phone services to fixed line usage and more remarkably pay phone services which are relatively cheaper. Loosely speaking therefore, these patterns appear to suggest a relatively high sensitivity of telecommunications services to price changes.

Other indicators of uptake of telecommunications services that may bear a direct relationship to tariff increases include changes in minutes of use (call duration) and subscribers per 100 inhabitants. Patterns and trends in minutes of use per subscriber control for changes in the subscriber base and are therefore likely to provide a more reliable picture in the direction of usage. Figure 6 suggests a consistent decline in minutes of use over the past five years, possibly reflecting
the discouraging effect of high tariffs. The minutes of use per marginal user have declined from 7 minutes per user per day in 2001 to just 3 minutes in 2005 (UBOS, 2006).

**Figure 6: Trends in Telephone Usage**

![Daily and monthly telephone usage (2003-2006)](image)

*Source: Uganda Communications Commission*

The patterns also appear to suggest that increases in taxes are in turn passed on to the final consumers by the telecommunications services providers in the form of increased tariffs which ultimately results in reduced usage of the services. Again this points to a discouraging effect running from price and affordability on the one hand and demand and usage of telecommunications services, on the other.

In as much as the penetration has doubled between the period 2001 and 2005, the current figure of around 5.9 percent is quite low both in absolute terms and more particularly when seen in light of the fact that over 65 percent of the land area is covered by fixed and or mobile telephone network.
Table 8: Growth of Ugandan Telecoms Industry

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>24,581,100</td>
<td>25,426,200</td>
<td>26,302,000</td>
<td>27,207,900</td>
</tr>
<tr>
<td>Subscriptions</td>
<td>565,099</td>
<td>843,356</td>
<td>1,247,530</td>
<td>1,625,902</td>
</tr>
<tr>
<td>Teledensity</td>
<td>2.30</td>
<td>3.32</td>
<td>4.74</td>
<td>5.98</td>
</tr>
</tbody>
</table>

Source: UBOS, UCC

The figure is also low when compared to other countries with similar characteristics in the region such as Kenya that has a penetration rate of around 15 percent.

Figure 7: Level of telephone penetration for selected countries

Source: Uganda Communications Commission

Affordability is certainly a major reason for the low uptake of services.

At a more general level, the current telecommunications sector taxation regime is quite surprising especially if one is to adopt the view that telecommunication services are basic utilities that are essential to society just like water and electricity and as such should not bear such a high tax burden. It is even more
surprising since the high service charges appear to contradict the professed
government policy of universal access.

In what follows, we undertake to relate the current sector tax policy to sector
investment and revenue for the government treasury. We also attempt to assess
the current tax policy with respect to equity and efficiency.

**Taxes and sector investment**

To the extent that high taxes tend to discourage uptake of services, one can argue
that high taxes might slow down the growth of the telecommunication industry
and reduce direct investment by shareholders. The sudden changes in tax policy
and rates may also affect the companies’ ability to prepare reliable business plans
and revenue forecasts, making it difficult to raise funding and increasing the risk
factors to their lenders who become increasingly uncomfortable with uncertainty
in the market. Another mechanism through which high taxes could affect
investment is through reduction in profit margins of the operators as they strive
not to transfer the tax to consumers\(^6\). Indeed, the ratio of investment to revenue
has generally been declining with an increase in taxes, with the exception of the
year 2004 (Table 9).

**Table 9: Tax-Investment relationship for the telephone sub-sector (2001-2005)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Total Revenue</th>
<th>Tax Revenue</th>
<th>Total Investment</th>
<th>Tax/Rev(%)</th>
<th>Invest/Rev (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>14,265,744</td>
<td>6,522,470</td>
<td>47,139,231</td>
<td>5.708159</td>
<td>41.25404</td>
</tr>
<tr>
<td>2002</td>
<td>149,297,252</td>
<td>9,302,485</td>
<td>52,083,076</td>
<td>6.230848</td>
<td>34.88549</td>
</tr>
<tr>
<td>2003</td>
<td>178,739,047</td>
<td>16,282,735</td>
<td>59,512,933</td>
<td>9.10978</td>
<td>33.29599</td>
</tr>
<tr>
<td>2004</td>
<td>238,264,513</td>
<td>27,032,433</td>
<td>88,350,345</td>
<td>11.34556</td>
<td>37.08078</td>
</tr>
<tr>
<td>2005</td>
<td>275,460,316</td>
<td>53,566,781</td>
<td>67,144,956</td>
<td>19.44628</td>
<td>24.37555</td>
</tr>
</tbody>
</table>

*Source: Uganda Communications Commission*

\(^6\) It should be noted that this will depend on the tax incidence, which in turn depends to a large
extent on the nature of price sensitivity of demand of the services.
The message of this relationship appears to suggest the obvious; high taxes discourage investment. This trend is quite worrying, if not for anything else, then for the reason that low investment may translate in a slow down in uptake of services and ultimately result in low tax revenue for the government treasury. In the overall, high taxes on a narrow base appear to be self defeating in the long run.

Generally, if the economic incidence of increased taxes is borne by operators then the amount of capital left over from profits to invest and fulfil roll over obligations is therefore reduced affecting network service growth as well as development. The reduced profit margin may also reduce flexibility in tariff decrease which in turn implies that it will not be possible for consumers to share in any productivity gains.

Taxes, government revenue and overall economic growth

High taxes on a narrow tax base in the telecommunications sector are not only bad for uptake of services or investment and revenue for the government treasury. Given the strong synergies between telecommunications and productivity growth in other sectors of the economy, high taxes can also be bad for overall economic growth. A recent study by London Business School found that, in a typical developing country, a rise of ten mobile phones per 100 people boosts GDP growth by 0.6 percentage points.

7 The incidence of a tax can be distinguished depending on whether it is statutory incidence or economic incidence. Statutory incidence refers to the party that has the legal obligation to remit the tax to the government whereas economic incidence refers to who actually pays the tax, that is, the party whose behavior is changed or whose welfare is reduced as a result of the tax.
Tax equity and efficiency

Apart from examining possible consequences that tax policy variables can have on outcomes in the telecommunications sector, it is imperative to assess the sector tax regime itself with respect to some standard yardsticks that should characterize a good tax system. This should enable us find answers to some potentially interesting policy issues such as: is there any discernible relationship between tax revenue collected from the sector and the proportion of this revenue that is spent on sector specific or any other activities for that matter, that exclusively or at least disproportionately benefit sector operators and their customers? Does the current sector tax regime in any way favour the poor and disadvantaged segments of society? If not, isn’t it possible then that the poorer segments are made to bear a disproportionally heavier “excess burden”?

In order to provide answers to some of the foregoing questions our subsequent analysis will be founded on two yardsticks of a good tax system namely, equity and efficiency.

Tax equity

Equity relates to fairness of a tax system. Fairness is subjective but there are certain guiding principles that define an equitable tax system. Fairness encompasses vertical and horizontal equity. Vertical equity posits that those individuals in a position to pay higher taxes should pay more. There are two basic principles that are usually considered under vertical equity, the benefit principle and ability to pay principle. In simple terms the benefit principle suggests that taxes should be paid according to what one gets from the system.
Certainly a more complete understanding of whether this holds would require undertaking an analysis of government expenditure incidence. This task is outside the terms of reference and scope of the present exercise. However, there is no reason to imagine that there is a significant linkage between what customers and operators in Uganda’s telecommunications sector pay as taxes and what they receive from government as would be required by the benefit principle. Put another way, the sector operators and customers in Uganda are not getting any special treatment from government to warrant such high taxes!

The ability to pay simply suggests that a fair tax should fall proportionately on those with a higher measure of ability to pay. In other words, a good tax should be proportional in the sense that it should increase with the ability to pay. This would generally require richer households to pay more than their poorer counterparts. On the contrary the current sector tax system in Uganda is regressive. This is because the share of telecommunications in total expenditure reduces as income increases. A uniform tax rate coupled with the decreasing share of income devoted to telecommunications as income increases means that poorer households bear a higher burden than their higher income counterparts. Uganda’s current telecommunications tax system is therefore regressive; it is unfair to the poorer and disadvantaged members of society, who incidentally form the majority of the population.

Horizontal equity on the other hand would require that those individuals who are the same in all relevant respects should by way of taxes be treated equally. However, this is very unlikely to hold since customers of the same income spend differing amounts on telecommunication. This then makes the current sector tax system discriminatory, in violation of the horizontal equity principle.
Tax efficiency

Efficiency relates to the discouraging effects of a tax system. Taxes are by their very nature distortionary. A good tax system should thus seek to minimize the distortions that it can potentially cause\(^8\). Distortions can be static or dynamic. These concepts are closely related in the sense that they both refer to a change in behaviour induced by an increase in taxes. Their key difference lies in their treatment of consumers’ and firms’ tastes and preferences and production technologies respectively. Static efficiency losses assume that tastes and preferences as well as firms’ technologies are fixed. This means that the change in behavior can only be reflected in reduced consumption and production levels. The remarkable reduction in minutes of use and a slowdown in uptake of services that was alluded to earlier is a clear indicator that the static inefficiency losses have been enormous. This loosely means that the present tax system is inefficient in a static sense, since it has resulted in more than proportionate reduction in uptake of services.

In a dynamic setting preferences and technologies are variable and as such tax increases may induce agents to delve into other alternatives. This may in our case be seen in the apparent shift by agents away from mobile phone use to public pay phone services and fixed phone lines that attract lower tax rates and therefore relatively cheaper. This again renders the present tax system inefficient, even in the dynamic perspective.

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\(^8\) The term distortion is used in this context to mean the discouraging effects or change in behaviour that a tax may induce. In economics these discouraging effects or distortions are technically referred to as excess burden or deadweight loss.
In the overall, however, great caution should be exercised when evaluating the desirability or otherwise of telecommunication taxes. In particular, the mere fact that taxes can result in distortions should not necessarily mean that they are undesirable. Instead, distortion should be viewed as part of the cost side of the cost-benefit analysis of any tax system. Indeed even if the benefits are determined to justify the costs, the tax system could be restructured to reduce inefficiency while raising the required revenue for the government treasury. We undertake exogenous policy shift simulations in a subsequent section in order to explore such alternatives.

5 Tax policy and tariff benchmarking

This section makes a comparison of telecommunications sector tax policy and tariffs in Uganda with the system obtaining in other countries in the region. It seeks to make inference on some questions such as: Are there any discernible differences in telecommunications sector tax rates between Uganda and other comparable countries? Are there any discernible differences in tariffs in Uganda and other comparable countries? Are there any discernible differences in levels of penetration between Uganda and the comparator countries? If so, to what extent can one possibly attribute this difference to differences in sector tax policy and tariffs?

Of course, owing the fact that countries tend to be heterogeneous in many respects, the analysis here should only be viewed as an approximation. We largely limit our comparison to two countries in the region, Kenya and Tanzania. They are more likely to have some structural similarities. They are also in a customs union and therefore likely to pursue closely similar sector tax policies. Of late, there has also developed a trend of sharing facilities among the mobile
cellular operators such that a customer can use their line across the geographical boundary of his or her country in the region. At present this is being done for the “Celtel” customers across the east African region. There is also an arrangement among “Mango” in Uganda, “Safaricom” in Kenya and “Vodacom” in Tanzania to connect each others’ subscribers as they cross from their native countries to any other in the region. More recently, MTN (Uganda) as well as Safaricom-Kenya and Vodacom-Tanzania have also put in place a similar arrangement. It would be interesting if these customers paid similar amounts in the different countries, after controlling for exchange rates. Figure 8 shows that Uganda compares quite poorly in terms of teledensity against countries in the region.

Figure 8: Level of telephone penetration for selected countries

<table>
<thead>
<tr>
<th>Year</th>
<th>Uganda</th>
<th>Tanzania</th>
<th>Kenya</th>
<th>Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2002</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2003</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2004</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>2005</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: Uganda Communications Commission

The Figure shows that the levels of penetration are low when compared to other countries in the region such as Kenya that has a penetration rate of around 15 percent and Tanzania whose penetration rate stands at around 11 percent.
An influential study by a consortium of leading international consultancy firms estimates the cost of taxes in the overall tax burden associated to the cost of mobile phone ownership in a cross section of 50 economies (see GSM Association, 2005). It ranks Uganda in second position as the country with the highest taxes on mobile phone services internationally. The current tax rate on mobile phone services in Uganda is 30 percent whereas it is around 25 percent and 26 percent in Tanzania and Kenya respectively. Whether this difference in tax rates is what explains the differences in penetration levels would require somewhat more sophisticated analysis which can not be undertaken in the scope of the present assignment and more importantly due to data limitations. Nonetheless, one can not rule out the fact that affordability is a major reason for the low penetration levels in Uganda. Table 10 presents mobile and local call tariff in Uganda, Kenya and Tanzania. On average, the cost of making a call are higher in Uganda than in any of the other east African countries. This may explain the relatively low penetration levels alluded to earlier.

**Table 10: Tariff benchmarking**
The foregoing sections have provided a description of the effects of current sector taxation policies on uptake and demand for services. We also undertook a benchmarking exercise in which we compared the tax rates obtaining in Uganda to those in the region. Our exposition indicates that the current tax regime in Uganda has had adverse consequences on the sector. It should, however, be pointed out that this kind of descriptive work can not be relied on to provide conclusive analysis since it does not say anything about the statistical plausibility of the underlying relationships. There is thus need to increase the statistical reliability of the relationships by undertaking an econometric analysis.
The subsequent section undertakes an econometric estimation of the demand and penetration elasticities for telecommunication services and applies them to gain an insight into the nature of “excess burden” arising from the current sector tax policy. The specifications also form the basis for policy simulations and scenario analysis.

6 Econometric methodology and analysis
This section undertakes an econometric estimation of price and penetration elasticities of the various telecommunication services in Uganda. It also estimates the cross elasticities between mobile and fixed line services. The main thrust in this section is to examine and understand the nature and size of the underlying relationships between demand for the major categories of telecommunication services and tariffs. The elasticity estimates also enable us to establish the extent to which different parties (consumers and service providers) share in tax increases, that is, who pays what? In addition, the elasticity estimates obtained in this section form the basis for model forecasting and simulation which are undertaken in a subsequent subsection. A more detailed conceptual analysis of the possible relationships between tax induced tariff increases and demand for services is presented in the previous sections. The approach to elasticity measurement employed in this report entailed relating a measure of demand for telecommunication services and tariff changes through regression analysis. The various elasticity estimates are presented in what follows.

6.1 Modelling Price Elasticities for Mobile Services
The dependent variable employed in this study is the demand for telecommunication services. There are a number of suggestions in the literature on how to proxy measures that capture demand for telecommunication services.
The most common ones include number of calls, call duration or minutes of use and revenue from specific call types. Others are number of telephones and penetration of telephones. We employed minutes of use as a measure of demand. The price variable is defined as cost per minute. The variables are transformed into their natural logarithmic form so the coefficients can be interpreted as elasticities. The price elasticity estimates are presented in Tables 11 and 12.

**Table 11: Mobile price elasticity estimates**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.659620</td>
<td>10.28156</td>
<td>0.0000</td>
</tr>
<tr>
<td>Price per minute</td>
<td>-0.375192</td>
<td>-6.197367</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

**Table 12: Fixed line price elasticity estimates**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.323101</td>
<td>7.75683</td>
<td>0.0000</td>
</tr>
<tr>
<td>Price per minute</td>
<td>-0.137471</td>
<td>-2.398232</td>
<td>0.0310</td>
</tr>
</tbody>
</table>

The low price elasticity estimates can be interpreted to mean that most of the tax increments are passed on to consumers in the form of higher prices. This means that consumers are made to bear most of the burden of the high taxes. In absolute terms, the elasticity estimate of fixed line services is lower than that for mobile services. This can be interpreted to mean that fixed line service users shoulder a higher tax burden when compared to their mobile service counterparts. This result seems to be plausible if one is to adopt the view that most fixed line users are either institutions and commercial premises or generally above average income residential establishments. These are less likely to reduce services because of modest increases in tariffs.
6.2 Modelling Cross Elasticities

In cases where services can be substituted (such as mobile and fixed line telecommunication services), it is possible that an increase in price of one service may result in an increase in demand for the other (substitute) service. Owing to the fact that taxes and tariffs on mobile and fixed line services have not been changing proportionately, it was imperative to analyse cross elasticities between these two services. It was important to establish whether the relatively higher taxes and tariffs on mobile services have resulted in a shift of demand in favour of fixed line services. The cross elasticity estimates for fixed and mobile services in Uganda are presented in Tables 13 and 14.

<table>
<thead>
<tr>
<th>Table 13: Mobile services demand and price of fixed line services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable: mobile minutes of use</strong></td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>Fixed line services price</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 14: Fixed line services demand and price of mobile services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable: fixed minutes of use</strong></td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>Mobile services price</td>
</tr>
</tbody>
</table>

The results suggest that a one percentage point increase in fixed line tariffs reduces demand for mobile services by about 0.17 percentage points. On the other hand a one percentage point increase in mobile services tariffs reduces fixed line services demand by 0.13 percentage points. In other words, these results mean that a tariff increase of one service will result in a reduction of demand for the substitute service. This contradicts the theoretical predictions but
is generally plausible in view of the declining trends in the telecommunications sub-sector. This result is also plausible if it is interpreted to suggest that in an effort to keep within a given budget for telecommunication services, an increase in price of one service may induce households to ultimately reduce demand of all services as they attempt not to exceed their telecommunication budgetary allocations.

6.3 Modelling Penetration Elasticities

Increases in taxes and tariffs may also discourage penetration, that is, may slow down the growth rate of new subscriptions. In order to analyse the effects of changes in costs on penetration of the various telecommunication services, we estimated penetration elasticities. The results are presented in Table 15.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-17.89665</td>
<td>-12.76946</td>
<td>0.0000</td>
</tr>
<tr>
<td>TARIFF</td>
<td>-0.120888</td>
<td>-3.729666</td>
<td>0.0013</td>
</tr>
<tr>
<td>UR</td>
<td>14.18828</td>
<td>4.103185</td>
<td>0.0006</td>
</tr>
<tr>
<td>INC</td>
<td>0.527759</td>
<td>2.746116</td>
<td>0.0125</td>
</tr>
</tbody>
</table>

The dependent variable is measured as lines per 100 inhabitants. The average tariff is used as an indicator of the cost of telephone services. UR is the proportion of urban to rural population whereas \( inc \) refers to income per capita. The low penetration elasticity means that tax increases are passed on to consumers in the form of high taxes. The increased costs of telephone airtime resulting from increased taxes over the past few years may thus explain the recent slow down in penetration growth rates.

7 Policy change simulation and analysis
Using the statistical model specifications in the preceding section as well as the current sector tax rates we also undertook a simulation exercise to analyse the possible impact of some modest changes in taxes rates. We consider the following scenarios:

i. a one percent per year reduction of the present taxes on phone air time over the next four years (2007 to 2010) for mobile and fixed line services on demand and penetration; and,

ii. a three percent per year reduction of excise duty over the next four years (2007 to 2010), effectively eliminating it (excise duty) by the year 2010 on demand and penetration.

In order to compare the impact of various tax changes, a base case scenario was created, which projects patterns in consumption of telecommunications services and penetration over the next four years (2007 to 2010). Changes as a result of adjustments in tax rates in the new scenarios are then compared against this base case scenario and calculated for a four year period (2007 to 2010). It was assumed that all changes in taxes would be translated into equivalent changes in prices, in addition to any market driven tariff changes such as competition and declining cost of infrastructure and devices. The analysis also assumed that all tax change measures are introduced in early 2007, and their full impact is felt by the end of the first year, although in reality changes may be delayed.

Our base case scenario assumes a number of intervening factors that will result in increased usage of telecommunication services. These include an upward growth in per capita income, increased urbanisation, enhanced competition and
declining prices for handsets. However, an even faster expansion can be realised if there were some modest revisions to current sector tax policy.

A one percent per year reduction in taxes on telephone airtime over our forecast period (2007 to 2010) would reverse the current declining trend in demand for mobile telecommunications services into a positive and upward trend. In particular, such a tax policy would translate into a 30 percent increase in minutes of use as opposed to a 9 percent reduction over the same period under the current tax policy (Figure 9).

Figure 9: Impact of a one percent per year reduction in taxes on mobile phone airtime

A gradual reduction and eventual elimination of excise duty on telephone airtime would on the other hand result in a 56 percent increase in demand for mobile services over the period 2007 to 2010, compared to a base case reduction of 9 percent over the same period.

Figure 10: Impact of reduction (and eventual elimination) of excise duty on mobile phone airtime
A one percent per year reduction in taxes on fixed line telephony airtime over our forecast period (2007 to 2010) would result in a 4.24 percent increase in demand for fixed line services as opposed to a 3.84 decline over the same period under the current tax policy (Figure 11).

**Figure 11: Impact of a one percent per year reduction in taxes on fixed line usage**

A one percent per year reduction in the cost of telephone airtime over our forecast period would result in an increase of penetration levels by 17.3 percent
over the 2007 to 2010 period as opposed to a 6.7 percent increase predicted by the base case scenario over the same period (Figure 12).

**Figure 12: Impact of a one percent per year reduction in taxes on penetration**

![Chart showing impact of tax reduction on penetration](chart1.png)

On the other hand, a gradual and eventual elimination of excise duty by the year 2010 would result in a 34.3 percent increase in penetration as opposed to a 6.7 percent change predicted by the base case scenario over the same period (Figure 13).

**Figure 13: Impact of reduction (and eventual elimination) of excise duty on penetration**

![Chart showing impact of excise duty elimination on penetration](chart2.png)
8. **Summary and recommendations**

This study sought to assess the impact of Uganda’s ICT sector taxation policies and prices on the demand and penetration patterns of telecommunication services. The first part of the study gave an overview of the structure and performance of the telecommunications sector over the past decade. The second part of the study sets the context in which the apparently high level of telecommunications sector taxes in Uganda can be possibly be explained and then assesses the possible effects of tax policy variables on some key telecommunications sector performance indicators such as penetration, usage and investment. The tax policy itself is also an assessed in light of some vitally important tenets of a good tax and tax system, specifically efficiency and equity.

Perhaps owing to limited competition in the sector, increases in taxes are passed on to consumers in the form of higher tariffs. This has over time resulted in a slowdown in uptake of services and sector investment. Indirectly, such a slowdown in uptake of services reduces tax revenue to the government treasury as well as a slow down in overall economic growth. The present sector tax system is also shown to be both inequitable and inefficient. Interestingly, our simulation results suggest that there is still scope for turning around the present declining trends. The main recommendation for revitalising the sector and ensuring its rapid expansion lies in some modest reductions in tax rates. In order to minimise disruptions in governmental services funded by tax revenue generated from the telecommunications sector, we suggest small and modest reductions in tax rates that are stretched over a number of years. These hold the key for revamping the rapid expansion of the sector. At an indirect level, the increased uptake of services from these modest reductions in taxes should result in an even greater
increase in revenue for the government treasury and overall productivity growth. Thus, modest tax reductions should result in a “win-win” situation.
References


GSM Association (2005), “Tax and the digital divide: how new approaches to taxation can connect the unconnected”.


