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### **Taxation Reforms: A CGE - microsimulation analysis for Pakistan**

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## Abstract

This paper provides an *ex ante* assessment of taxation reforms being considered in Pakistan, in order to widen the tax base and rationalise the rate structure of different taxes. Amongst the main proposals, those focusing on sales tax and agricultural direct taxes seem relatively more attractive. The former has the highest share in indirect taxes and is also easier to collect, while the latter is intended to bring the presently exempted agricultural incomes into the tax net. As a first step, we study the general equilibrium effects of existing taxes by removing them from the system one at a time. In the second step we study the micro-macro impacts of four policy experiments: a) increasing sales tax rate by 33 percent; b) applying a 10 percent sales tax on presently zero-rated goods; c) increasing sales tax rate by 33 percent and bringing the services sectors in the sales tax net; and d) increasing sales tax rate by 33 percent, bringing the services sectors in the sales tax net, and imposing a 5 percent flat tax on agricultural incomes. In the third step we calculate the lost revenue due to evasion and avoidance. Results from experiments indicate the tough choices for policy makers in trying to improve the currently low tax to GDP ratio in Pakistan. Almost all simulations result in a decrease in investment levels, reduced consumption, and an increase in poverty. We thus recommend a gradual approach to tax reform that can make the adjustment process less painful.

**Keywords:** Taxation, Microsimulation, General Equilibrium, Poverty, Inequality, Progressivity, Redistribution.

**JEL Classification:** H22, D58, C51, C81, I32

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## 1. INTRODUCTION

The taxation system in developing countries usually suffers from a narrow tax base, complex rate structure, and high compliance costs. Achieving goals related to progressivity and redistribution thus become more difficult due to the challenges related to the structure of income earners. In a country like Pakistan where 68 percent of the population lives in rural areas and around 30 percent of households are below the poverty line, the scope of direct (income) taxes is not attractive. To meet the government's operational and development expenditure needs, indirect taxes account for a major chunk of overall revenue collections. However, under the World Trade Organization (WTO) commitments tariffs, excise duties and surcharges are being gradually phased out due to their distortionary impacts. The general sales tax (GST) in VAT mode now contributes significantly to state revenue amongst the indirect taxes in Pakistan. These taxes are preferred by revenue administrators as they are difficult to evade.

The economy has witnessed substantial capital inflows during the period 2002-07, which in turn boosted domestic investment and consumption, ultimately keeping the GDP growth rate at an average of around six percent. However, this economic growth could not be translated into higher revenue collection given the inelastic nature of taxes. Although in absolute terms all taxes showed a rising trend, however as a percentage of GDP the trend remained stagnant. It was under this milieu that a comprehensive tax reform agenda was put forward by the government which included first generation reforms (rationalizing tax brackets and rates) and second generation reforms (focusing on the administrative capacity of tax machinery in Pakistan).

By 2007-08, While these efforts were underway, the economy started to feel the financial crunch posed by the increasing fiscal and current account deficits largely due to: a) rising global oil and food prices (which lead to a higher import bill), b) the burden of subsidies allowed for electricity, oil, wheat, fertilizer and textile research and development, and c) depreciating value of domestic currency. Given this predicament, it has become very difficult for the public sector to continue its ambitious development spending on medium to long term infrastructure and social sector projects. As a consequence, Pakistan's Public Sector Development Program (PSDP) was reduced, and resources diverted to more immediate needs of the economy in order to avoid an increase in inflation, unemployment and poverty levels.

To bridge the twin deficits the economy required external help through multilateral and bilateral arrangements<sup>1</sup>. Under both these avenues the donors demanded a more aggressive fiscal effort from the state in order to raise domestic mobilization levels. Put in numbers, they wanted to see Pakistan's tax to GDP ratio improved (which has averaged a meagre 10.6 percent between 2002 and 2008). This was seen as the only way Pakistan can pay back the massive debt it will have procured at this stage. In this context, several tax policy options have surfaced. For example, the International Monetary Fund (IMF) has been suggesting a transition from GST to a full Value Added Tax (VAT). However due to the politically unpopular reaction to this move the Government and IMF settled for an extended-GST regime, where several options are open, such as: an increase in the GST rate and a widening of the tax base, as the GST currently does not cover various services sub-sectors. On the other hand, the World Bank (WB) has advised the initiation of direct taxation on the agricultural sector, which remains tax exempt since the country's independence in 1947. The Federal Board of Revenue (FBR) has also been focusing on widening the tax bases through adjustments in threshold and withdrawal of exemptions. In its annual review for the year 2003-04, the FBR has reported that out of a population of 151 million, only 1.3 million are tax payers. After clearing claims submitted for rebates, this number is further reduced to 0.9 million. However, even within this group there are inherent difficulties such as evasion and under-reporting of earned income and profits.

The rural areas still lack financial infrastructure. There is little record of consumer transactions in rural regions. Therefore the government cannot fully benefit by taxing consumption as approximately 70 per cent of Pakistan's population still lives in these rural areas where economic activity remains largely undocumented.

There is also a grave issue of duplicity of taxes in the country, and the Chambers of Commerce in Karachi, Lahore and Islamabad have been registering their concerns with the authorities regarding this problem. There are many taxes that are charged by the Federal Government and are also levied by the provincial or local governments using the same or a similar name. Toll taxes are a common example of this phenomenon.

On the administrative side, the foremost issue is that of tax compliance. Only 50 percent of registered persons and businesses file returns. The poor relationship between the tax payer and the tax administrator is the major cause of such an issue. The promotion of a payer-friendly tax culture requires the automation of tax filing processes and minimizing the role of public officials.

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<sup>1</sup> The most recent episode is IMF Stand By Arrangement initiated in November 2008, which provides Pakistan \$7.6 billion, at an interest rate of 3.5 to 4.5 percent over 3.5 to 5 years.

Educating the tax payers to use the on-line filing system can at least temper the perceptions of government revenue collection institutions being corrupt that in turn justify evasive practices.

The purpose of this paper will be to study the *ex ante* effects of proposed reforms on the Pakistan economy. We will use a Computable General Equilibrium (CGE)-microsimulation framework in order to obtain macro, meso and micro level results of our policy simulations. Section 2 gives an overview of tax reforms in the country. Section 3 explains the specifications of the model and datasets used in this study. We also discuss here the considerations that went into the design of our simulations. Most of these experiments are in line with the current proposals under discussion with the IMF and other multilateral donors. In section 4 we interpret our results, where we initially study the general equilibrium impact of the present form of taxes. Estimates of revenue loss due to evasion are also given. We focus on the macro-micro impact of reforms primarily due to changes in GST rate/structure, and the direct and indirect tax mix. We also assess the possibility of taxing agriculture sector incomes. Section 5 concludes and recommends further uses for the model.

## 2. TAX REFORMS IN PAKISTAN

Pakistan has shown dismal performance in increasing its tax revenues as its tax system continues to suffer from complexity (difficult to administer and comply with), inelasticity (unresponsive to economic growth), inefficiency, and inequity (GoP 2003). As cited earlier, the tax to GDP ratio in Pakistan is among the lowest in the world. Table 1 gives a comparison for the year 2005 in a cross-section of countries. Pakistan's 10.5 percent tax to GDP ratio is well below other Asian countries like Sri Lanka (16.5%), India (14.1%), and the Philippines (12.6%).

Recent tax policy reforms in Pakistan can be classified into first and second generation reforms. The first generation reforms focused on aligning the tax rates and structure with the country's overall economic growth (see Yusuf 2007). Main measures included widening the tax base through adjustments in threshold, reforming GST along the lines of VAT, reducing reliance on excise duties, rationalizing customs duties, implementing a uniform rate structure for corporate taxation, and gradually reducing income tax rates.

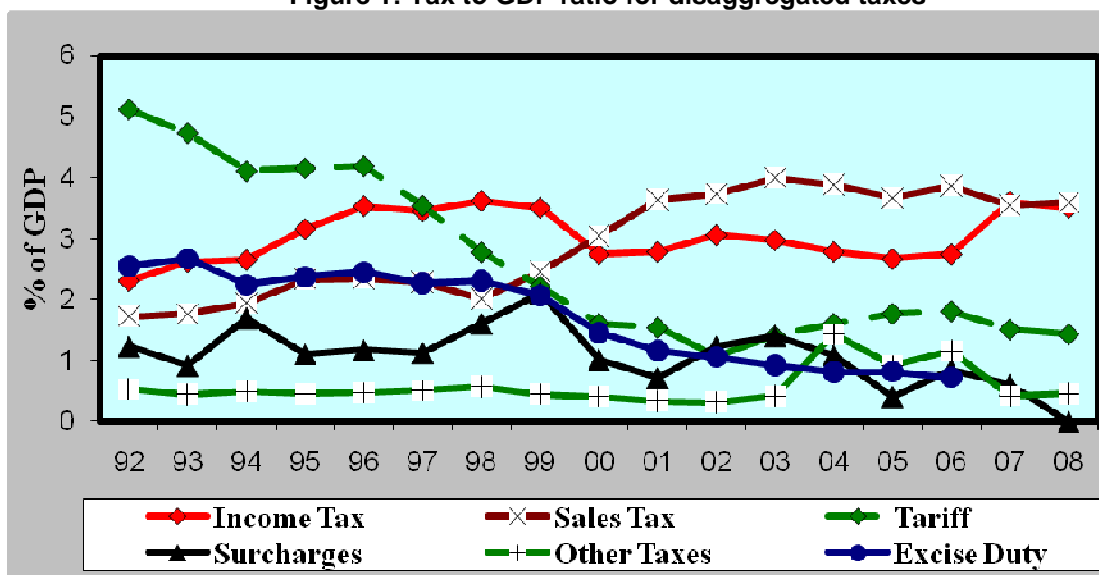
**Table 1: Tax/GDP ratio in selected countries**

Country	2005
India	14.1
Pakistan	10.5
Sri Lanka	16.5
Mexico	19.0
Egypt	14.1
Korea, Rep	24.6
Thailand	16.4
Malaysia	16.1
Philippines	12.6
Turkey	31.3
Sweden	50.4

The second generation reforms focused on administrative changes. Collaborating with WB in 2001, Pakistan initiated the implementation of reforms in the area of tax administration and management. The objective of these reforms was to minimize tax avoidance and evasion through simplification of procedures, self-assessment schemes, a focus on the buoyancy of different types of taxes, and improved overall organizational management.

The federal government is responsible for the collection of: a) direct taxes, which include income tax, corporation tax, capital value tax, capital asset tax, workers welfare fund; and b) indirect taxes, which include GST at the production, retail and import stage, excise duties on selected manufacturing sector items, and customs duties. The tax to GDP ratio for disaggregated taxes is given in Figure 1. Between 1992 and 2006, note that the highest decline was in revenue collected through tariffs (or customs duties). This has been compensated through increase in revenue from GST. The revenue from income taxes (as percent of GDP) shows a stagnant trend.

**Figure 1: Tax to GDP ratio for disaggregated taxes**



While the administrative capacity of the tax authorities still remains constrained, it is however important that as growth rate climbs up, the additional wages and rents should be brought under the tax net. In the case of Pakistan, it may be noted that the incomplete reforms in the areas of income and sales taxes have not been able to fully compensate for the decline in tariffs and excise duties (Ahmed 2008).

Therefore, in order to craft a medium-term plan for tax policy reforms it is essential that an agenda based on transparency, equality and simplicity be followed, which should address the existing caveats in the areas of documentation of informal economy, automation of business processes, and capacity building of human resources involved in tax administration.

In this regard, FBR initiated its Tax Administration Reforms Project (TARP) in 2005 aimed at achieving greater efficiency and productivity in tax collection. In 2007, the WB provided assistance in helping the tax authorities to learn from best practices of other countries, and subsequently a Tax Policy Programme was initiated with technical assistance from the Andrew Young School of Policy Studies at Georgia State University (in the USA).

The fiscal effort from the provinces has been minimal. There is negligible amount of tax collected from avenues classified under the provincial domain. These include agricultural incomes, capital gains on tangible assets, services, and urban property.

The still pending compliance issues point towards the complexity of tax assessment which needs regular attention. Sometimes it is the pursuit of progressivity that makes the taxation process more complex. However Martinez-Vazquez (2006) explains that there seems to be low progressivity in Pakistan’s overall tax structure. To some extent the low progressivity (or vertical equity) is primarily due to the already high burden of taxes on poor. See also Ahmed and O’ Donoghue (2009).

**Figure 2: Structure of federal tax revenue**

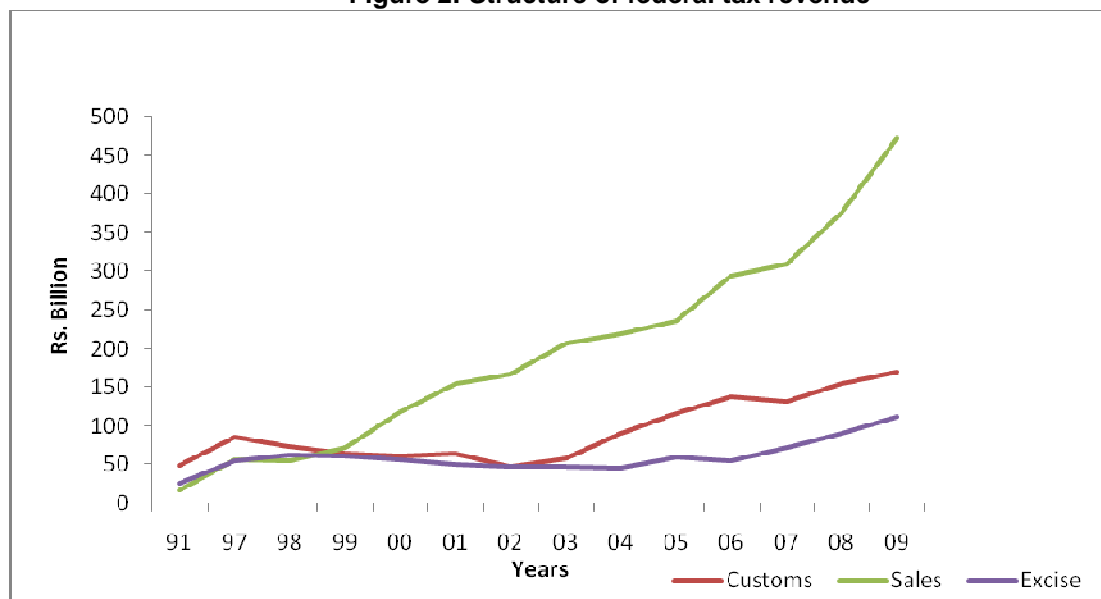
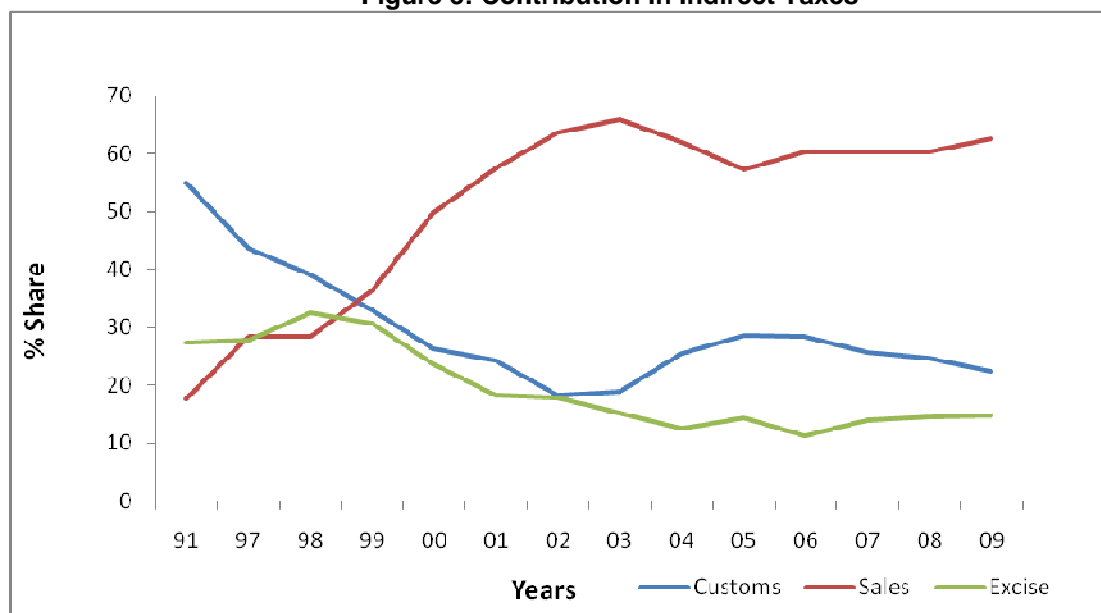


Figure 2 exhibits the indirect tax trend between 1991 to 2009. In the early 1990s customs duties contributed the highest amount (Rs. 62 billion in 1992) followed by excise duties (Rs. 31 billion) and sales taxes (Rs. 21 billion).

However, with a view to remove distortions, subsequent governments gave increased importance to sales tax in VAT mode whose collection increased to Rs. 295 billion in 2006 followed by customs duties (Rs. 138 billion) and excise duties (Rs. 59 billion).

**Figure 3: Contribution in Indirect Taxes**



This is also seen in Figure 3 which exhibits the percentage share of individual taxes in the overall indirect tax collection. The sharp decline in the contribution of customs duties reflects WTO-related commitments towards trade liberalization.

### **3. DATA, MODEL AND SIMULATION DESIGN**

#### *3.1 Datasets*

The Social Accounting Matrix (SAM) for our CGE model was derived from Dorosh, Niazi and Nazli (2004)<sup>2</sup>. This SAM is comprised of information from five different data sources. The Input-Output table provides information on the activities and commodity accounts. This table has been published by the Federal Bureau of Statistics for the year 1990-91. The national accounts data for 2001 is used to compile information about the value addition in fifteen sectors.

For consumption-related information, the Pakistan Integrated Household Survey (PIHS) 2001 is used. The Pakistan Rural Household Survey 2001 is used to disaggregate household incomes, while the Pakistan Economic Survey 2001-02 provides sector-wide and commodity-wide data on production, prices, and trade. On the activities side this SAM includes payments and receipts for 12 agricultural sectors, 16 industrial sectors, and 6 services sectors (Table 2). Similar sectoral details are observed in the commodity accounts.

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<sup>2</sup> The details on SAM are drawn from Ahmed and O' Donoghue (2010).



Factor accounts include labour, land and capital with labour disaggregated into 10 different categories. This categorical disaggregation is based on the criteria of farm size, agriculture/non-agriculture wage, and unskilled/skilled labour. Land is disaggregated according to farm size (in different provinces). Capital is categorised into livestock, other agriculture, and informal and formal capital. The household accounts are distributed into rural and urban with rural households being further classified into 17 categories based on farm size, and rural poor/rural non-poor. Urban households are classified into poor and non-poor. Other institutions in the SAM include enterprises, government, and the rest of the world.

**Table 2: Pakistan Macro SAM in Rs. Billion**

	ACT	COM	FAC	HOU	ENT	GCUR	ROW	CAP	Total
Activities	0	7201	0	0	0	0	0	0	7201
Commodities	3823	0	0	2699	0	409	678	534	8143
Factors	3377	0	0	0	0	0	0	0	3377
Households	0	0	3377	0	0	0	185	0	3562
Enterprises	0	0	0	0	0	0	0	0	0
Government	0	252	0	146	0	0	0	0	398
Indirect taxes		204							204
Import duties		48							48
Direct taxes				146					146
Rest of world	0	691	0	0	0	0	0	0	691
Saving	0	0	0	717	0	-11	-171	0	534
Total	7201	8143	3377	3562	0	398	691	534	23906

Source: Dorosh *et al.* (2004)

The details about household budgets are obtained from the Household Income and Expenditure Survey 2001-02. This is a representative survey of 16400 households. The sample of households was drawn from 1150 primary sampling units of which 500 are urban and 650 are rural. Details for profits accruing and inputs used in business were also available in the survey, which made it easier to do estimates i.e. agriculture profit functions.

### 3.2 CGE Model Specifications

The basic specifications of this model are from Cororaton and Orden (2007). This framework is based on the EXTER convention (see Decaluwe, Dumot, Robichaud, 2000). The model's production block combines the intermediate inputs and value added to give the final output, which is then either exported or domestically sold. The imported inputs are combined with the domestic goods to provide the composite goods.

The export transformation has been specified using a constant elasticity of transformation (CET) function and the import to domestic good relation has been specified using a constant elasticity of substitution (CES) function.

The value addition is derived from four different sources (specified using a CES function) namely; skilled labour, unskilled labour, capital, and land. Due to the considerations of Pakistan being a developing country with an agricultural sector contributing substantially to overall GDP, the unskilled labour is thus further sub-divided into farm labour and unskilled workers, represented using a CES function. Land, capital and unskilled labour are combined using a CES function to give the agricultural sector's value addition. In the case of the non-agricultural sector land is replaced by unskilled labour while other two factors of production remain the same.

The model specifies consumption using a linear expenditure system (LES), which is in line with the standard tradition used in many CGE models. The overall consumption at the household level is the difference between the disposable income and household savings. The demand for capital by destination is determined (amongst other factors) by the ratio of return to capital and user cost of capital. The summation of this demand for capital by destination then gives us the overall real investment which is then multiplied by the price of investment in order to obtain overall nominal investment. Finally we can calculate the investment demand by origin. This is done by multiplying the ratio of nominal total investment to composite price of the commodity with the investment shares given in the base data.

Output price is a weighted combination of export and local price. The latter is different from the domestic price due to indirect taxes. These taxes are also added along with the world price of import (multiplied by exchange rate) and tariff rate to give the domestic import price. The export price is determined by world the price of exports (multiplied by exchange rate) and export subsidies<sup>3</sup>.

### *3.3 Closure rules*

In the agricultural sector capital and land are fixed, while in the non-agricultural sector only capital is fixed. Unskilled labour is allowed mobility across sectors, while skilled labour can only move between non-agricultural sectors. The supply of skilled labour, farmers, and workers is fixed. Supply of land is also fixed.

The supply in goods market is equated with the sum of intermediate demand, household and government consumption to give the goods market equilibrium. Total investment is equal to total savings which is, in turn, comprised of household, firm, foreign and government savings.

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<sup>3</sup> However, this is not in the present specification of this model.

Real government consumption is fixed, allowing government income and savings to vary. Savings of firms are fixed; a rise in firm's income will therefore imply increased dividends to households but not an increase in retained earnings of firms. Most of these closure rules are similar to Cororaton and Orden (2007) allowing an extension of analysis to Pakistan's economy<sup>4</sup>.

The weighted value-added price is considered as a numeraire. The nominal exchange rate is kept flexible, which implies that foreign savings as measured by the domestic currency is also flexible. Thus the external account is cleared by the exchange rate given that foreign savings in terms of foreign currency is fixed.

### *3.4 Microsimulation Model*

We develop an income generation model following Alatas and Bourguignon (2000). Due to its ease of estimation and transparency this approach has been followed in numerous studies<sup>5</sup>. For general discussion of this micro model see Bourguignon, Ferreira and Lustig (1998), Bourguignon, Fournier and Gurgand (2001). For applications where this specification is used for subsequent linkage with a CGE model, see Robilliard *et al.* (2001), Bussolo and Lay (2003) and Hérault (2005). We followed the standard form shown in Bourguignon, Robilliard and Robinson (2003), which is a companion paper of Robilliard *et al.* (2001). However, the latter provides a much more detailed CGE model to study the impact of the financial crises in Indonesia. We link our CGE model with the microsimulation model using the top-down approach given in Bourguignon *et al.* (2003).

## **4. INTERPRETATION OF RESULTS**

### *4.1 General Equilibrium Impact of Existing Taxes*

In order to study the general equilibrium impact of existing taxes, we start by removing them one at a time and see their macroeconomic impact in Table 3. In the case where income taxes are not present real investment increases by 6.1 percent.

Overall household consumption increased by 5 percent, within which households belonging to the farm sector are the highest gainers (7.3%) followed by urban non-poor households (3.6%) and rural workers (2.7%).

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<sup>4</sup> Cororaton and Orden (2007) conducted simulations that include: a) impact of increase in foreign savings; b) increase in world prices of cotton lint; c) improvement in total factor productivity; and d) production subsidy.

<sup>5</sup> An earlier version of this paper provides results on multi-logit occupational choice and Heckman estimations.

However urban poor households faced a decline in consumption by 0.4 percent. This increase in consumption may partly be responsible for the hike in prices of food items (8.0%), and durable items (1.4%). Prices declined for services by almost 7.0 percent and this may have come about as a result of the decline in government revenue and services sector output by 8 percent while agriculture and industrial output rose by 1.03 and 1.8 percent respectively. The decline in services sector output may be partially responsible for the decline in wages of skilled labour by 15.7 percent. The wages for farm and unskilled labour increased by 12.6 and 2 percent respectively. On the revenue side, while direct taxes declined by 100 percent there is an increase in tariff and indirect tax revenue by 2.9 and 3.7 percent, respectively. The increase in these taxes is through the channels of increased investment, household consumption, and output in commodity-producing sectors.

In the second case where the GST rate is kept at zero the increase in most macroeconomic economic variables is greater than the previous simulation, a result of the greater income and substitution effects. Investment increased by 23.8 percent, household consumption increased by 9 percent where farmers and rural workers are the main gainers having an increase in consumption by 14.8 and 5.2 percent, respectively. The consumption of both urban non-poor and urban poor declines primarily due to the increase in consumer prices of durable items and services. The decline in government revenue partially impacts urban services. This reduction in public sector revenue may also explain the decrease in wages of rural workers (1.8%) and skilled labour (29%); the wages of farmers and unskilled labour increase by 27 and 4.4 percent respectively. The direction of change in wages is similar to the case without income taxes. However, the magnitude of change is greater. In terms of sectoral output agriculture and industry see an increase while the services sector faces a decline. Due to the removal of GST the consumer prices of durable items fell by 6 percent and services sector consumer prices decreased by 16.3 percent. It seems that increases in wages and consumption of rural households pushed the food prices higher by 11 percent.

In the third case removal of tariff has a much lower impact on macroeconomic variables. However, the direction of change remains the same as in the case of removal of income taxation and GST. This lower magnitude can be justified given that the share of trade taxes in tax revenues is 18 percent (according to 2005 figures). As a percentage of GDP tariff collection is almost 2 percent thus resulting in lesser income side linkages. It is interesting to note the pro-poor effects of tariff removal on household consumption.

The household breakup indicates that farmers, rural workers, and the urban poor see increased consumption levels while for the urban non-poor households consumption declines by almost 2 percent.

This also has inequality-reducing implications and can also be seen from the increase in wages, which improve for both unskilled and farm labour. Such a scenario goes in favour of trade liberalisation via reduction in price-based restrictions (such as tariffs).

Our estimates for evasion show that if statutory rates are applied instead of the effective rates, then; a) customs duty revenue increases by 6.4 percent, b) direct tax revenue increases by 20.2 percent and c) indirect tax revenue, which includes revenue from GST, excise and surcharges increases by almost 40 percent. The evasion in the case of indirect taxes may be even greater; however, this may depend on how correctly we estimate the size of the informal and undocumented portion of the economy.

Taking a lead from the recent discussions between FBR, the Ministry of Finance and multilateral organizations, we focus on four main policy proposals for tax policy changes. These are the following:

- Sim-A: Increasing GST rate by 33 percent
- Sim-B: A 10 percent GST on presently zero-rated goods
- Sim-C: Increasing GST rate by 33 percent + bringing services into the tax net
- Sim-D: Increasing GST rate by 33 percent + bringing services into the tax net + levying a 5 percent flat tax on agricultural incomes

The impact of these experiments should be seen in terms of their socio-economic costs and benefits. These are not necessarily comparable with each other. However, we retain the same closure rules and elasticities for all simulations.

#### *4.2 Result-I: Increasing GST rate by 33 percent*

This policy change leads to a decline in overall investment by 5.6 percent (Table 4). While government income increases by 15.4 percent, firm incomes decrease by 1.5 percent. The return to factors indicate a decline in the case of land (-7.1%) and capital (-1.5%), whereas labour returns show mixed results. The wages decrease for farm labour by 6.5 percent, increase for skilled labour by 8.9 percent, and change negligibly for unskilled labour.

How does the increase in GST rate impact the consumer prices? This is exhibited in Table 5 where the prices decrease for agricultural goods yet increase in the case of industrial goods.

The reason for this can be explained from the tax base selected for the imposition of GST. The agricultural goods (particularly staple food items) are exempt from any form of taxation in Pakistan.

Therefore, the entire burden of increased GST rate is borne by the industrial sector which includes large scale manufacturing, small scale manufacturing, mining, electricity, gas, and construction. A similar explanation can be found in Refaqt (2003) in the context of social incidence of GST in Pakistan.

In the case of agriculture, the largest decrease in prices is seen for sugarcane (-9%), cotton (-6%), and rice (-4%). In the case of industry the highest increase in consumer prices is seen for food manufacturing (11.3%), petroleum refining (9.3%), and transport (3.6%). For the services sectors the prices for both private and public services increase by 2.3 and 7.1 percent, respectively. At this stage, the change in consumer prices can also be explained by the underlying changes in the factor prices.

In the agricultural sector the wages for farm labour have declined and so have the returns to land. Table 6 shows that the land returns decline in all agricultural sub-sectors, with the highest decline seen in sugarcane (-15.2%), cotton (-13.2%), wheat (-7.8%) and rice (-7.3%). The return to capital (Table 7) decreases for some industrial sectors having backward linkages with the agricultural sector. These include livestock (-4.3%), food processing (-3.5%) and fisheries (-2.4%). The activities showing an increase in their return to capital include leather (11.9%), housing (1.7%), rice (4.5%), and wheat milling (2.5%).

What is the impact of changes in goods and factor prices on exports? We see this in Table 8 where key exporting sectors lose substantially as the indirect tax burden is increased. The textile sector exports, which account for more than a 60 percent share in Pakistan's overall exports, decline by 6.2 percent. Other sectors facing a decline include chemicals (-2.1%), manufacturing (-1.5%), transport (-2%) and cotton yarn (-1%). There is a general decline in imports as shown in Table 9. However, textile and private services show an increase of 1.8 and 2.3 percent, respectively.

The changes in production and trade can impact the sectoral employment levels. According to our closure rules, the sectoral treatment of factor market is such that in the agricultural sector, capital and land are fixed while in the non-agricultural sector only capital is fixed. Unskilled labour is allowed mobility across sectors, while skilled labour can only move between non-agricultural sectors. The supply of skilled labour, farmers and workers is fixed. Supply of land is also fixed. We can observe in Table 10 that the employment of unskilled labour declines in cotton, sugarcane, paddy, textile and other manufacturing. However, there is an increase in wheat and rice milling, leather and private services.

The skilled labour declines in all sectors except public services where employment expands by 8.5 percent indicating government's capacity to employ more given the increase in tax revenues.

Most of the welfare indicators show some deterioration. The change in household consumption given in Table 14 indicates a decline for farmers, farm renters, rural workers, and the urban poor. The consumption of urban non-poor increases by 2.8 percent which indicates that in consumption terms such a policy change has been regressive. Our microsimulation results show an increase in poverty headcount by 2.1 percent (Table 15). There is also an increase in the poverty gap (2.4%) and poverty severity (2.6%). The highest increase in poverty is seen in Sindh province (4.9%) followed by NWFP (1.4%). The inequality also worsens (Table 16) as the Gini coefficient increases by 0.6 percent.

#### *4.3 Result-II: 10 percent GST on presently zero-rated goods*

Under the IMF stand-by arrangement Pakistan is now expected to start work on the implementation of a value-added tax which will replace the existing GST. In turn, this step will imply withdrawing the presently available zero-rated facility to key exporting industries. These include textile, leather, sports, surgical equipment and carpets. The zero-rated goods facility has been in place since 2005-06. If such a policy change takes place, what precisely will be its economy-wide impacts? We discuss these in our second experiment by imposing a 10 percent GST (in VAT mode) on presently zero-rated goods.

The real and nominal investment is expected to decline by 10.3 and 8.5 percent, respectively (Table 4). The government income as a result of increased tax revenues increases by 39.4 percent. Due to declining imports the revenue from customs duties declines by 0.4 percent; however the direct and indirect tax revenues increase by 7.7 and 77.6 percent, respectively. It is now the enterprise sector that bears the higher burden of taxes, which slash the overall firm incomes by 4.1 percent.

The overall returns for factors of production decline except for skilled labour. The returns for capital decline by 4.1 percent and land by 18.2 percent. The wage for farm labour declines by -16.1 percent while there is a negligible increase for unskilled labour.

In Table 5 we see how the removal of the zero-rated facility impacts on consumer prices. The price level in key export-oriented sectors sees a sharp increase, decreasing the competitiveness of domestically produced goods vis-à-vis foreign exports as a consequence. The textile sector prices increase by 17.9 percent, leather by 19.9 percent, and rice by 10.7 percent. Some of the items that form a part of core inflation in Pakistan also increase.

For example, the petroleum refining sector sees an increase in its price level by 4.9 percent while overall energy prices increase by 7.3 percent. While the prices in the industrial sectors rise, there are substantial reductions in the prices of agricultural activities.

Apart from the fact that these activities are GST exempt, the decline in prices can also be explained through the changes in underlying factor prices. We observe in Table 6 that land prices decline for major crops namely wheat (-18.2%), rice(-22%), cotton (-25%) and sugarcane (-33%). As industrial activities are relatively more capital-intensive, the increase in their prices is thus related to the price of capital. Note that in Table 7 the capital returns increase for cotton yarn (6.7%), rice milling (5.8%), leather (3.6%), energy (6.3%) and petroleum refining (4.1%).

We can now quantify the impact on exports (Table 8). The textile sector exports decline by 13.5 percent, leather by 9.7 percent, food processing by 4.8 percent, chemicals by 3.2 percent, and other manufacturing by 2.9 percent. Given that Pakistan's economy is heavily reliant on imported raw material and machinery, it is important to note that a slowdown in export growth will in turn imply lesser availability of foreign exchange reserves. This will make affordability of imports difficult and can certainly have a detrimental impact on sustaining the country's overall macroeconomic stability and pro-poor development agenda. A prudent alternative may be the gradual removal of the zero rating facility (commodity by commodity) which will make the sectoral adjustment process less painful. In Table 9 we see that manufacturing sector exports decline by 4.9 percent, chemicals by 1.5 percent, and cotton yarn by 13.7 percent. In agriculture, wheat sector imports decline by 7.1 percent, which may raise food security issues domestically.

The changes in employment are exhibited in Table 11. While unskilled labour employment is reduced in textile (-10%), manufacturing (-6.6%), and livestock (-17.5%), it increases in cotton yarn (12.5%), rice milling (14.3%), and construction (4.6%). Farm employment declines in paddy (-15.4%), cotton (-7.3%) and sugarcane (-14.3%) and increases in fruits/vegetables (6.2%) and forestry (14.3%). The employment of skilled labour declines in all industrial activities except public services, where employment expands by 18.4 percent.

As seen in the first simulation, an increase in indirect taxes leads to a decline in household consumption for all segments of the population except urban non-poor (Table 14). The largest decrease is seen in the consumption levels of large and medium scale farmers in all provinces. In fact, this is a manifestation of the decline in wages of farmers as explained above, which translates to their lower consumption levels. In percentage terms the poverty headcount in Punjab and Sindh increases by more than 3 percent (Table 15). The overall poverty headcount ratio increases by 4.7 percent.

As urban non-poor consumption increases one could expect a rise in inequality. In Table 16 the Gini coefficient increases by more than 1 percent in Punjab, Sindh and NWFP.



#### *4.4 Result-III: Increasing GST rate by 33 percent and bringing services into the tax net*

In Table 4 real investment declines by 14.6 percent. Government income increases by 65.3 percent but firm income decreases by 4.6 percent. The services sector contributes over 50 percent to overall GDP in Pakistan. Given the substantial scale of transactions in this sector the indirect tax revenue thus increases by 130 percent. The direct tax revenue increases by 9 percent and tariff revenue decreases by 1 percent. All factors of production see a decline in their returns; however, the wage for skilled labour increases by 28.8 percent.

After bringing the services sector into the tax net the consumer price of private services increases by 17.7 percent and public services by 34.5 percent (Table 5). Other services that see an increase in their price level are commerce (13.4%), transport (6.5%), and housing (3.0%). Given the increased GST rate the industrial sector prices also increase. The highest rise is seen in food processing (14.5%) followed by textile (8.4%), and leather (7.2%).

Factor prices are affected in the same manner as seen in the previous simulation, only this time the magnitude is higher. In the case of land prices the largest decrease is seen for sugarcane (-39.1%) followed by cotton (-30.3%). See Table 6 for other agricultural sectors. The capital returns given in Table 7 indicate that the change in petroleum sector under this simulation becomes negative (-1.9%). It is interesting to note that two export-oriented sectors having a similar production structure behave differently; for the textile sector the capital returns decrease by 1.7 percent while for leather the returns increase by 26.2 percent.

The exports of most sectors face a decline (Table 8). Most notably, textile exports decrease by 14.5 percent, leather by 1.9 percent, and food processing by 6.4 percent. However, the rice sector exports expand by 3.8 percent.

In the case of imports (Table 9), all sectors see a negative change except textile and private services whose imports increase by 5.4 and 5 percent, respectively. The rise in private sector imports can be explained in the context of the increased relative price of domestic services that in turn make foreign services more attractive.

Given the above macro-level impacts, the micro-level changes indicate an increase in consumption inequalities. While urban poor consumption decreases by 1.7 percent, urban non-poor consumption gains by 9.1 percent (Table 14). The consumption of households associated with the farm sector face a sharp decline, as both rural non-farm poor and rural non-farm non-poor see a 3.2 and 2.7 percent decline, respectively.

The channels through which this simulation affects the welfare levels are two-pronged. First the price of services increased, which in turn raised the costs related to transport, storage, distribution, and wholesale and retail marketing. Second, the increased GST rate structure added to the existing burden of taxes and directly curbed consumer purchasing power.

However, the zero-rated sectors are not completely insulated given the knock-on impacts from taxation in the services sector. The employment level of skilled labour given in Table 12 declines in all sectors, particularly private services (-24.7%). Given the increased revenue available with the government, employment in public services increases by 22.4 percent. Unskilled labour employment also increases in some sectors such as private services (5%), energy (4.3%), rice (20%), cotton (12.5%), and leather (33.3%).

The poverty headcount ratio increases by 5.6 percent with both gap and severity increasing by 5.1 and 5.7 percent, respectively (Table 15). The Gini coefficient also increases by 1.3 percent, indicating an increase in overall inequality across households.

#### *4.5 Result-IV: Increasing GST rate by 33 percent, bringing services into the tax net and levying a 5 percent flat tax on agricultural incomes*

In our fourth experiment we combine the first and third simulations with an agricultural income tax. This policy change represents all three proposals currently being viewed as necessary by the IMF for increasing Pakistan's tax to GDP ratio. In response to such a change, government income increases by 77.6 percent (Table 4) as a result of an increase in indirect (131%) and direct taxes (46%). The increased burden of taxation depressed real investment by 15.8 percent. The income of firms also sees a decline of 5.4%. Farm labour loses the most in this simulation, and their wages decline by 22.3 percent. The return to land is also reduced by 24.5 percent.

The impact of these changes on consumer prices is very similar to the third experiment. The agricultural tax does not significantly add to the existing burden of price increases as this is a direct tax proposal and not an indirect tax, which is in fact easier to pass on to the consumers. Similarly, the direction of factor prices (Table 6 and Table 7) is very similar to the previous experiment. However, the magnitude of change is higher. There is a substantial change in the export of textile and manufacturing, which decline by 16.4 and 5.9 percent, respectively (Table 8).

Similarly due to decreased investment levels and a decline in firm income, the imports shown in Table 9 also reflect a decrease in sectors such as cotton yarn (-12.3%), manufacturing (-7%) and chemicals (-2.4%).

In Table 14 we observe the scenario's impact on household consumption which declines sharply for the farming segment. The worst affected are large- and medium-scale farmers in Sindh whose consumption drops by 22.7 percent. The consumption for landless farm renters decreases by 9.2 percent and that of landless farm workers by 3.2 percent. The increased revenue which now becomes part of government consumption in fact boosts the welfare level of skilled labour in public services, which then leads to the consumption of urban non-poor increasing by 11 percent. This can be explained from the changes in employment shown in Table 13 where the employment level of skilled labour working in public services increases by 25.6 percent. The employment of unskilled labour also increases in sectors such as private services (6.6%), rice (20%), cotton yarn (12.5%), energy (4.3%), and construction (5.4%).

This policy change leads to an almost 14 percent increase in poverty (Table 15) that affects Sindh and Punjab provinces the worst, as their headcount ratio increases by 8.2 and 7.5 percent, respectively. In contrast to the previous experiments, here we observe that poverty also increases in Baluchistan province by 6.9 percent. Finally, the overall inequality level rises by 1.5 percent (Table 16).

## **5. CONCLUSION AND POLICY RECOMMENDATIONS**

This paper provides an *ex ante* assessment of taxation reforms being considered in Pakistan in order to widen the tax base and rationalise the rate structure of different taxes. Amongst the main proposals, those focusing on GST and direct taxes on agriculture seem more attractive. The former has the highest share in indirect taxes and is also easier to collect, and the latter is intended to bring the presently exempted agricultural incomes into the tax net. In the first step we study the general equilibrium effects of existing taxes by removing them from the system one at a time. In the second step we study the micro-macro impacts of four policy experiments related to GST and agriculture taxation.

Given the inelasticity of taxes in Pakistan, the options to increase government revenue through taxes are very limited. Increased fiscal effort was required during high growth period 2002 to 2007. There were absolute increases in almost all forms of taxes, however the trend seemed stagnant vis-à-vis economic growth and increased production activity.

Given that direct taxes will not be forthcoming in the short-term, the increase in tax revenue has to come from the side of indirect taxes. Among the indirect taxes, GST will be the preferred option given its less distortionary nature. A better move would be to convert the existing GST into a full VAT.

Our experiments indicate that all options regarding increases in GST rate and the widening of its base will hurt investment and consumption. However, the policy conclusion should then be based on the question: *which option hurts less?*

The following policy conclusions may prove less painful for future tax policy:

**Lesson from Sim-A:** A differential GST rate may be more equitable. A structure encompassing further reduction in rates for pro-poor consumption items may make the existing GST relatively more progressive.

**Lesson from Sim-B:** Instead of full removal of the zero rating facility, a more prudent approach will be gradual removal that may take the form of: a) introduction of a reduced GST in the beginning, or b) introduction of GST commodity by commodity over a medium-term period. Gradually removing the zero-rated facility will make the sectoral adjustment in the export-oriented sectors less painful.

**Lesson from Sim-C:** Public sector services having direct social incidence may be kept tax-exempt.

**Lesson from Sim-D:** A flat agriculture tax will be relatively regressive. A basic income threshold may be adopted in order to bring some progressivity in the system.

This extensive work on reforming indirect and agricultural taxation remains a work in progress. The way forward for research in this area possibly using the model structure adopted here may take the following forms:

- Extending the model to take account of over-time capital accumulation i.e. developing a dynamic CGE model. It will be interesting to see how the increased tax revenue as a result of policy changes described above translates over time into public sector investment in education, health, and related social sectors.
- Requiring the further disaggregation of the services sub-sectors in order to optimally study the impact of indirect taxation on public and private services.
- A bottom-up CGE microsimulation model may allow us to study agriculture taxation in greater detail. The tax-benefit microsimulation model will allow for setting an allowance for farming households and then subjecting them to non-linear rates allowing for progressivity and redistribution.

## 6. TABLES & FIGURES

**Table 3: Impact of present taxation structure (% change over base)\***

	<b>Ytax=0</b>	<b>GST=0</b>	<b>Tariff=0</b>
Real Investment	6.1	23.8	3.1
Revenue			
Tariff revenue	2.9	2.7	-100.0
Direct tax revenue	-100.0	-9.6	-1.7
Indirect tax revenue	3.7	-100.0	0.8
Wages			
Farm labour	12.6	27.1	4.1
Rural worker	-1.3	-1.8	-0.2
Skilled labour	-15.7	-29.2	-5.5
Unskilled labour	1.71	4.37	0.71
Output			
Agriculture	1.03	1.92	0.50
Industry	1.76	5.11	0.58
Services	-7.87	-20.31	-3.11
Consumer Prices			
Food	8.0	10.9	8.1
Durables	1.4	-5.9	-0.7
Services	-6.8	-16.3	-2.5
Household Consumption	4.76	8.65	1.50
Farmer	7.29	14.78	2.35
Rural worker	2.68	5.17	1.09
Urban non-poor	3.64	-9.51	-1.65
Urban poor	-0.35	-0.52	0.17

\*y<sub>tax=0</sub> → removal of income tax, g<sub>st=0</sub> → removal of GST, tariff =0 → removal of tariff.

**Table 4: Impact of proposed tax reforms (% change over base)\***

	<b>Sim-A</b>	<b>Sim-B</b>	<b>Sim-C</b>	<b>Sim-D</b>
Real Investment	-5.6	-10.3	-14.6	-15.8
Government Consumption	20.0	48.3	78.3	91.0
Government Income	15.4	39.4	65.3	77.6
Firm Income	-1.5	-4.1	-4.6	-5.4
Tax Revenue				
Tariff revenue	-0.6	-0.4	-1.0	-2.1
Direct tax revenue	2.8	7.7	9.0	46.0
Indirect tax revenue	30.6	77.6	129.7	130.9
Wage				
Farm labour	-6.5	-16.1	-18.4	-22.3
Skilled labour	8.9	23.8	28.8	34.9
Unskilled labour	0.1	0.1	-1.3	-1.6
Land return	-7.1	-18.2	-20.3	-24.5
Capital return	-1.5	-4.1	-4.6	-5.4

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 5: Percentage change in consumer prices for selected items (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
Wheat irrigated	-2.9	-7.3	-8.4	-10.9
Wheat non-irrigated	-3.2	1.8	-9.1	-11.8
Paddy IRR1	-3.5	-11.9	-11.5	-14.5
Paddy basmati	-4.0	-10.0	-13.0	-16.4
Cotton	-6.0	-12.5	-14.8	-17.7
Sugarcane	-9.0	-20.4	-24.0	-28.9
Other major crops	-4.1	-10.2	-11.3	-14.1
Fruits, vegetables	-2.1	-4.3	-5.7	-7.6
Livestock, cattle, dairy	-2.1	-0.6	-6.6	-9.8
Poultry	-0.8	2.9	-2.4	-3.6
Forestry	-1.4	6.9	-4.0	-5.3
Fishing Industry	0.6	9.7	1.1	0.9
Mining	5.1	3.4	7.2	7.2
Vegetable oil	1.4	3.0	3.5	2.9
Wheat milling	-0.3	0.0	-0.6	-1.9
Rice milling IRR1	0.2	10.7	0.7	0.0
Rice milling Basmati	-0.3	9.9	-0.7	-1.7
Sugar	1.3	0.7	2.1	0.9
Other food	11.3	4.2	14.5	14.5
Cotton lint, yarn	3.3	-1.8	3.5	2.9
Textiles	3.0	17.9	8.4	9.0
Leather	1.2	19.9	7.2	6.6
Wood products	0.5	3.4	2.9	3.2
Chemicals	1.8	3.2	3.8	3.6
Petroleum refining	9.3	4.9	13.2	13.3
Other manufacturing	2.1	2.8	3.9	3.7
Energy	5.0	7.3	11.0	12.5
Construction	0.4	0.0	0.5	0.7
Commerce	1.3	13.1	13.4	14.0
Transport	3.6	3.8	6.5	6.5
Housing	1.8	4.6	3.0	5.7
Private services	2.3	5.4	17.7	18.6
Public services	7.1	17.4	34.5	39.0

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 6: Percentage change in return to land (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
Wheat irrigated	-6.8	-18.2	-20.6	-25.4
Wheat non-irrigated	-7.8	-20.7	-23.2	-28.4
Paddy IRR1	-6.8	-22.0	-21.5	-26.2
Paddy basmati	-7.3	-33.0	-23.6	-28.9
Cotton	-13.2	-25.3	-30.3	-35.1
Sugarcane	-15.2	-33.3	-39.1	-46.5
Other major crops	-6.2	-16.4	-17.7	-21.5
Fruits_ vegetables	-3.9	-10.9	-13.4	-16.5
Forestry	-1.0	-1.8	-3.1	-4.0

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 7: Percentage change in capital returns in selected sectors (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
Livestock, cattle, dairy	-4.3	-22.5	-16.1	-21.7
Poultry	-1.3	-15.7	-6.9	-8.3
Fishing Industry	-2.4	-6.9	-6.6	-7.2
Mining	-3.5	-2.4	-7.1	-8.1
Vegetable oil	-1.8	-0.9	-4.3	-5.1
Wheat milling	2.5	4.7	4.5	3.7
Rice milling IRRI	4.5	9	11.4	13.4
Rice milling Basmati	4.5	5.8	12	13.9
Sugar	2.5	7	6.4	6.3
Other food	-3.5	-1.3	-6	-5.8
Cotton lint, yarn	0.3	6.7	5.9	7.2
Textiles	-2.3	-6.7	-1.7	-1.7
Leather	11.9	3.6	26.2	34.6
Wood products	-4.4	-6.4	-10.3	-11
Chemicals	-4.2	-5.7	-11.9	-13.9
Petroleum refining	-3.4	4.1	-1.9	-2.1
Other manufacturing	-9	-12.2	-20	-21.8
Energy	1	6.3	5.9	7.5
Construction	0.3	3.2	1.2	1.9
Commerce	-0.5	-3.4	-2.8	-3.4
Transport	0	2.1	0.2	-0.3
Housing	1.7	5.2	2.7	6
Private services	2.6	6.7	2.6	3.5

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 8: Percentage change in selected exports (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
Fruits, vegetables	4.2	11.3	12.7	15.5
Poultry	1.9	11.4	6.0	7.4
Fishing Industry	0.0	2.6	1.3	1.3
Mining	-1.9	-5.7	-7.5	-9.4
Vegetable oil	-3.0	-2.4	-5.8	-5.3
Rice milling Basmati	1.3	1.9	3.8	5.0
Other food	-2.4	-4.8	-6.4	-7.1
Cotton lint, yarn	-0.7	3.3	-1.2	-1.3
Textiles	-6.2	-13.5	-14.5	-16.4
Leather	1.9	-9.7	-1.9	0.0
Chemicals	-2.1	-3.2	-5.3	-5.3
Other manufacturing	-1.5	-2.9	-4.9	-5.9
Transport	-2.0	-1.4	-3.3	-3.9
Private services	-0.4	-0.1	-2.8	-3.2

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 9: Percentage change in selected imports (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
Wheat irrigated	-3.2	-9.7	-12.9	-12.9
Fruits, vegetables	-2.2	-5.9	-6.7	-8.1
Livestock, cattle, dairy	-2.8	-12.5	-8.3	-11.1
Fishing Industry	-0.8	-5.0	-2.8	-2.9
Mining	-2.5	-3.6	-5.3	-6.0
Vegetable oil	0.0	-2.5	-1.7	-2.9
Wheat milling	-2.4	-7.1	-8.3	-10.7
Sugar	-3.6	-3.6	-7.1	-7.1
Other food	-1.8	-0.9	-1.8	-1.8
Cotton lint, yarn	-4.1	-13.7	-11.0	-12.3
Textiles	1.8	0.6	5.4	5.4
Chemicals	-0.6	-1.5	-1.9	-2.4
Petroleum refining	-0.3	0.3	0.0	-0.3
Other manufacturing	-2.7	-4.9	-6.4	-7.0
Private services	2.3	4.1	5.0	6.4

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 10: Aggregated employment changes under Sim-A (% change over base)\***

	Unskilled labour	Farmer	Skilled labour
Wheat irrigated	-1.4	0.6	
Paddy IRRI	-7.1	0.0	
Cotton	-6.6	-4.9	
Sugarcane	-9.1	-5.7	
Other major crops	-0.6	0.7	
Fruits_ vegetables	1.3	3.1	
Livestock, cattle, dairy	-3.2		
Fishing Industry	-1.8		
Mining	-10.0		-9.3
Vegetable oil	0.0		-16.7
Wheat milling	3.7		-10.0
Rice milling IRRI	14.3		0.0
Rice milling Basmati	6.7		-5.3
Sugar	6.1		-9.0
Other food	-5.1		-15.9
Cotton lint yarn	0.0		-11.5
Textiles	-4.3		-14.9
Leather	33.3		0.0
Wood products	-4.0		-5.7
Chemicals	0.0		-5.3
Cement bricks	-16.7		-17.9
Petroleum refining	0.0		-5.7
Other manufacturing	-3.9		-8.6
Energy	0.0		-3.8
Construction	0.3		-11.5
Commerce	-0.3		-4.4
Transport	-0.1		-10.3
Private services	3.2		-7.2
Public services			8.5

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes



**Table 11: Aggregated employment changes under Sim-B (% change over base)\***

	Unskilled labour	Farmer	Skilled labour
Wheat irrigated	-4.7	-0.6	
Wheat non-irrigated	-11.1	0.0	
Paddy IRRI	-7.1	0.0	
Paddy basmati	-18.8	-15.4	
Cotton	-10.5	-7.3	
Sugarcane	-18.2	-14.3	
Other major crops	-2.7	1.1	
Fruits, vegetables	2.1	6.2	
Livestock, cattle, dairy	-17.5		
Poultry	-12.5		
Forestry	11.8	14.3	
Fishing Industry	-5.4		
Mining	-10.0		-16.7
Vegetable oil	0.0		-33.3
Wheat milling	7.4		-22.0
Rice milling IRRI	14.3		-11.1
Rice milling Basmati	6.7		-21.1
Sugar	12.1		-20.5
Other food	0.0		-28.6
Cotton lint yarn	12.5		-19.8
Textiles	-10.0		-34.5
Leather	0.0		-20.0
Wood products	-4.0		-13.2
Chemicals	0.0		-10.5
Cement bricks	-22.2		-28.2
Petroleum refining	0.0		-5.7
Other manufacturing	-6.6		-16.0
Energy	2.2		-7.1
Construction	4.6		-23.9
Commerce	-1.8		-11.8
Transport	2.4		-21.6
Private services	8.3		-17.0
Public services			18.4

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 12: Aggregated employment changes under Sim-C (% change over base)\***

	Unskilled labour	Farmer	Skilled labour
Wheat irrigated	-4.7	-0.6	
Wheat non-irrigated	-11.1	0.0	
Paddy IRRI	-7.1	0.0	
Paddy basmati	-6.3	-7.7	
Cotton	-13.8	-9.8	
Sugarcane	-22.7	-17.1	
Other major crops	-1.8	2.2	
Fruits, vegetables	2.1	6.7	
Livestock, cattle, dairy	-11.5		
Poultry	-4.2		
Forestry	11.8	14.3	
Fishing Industry	-3.6		
Mining	-10.0		-22.2
Vegetable oil	0.0		-33.3
Wheat milling	7.4		-28.0
Rice milling IRRI	14.3		-22.2
Rice milling Basmati	20.0		-15.8
Sugar	12.1		-25.6
Other food	-5.1		-38.1
Cotton lint, yarn	12.5		-26.0
Textiles	-1.4		-33.3
Leather	33.3		0.0
Wood products	-4.0		-17.0
Chemicals	0.0		-15.8
Cement bricks	-33.3		-38.5
Petroleum refining	0.0		-11.4
Other manufacturing	-9.2		-21.6
Energy	4.3		-9.2
Construction	3.8		-30.3
Commerce	-0.8		-13.3
Transport	2.0		-27.2
Private services	5.0		-24.7
Public services			22.4

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 13: Aggregated employment changes under Sim-D (% change over base)\***

	Unskilled labour	Farmer	Skilled labour
Wheat irrigated	-6.0	-1.1	
Wheat non-irrigated	-11.1	0.0	
Paddy IRRI	-7.1	0.0	
Paddy basmati	-12.5	-7.7	
Cotton	-15.8	-10.6	
Sugarcane	-27.3	-22.9	
Other major crops	-2.4	2.6	
Fruits_ vegetables	2.5	7.8	
Livestock, cattle, dairy	-15.5		
Poultry	-4.2		
Forestry	11.8	14.3	
Fishing Industry	-5.4		
Mining	-10.0		-24.1
Vegetable oil	0.0		-33.3
Wheat milling	7.4		-34.0
Rice milling IRRI	28.6		-22.2
Rice milling Basmati	20.0		-21.1
Sugar	12.1		-30.8
Other food	-5.1		-41.3
Cotton lint, yarn	12.5		-29.2
Textiles	0.0		-37.5
Wood products	-4.0		-18.9
Chemicals	-6.7		-21.1
Cement bricks	-33.3		-41.0
Petroleum refining	0.0		-14.3
Other manufacturing	-10.5		-24.1
Energy	4.3		-10.9
Construction	5.4		-34.3
Commerce	-0.9		-15.4
Transport	1.7		-31.6
Housing			
Private services	6.6		-28.2
Public services			25.6

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 14: Percentage change in household consumption (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
Large Farmers_Sindh	-5.2	-12.2	-14.0	-22.7
Large Farmers_Punjab	-4.2	-10.7	-12.0	-20.5
Large Farmers_Other Pakistan	-4.1	-9.3	-10.3	-19.6
Medium Farmers_Sindh	-4.2	-10.6	-12.0	-20.5
Medium Farmers_Punjab	-3.4	-8.7	-9.8	-18.0
Medium Farmers_Other Pakistan	-4.1	-10.9	-12.1	-20.7
Small Farmers_Sindh	-2.7	-7.1	-8.0	-16.1
Small Farmers_Punjab	-2.7	-6.9	-8.0	-15.9
Small Farmers_Other Pakistan	-2.2	-5.6	-6.6	-14.3
Small Farm Renters_landless_Sindh	-2.7	-6.5	-7.7	-9.2
Small Farm Renters_landless_Punjab	-2.5	-6.2	-7.3	-8.9
Small Farm Renters_landless_Other Pakistan	-2.1	-6.3	-7.0	-9.2
Rural agricultural workers_landless_Sindh	-0.5	-1.5	-2.5	-3.0
Rural agricultural workers_landless_Punjab	-0.6	-1.7	-2.6	-3.2
Rural agricultural workers_landless_Other Pakistan	-1.1	-2.2	-3.3	-4.4
Rural non_farm non_poor	-0.7	-1.8	-2.7	-3.3
Rural non_farm poor	-0.9	-2.4	-3.2	-3.8
Urban non_poor	2.8	7.7	9.1	11.0
Urban Poor	-0.2	-0.5	-1.7	-2.1

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 15: Poverty impact of proposed tax reforms (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
<b>Overall Pakistan</b>				
FGT(0)	2.1	4.7	5.6	14.2
FGT(1)	2.4	4.9	5.1	6.5
FGT(2)	2.6	5.4	5.7	7.1
<b>Punjab Province</b>				
FGT(0)	0.9	3.7	4.7	7.5
FGT(1)	0.3	0.8	0.8	1.0
FGT(2)	0.2	0.5	0.5	0.7
<b>Sindh Province</b>				
FGT(0)	4.9	4.9	4.9	8.2
FGT(1)	9.3	10.2	10.3	10.8
FGT(2)	10.5	11.1	11.1	11.4
<b>N.W.F.P</b>				
FGT(0)	1.4	1.4	1.4	5.8
FGT(1)	0.2	0.5	0.7	0.8
FGT(2)	0.2	0.4	0.4	0.5
<b>Baluchistan Province</b>				
FGT(0)	0.0	0.0	0.0	6.9
FGT(1)	0.4	0.8	0.8	1.1
FGT(2)	0.2	0.4	0.4	0.5

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

**Table 16: Inequality impact of proposed tax reforms (% change over base)\***

	Sim-A	Sim-B	Sim-C	Sim-D
<b>Overall Pakistan</b>				
Gini	0.6	1.0	1.3	1.5
GE(1)**	1.0	1.8	2.3	2.8
GE(0)	1.2	2.2	2.8	3.4
GE(2)	0.8	1.5	2.2	2.7
<b>Punjab Province</b>				
Gini	0.5	1.0	1.3	1.5
GE(1)	0.9	1.9	2.5	3.1
GE(0)	1.0	2.2	2.7	3.4
GE(2)	1.1	2.2	3.0	3.7
<b>Sindh Province</b>				
Gini	1.0	1.7	1.9	2.3
GE(1)	1.7	2.9	3.3	3.9
GE(0)	2.1	3.5	4.0	4.7
GE(2)	1.4	2.4	2.9	3.5
<b>N.W.F.P</b>				
Gini	0.5	1.0	1.5	1.8
GE(1)	1.0	2.0	3.0	3.6
GE(0)	1.1	2.2	3.2	3.8
GE(2)	1.2	2.3	3.6	4.3
<b>Baluchistan Province</b>				
Gini	-0.2	-0.4	-0.3	-0.3
GE(1)	-0.5	-1.0	-0.8	-1.0
GE(0)	-0.1	-0.1	0.2	0.3
GE(2)	-0.9	-1.9	-1.9	-2.3

\*Sim-A: Increasing GST rate by 33 percent, Sim-B: 10 percent GST on presently zero-rated goods, Sim-C: Increasing GST rate by 33 percent + GST on services, Sim-D: Increasing GST rate by 33 percent + GST on services + 5 percent flat tax on agricultural incomes

\*\* GE ranges from zero (complete inequality) to infinity. See Cowell (1995). An increase in GE parameter implies less sensitivity towards inequality at the lower end of the distribution. GE(1) is Theil index of inequality that gives equal weight to the entire income distribution. GE(0) is the mean log deviation, giving higher weight to income differences at the lower end of distribution. GE(2) is one half the squared coefficient of variations and gives more weight at the upper end.

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