Welfare impact of external balance in pakistan: CGE-microsimulation analysis

Ahmed, Vaqar and O' Donoghue, Cathal

Planning Commission Pakistan, TEAGASC

1 June 2008

Welfare Impact of External Balance in Pakistan: CGE-Microsimulation Analysis

Vaqar Ahmed[1]

Ministry of Planning & Development, Pakistan

Cathal O' Donoghue

Rural Economy Research Centre, Teagasc, Ireland

---

[1] Address for correspondence: vahmed@gmail.com , Cathal.ODonoghue@teagasc.ie . Authors would like to acknowledge comments / technical help by Paul Dorosh and Stefan Boeters. The usual disclaimer applies.

Abstract

This paper studies the welfare impact of changes in the external balance of a developing economy (Pakistan). We explain that the economic growth achieved during the past decade is highly dependent on the improvements in external balance. After 2001, Pakistan has benefited from, an increase in the inflow of remittances, foreign assistance from bilateral and multilateral sources, and a relatively stable exchange rate. This was complimented by growth in the real sector. The GDP grew at an average of 7 percent from 2002 to 2007. During the same time period the growth in per-capita income was around 13 percent in dollar terms. This performance however has come under pressure due to the rising inflation, slowing down of global economy and external price shocks. The increase in import price of petroleum, raw materials and other manufactured goods has the potential of reducing the growth performance, impacting the competitiveness of the economy and thereby threatening the gains achieved during the past seven years in reducing the poverty levels. We study using a CGE-microsimulation model the effects of changes in import prices faced by Pakistan. Also provided in the simulation exercise is an analysis of increase in foreign savings that are usually prescribed for developing economies in order to augment the domestic savings and channelling investment towards developments in infrastructure and social sectors.

Keywords: Microsimulation, CGE Models, Income Distribution, Poverty, Inequality.

JEL Classification: D58, C81, C82.

1. INTRODUCTION

The two issues posing a continuous difficulty for the Balance of Payments position in Pakistan are the expensive structure of foreign savings and the terms of trade shocks. Foreign savings also known as the current account deficit usually play a very important role in the infrastructure and social sector needs of the developing countries. There are two forms of foreign savings; debt and non-debt. These non-debt sources of foreign savings are usually less of a concern if compared with the short and medium term debt instruments. The short term debt in particular is expensive and has been responsible in the past for plunging several developing countries in to a debt trap (see Voyvoda and Yeldan 2005).

Pakistan during the decade of 90s struggled with its debt servicing due to misappropriation of funds, poor revenue generation and a continuously depreciating exchange rate. The recovery from the twin deficits after 2001 allowed Pakistan to retire its expensive short term debt and presently it has medium to long term debt commitments under multilateral and bilateral arrangements. Like any other low and middle income country, Pakistan is a price-taker and its current account is exposed to shocks in the global export and import price indices. This issue is of critical importance due to the lack of diversification in the overall export structure of Pakistan. More than 60 per cent of Pakistani exports include raw cotton, yarn, garments and cloth-made ups. Despite the continuous efforts by the government's trade bodies the exports of other products have been sluggish. Some growth was recently registered in the exports of rice, leather, carpets, chemicals and pharmaceuticals. However the gap between textile and other export categories still remains large. On the import side also, the structure of the imported goods can play an important role in sustaining the long run development of a country. What is important is that a country should be importing more production goods in comparison to the consumption goods. In the light of the recent developments the import of machinery and other inputs increased to unprecedented levels. However oil price shocks have been a continuous threat to the overall terms of trade.

In this chapter we look at the welfare impact of changes in foreign savings and import prices. As for the later we are particularly interested in import price of petroleum, industrial raw material and machinery. The next section describes the recent trends in

the economy vis-à-vis the external balance. Section 3 will briefly describe our model framework. Section 4 focuses on data and measurement issues. Finally we discuss the results from our policy simulations.

2. STATE OF PAKISTAN ECONOMY

Real Sector Developments

Pakistan has remained an agrarian economy for most part of its economic history. Since its independence in 1947 agriculture remained the most important sector in the economy. However with the changes in the global demand, the shift towards industry and services sectors became inevitable. Although agriculture now contributes less than 25 per cent in the national output, however it employs more that 50 per cent of the active labour force in the country.

The growth rates of manufacturing and services sectors show relatively less instances of fluctuations whereas the agriculture sector has faced much more volatility. This can be endorsed through economic history and theory. Historically Pakistan has been very slow to modernise its agriculture sector. Almost all federal budgets to-date have: a) exempted agriculture from taxation thus bringing about economic inefficiencies, and b) protected agriculture sector through high tariffs. Retrospectively the climatic conditions in Pakistan have been getting worse for the traditionally harvested crops. The decline in water tables is a major concern. Between the years 2001 and 2002 the growth rate of agriculture was in negative due to the on-going drought in almost half of the entire farming land.

The growth in services sectors particularly after 2001 is remarkable and in fact exhibits the fact that the economy is getting diversified in products and services which have a stable domestic and global demand as compared to purely commodity-based production. Sectors such as banking, insurance, communications and transport have grown at an unprecedented rate. However there is a limit to the domestic demand of these services and Pakistan is still lagging behind as regards the export of services. Pakistan's share in the world's services sector is only 0.06 per cent. The total services exports stood at $1.5 billion in 2003-04 while the total services imports stood at $2.5 billion for the same year. According to the initial findings from a study conducted in

collaboration with International Trade Centre (ITC), Pakistan's services exports in various countries mainly face the problems of quality, acceptance of professional credentials, visa approval difficulties (particularly for exporters), re-certification process, multiple taxation regime, and country's image problem after 9/11 (Khan 2005).

In 2003 the industrial sector in Pakistan surpassed the agriculture sector in terms of their respective sectoral shares. The services sector shows more or less a constant pattern which is slightly above 50 per cent. However we do not know if the actual product value addition in Pakistan has increased or decreased. The Quantum Index of Manufacturing observes that the move towards the production of more value added products is slow. There is a dire need to cut costs and increase productivity to cater the international import demand. Quality control may be another issue to consider for the industrial sectors in the developing economies. Keeping in view the importance of ISO-standards and accreditation processes in a quota-free environment, the government established Pakistan Standards and Quality Control Authority (PSQCA) and the previously operational organisations namely, Pakistan Standards Institution (now SDC), Central Testing Laboratories (now QCC) and Metal Industries Research and Development centre (now TSC) have already been merged in PSQCA to provide one window standardisation, quality control and other technical services.

Sectoral growth rates may also be attributed to the changes in the fixed investment being done in these sectors. The activity-wise fixed capital formation in agriculture and manufacturing sectors exhibits a decline in agriculture from around Rs. 78 billion in the year 2000 to about Rs. 43 billion in the year 2006. However this decrease in the agriculture sector has not been matched by an increase in the manufacturing sector. This can have longer term impact on the structure of the economy. If the resources diverted from agricultural investment are now forming a part of the consumption expenditure, then GDP growth in Pakistan may not be sustainable in the medium term. If however the resources diverted from agriculture are moving into services sectors, then this implies a pre-mature shift towards the tertiary sectors. Given Pakistan's export base have relatively less services based exports therefore the later concern can also prove to be dangerous in the medium to longer term.

Fiscal Policy in Pakistan

The overall resource base in Pakistan is composed of four main components. First the revenue receipts include the tax revenue, non-tax revenue and surcharges[2]. Second the capital receipts include: a) external borrowing, and b) internal non-bank borrowing (this includes unfunded debt, public debt, treasury and deposit receipts, revenue account surplus and the surplus generated by the public sector corporations). Third external resources include the aid received from the consortium and non-consortium sources. Grants received by the country are divided into project and non project aid. The later can be further sub-divided into food, non-food, balance of payments and relief aid. Finally *self financing by autonomous bodies* is the surplus net of expenses of all autonomous departments (See Saeed 2005). Table 2 gives a time-series of fiscal indicators as a percentage of GDP.

The expenditure structure is divided into the current and development spending. The former includes categories such as debt servicing, defence and public administration, social services, law and order, provision of subsidies, grants to Azad Jammu and Kashmir, grants to railway and other departments, community services and economic services. The development budget is called the Public Sector Development Program (PSDP). Recently a major chunk of PSDP has been reserved for the infrastructure sectors such as water, power, transport and communications. This kind of public sector investment is now necessary due to its crowding-in and employment generating features. Besides Pakistan is also trying to offer and portray itself as a potential energy and trade corridor to the Middle East and East Asian countries. China has already expressed its willingness to engage in Pakistan's road and communications sector so that it can secure an easy access to the Arabian Sea (for its tradable goods). As the fiscal deficit position improved in Pakistan (Table 2), this created additional space for spending on social sectors such as education, health and population welfare. Until 2003 the development expenditure as percentage of GDP was on a continuous decline. During the same time period the current expenditures remained high thus compromising the social sector and infrastructure capital spending. This trend has now reversed and considerable emphasis is being given to sectors essential for long term economic growth.

---

[2] Revenue receipts net of provincial shares.

As in most developing countries Pakistan has seen periods of high deficits in the past. And during those times it resorted to five different sources for bridging the deficit; a) printing new notes, b) borrowing from public, c) foreign loans, aid and grants, d) borrowing from banks, and e) using previously saved balance[3]. The domestic debt burden has been ever increasing, which in turn contributed to rising interest payments. It was much later that the government slashed the state-run National Savings Scheme rates in order to bring its long term debt commitments under control. On the other hand tax revenue has not increased on a similar pace. In fact IMF on its every mission in Pakistan has been expressing concerns over the low tax to GDP ratio in Pakistan (Table 2). It was advised by the multilateral organisations that efforts should focus more at expanding the tax net further into the agricultural and services sectors, rather than reducing too much tax rates for the manufacturing sector in the hope of boosting growth in this sector, and thus future revenues. Furthermore in the past few years, tax revenues have not shown the buoyancy that would warrant such an approach. Petroleum levies need to be cut back as these directly create inefficiencies in the economy.

On the brighter side however Pakistan has achieved one of the fastest reductions in it external debt volumes. This view has been endorsed by the donor agencies such as the World Bank and Asian Development Bank. The external debt and liabilities to GDP ratio was 52 per cent in the year 2000 and within a time span of five fiscal years it was brought down to around 28 per cent in 2006.

In the past however rising debt servicing levels and the consequent increases in the deficits have led to increases in the inflation indices. For the past five years the inflation seems to be increasing due to factors other than the budget deficit. The government is trying to look into the institutional factors that are impacting consumer price index during times of high economic growth. As regards the food inflation government has tried to neutralise the inflationary impact by liberalising the import of food items from abroad. Another factor that has recently contributed to an increase in the general price level is the rising global oil prices. This in fact has also deteriorated Pakistan's trade balance as the value of imports has risen. Table 3 shows the break up of group-wise inflation. It is interesting to see the group-wise linkages in price changes. The energy group has grown the most in CPI basket of 92 items. These

---

[3] For details see Saeed (2005).

energy prices also pushed up the transport and communication costs, which in turn were instrumental in adversely impacting the prices of the food group.

In line with the promise of bringing about fiscal discipline in the budgetary operations, the Government in 2005, enacted a Fiscal Responsibility and Debt Limitation Act 2005. The main thrust of this act is to reduce and ultimately finish the revenue deficit and minimise the public debt levels. The main highlights of this act include:

- to eliminate the revenue deficit by not later than June 30, 2008 and to thereafter maintain a revenue surplus,

- to ensure that within a period of ten years beginning from July 1, 2003, the total public debt at the end of the tenth fiscal year (ending June 30, 2013) does not exceed 60 per cent of the estimated GDP for that year and thereafter to maintain total public debt below 60 per cent of GDP for any given fiscal year,

- to reduce the total public debt by not less than 2.5 per cent of the estimated GDP in every fiscal year[4], provided that the social and poverty related expenditures are not reduced below 4.5 per cent of the estimated GDP for any given fiscal year, and

- to not issue any new guarantees, including those on Rupee lending, bonds, rates of return, output purchase agreements and all other claims and commitments that may be prescribed from time to time for any amount exceeding 2.0 per cent of estimated GDP in any fiscal year.

Besides the Fiscal Responsibility and Debt Limitation Act, the government has also initiated several institutional reforms, whose benefits have recently started to appear. By 2004 all tax whitener schemes had been eliminated and a detailed tax survey and documentation exercise was undertaken. This led to an addition (in the tax base) of 234,189 new income tax payers and 34,000 new sales tax payers. A two-tier tax on those associated with the agriculture sector was introduced in 2003 while a number of small taxes at the federal and provincial levels were reduced[5]. The new income tax ordinance that was introduced in 2001 was purely on universal self-assessment basis with more equitable rates as compared to the past schedules.

---

[4] until June 30, 2013
[5] Agriculture income earners to pay taxes on any non-agriculture income earned during the year.

Monetary Policy and External Sector

Pakistan has undertaken massive restructuring of its monetary policy and the institutions responsible for implementation of this policy. Not only money markets and capital markets have been completely restructured but the entire exchange rate and interest rate regimes have been integrated to fine tune the alignment of capital inflows and outflows.

The Medium Term Development Framework 2005-10 sets out clear objectives for a balanced monetary policy:

- to ensure adequate money supply to encourage economic growth, productive employment and capacity expansion,

- to enhance competition and efficiency in the financial sector,

- to improve risk management capacity of the banking sector,

- to meet growing credit requirements of the private sector,

- to maintain price and exchange rate stability,

- to complement other macroeconomic policies to achieve development goals.

Money Supply (M2) has been generally accommodative of the increase in nominal GDP. M2 growth remained in double digits except for the years immediately after the nuclear tests of 1998. However in a very recent move the State Bank of Pakistan has tightened the monetary policy in order to curtail the rising inflationary levels. The M2/GDP ratio is an indicator of financial development in the country. This ratio has been on an increasing trend after 2001. This is suggestive of the banking and insurance sector's expansion in Pakistan. During the same time period Pakistan's exchange rate has remained very stable and has allowed the traders a predictable field for conducting their business. This is in contrast to the decade of 1990s when the frequent exchange rate disturbances had negatively affected the long term contracts of the business community.

Table 4 shows a sharp appreciation in the value of Rupee in 2003 against US dollar. This appreciation continued in 2004 as well. During the same time period Rupee also appreciated against the Saudi Riyal. However the leading currencies of the world have themselves appreciated after 9/11 against the US dollar due to USA's rising current

account deficit. This actually explains the increase in the exchange rate(s) of Euro and UK Pound against Rupee. As explained above this stability in exchange rate has contributed a lot in the improvements on the balance of payments side. The actual implementation of the trade policy in Pakistan has also kept the exchange rate stability as the foremost assumption.

The present trade policy of Pakistan focuses on increasing efforts in the trade diplomacy arena to gain increased market access for Pakistani goods. Export Promotion Board has been converted into a Trade Development Authority, giving this organisation due autonomy in its operations. Exporters are being engaged on a large scale for speeding up the effort towards, exports diversification, enhancing export competitiveness by reducing costs of doing business, focus on neglected regions and products, developing export of services and the capacity building in the areas of WTO and trade negotiations. The Export Promotion Bureau (EPB), National Tariff Commission (NTC) and Ministry of Commerce have launched a nation-wide awareness campaign on highlighting the WTO agenda in order to bring all stakeholders on board. Intellectual Property Rights Organisation (PIPRO) has been established to bring out the required legislation to remove any disincentives for the foreign investors. The 2003-04 trade policy particularly targeted product diversification and geographic expansion of exports by allowing a 25 per cent export subsidy on products whose total exports in any of the preceding three years (1999 – 2002) were not more than US $5 million and for all products exported to countries where the average annual exports in the preceding three years were not more than US $10 million. It was further envisaged that to enhance the industrial sector's competitiveness by reducing the cost of inputs, Water and Power Development Authority (WAPDA) and Karachi Electric Supply Corporation (KESC) will allow off-peak hour rates and bulk rates for industrial consumers (GoP 2004).

The post 9/11 scenario, contributed towards favourable trends for Pakistan's balance of payments. The inflow of remittances converted the current account deficit into a surplus within a time period of three years. Table 5 shows the past and present position of the current and capital account. The most noticeable change in the trend is the rising worker's remittances and an increase in exports particularly around the year 2004. Due to the debt relief the long term capital has increased from $ 525 million in 2000 to $ 2552 million in 2005. This not only ensures the steady supply of industrial

imports and raw materials but also warrants a good credit-worthiness for the overall economy.

Pakistan has found it hard to find new markets for its exports. Consequently the range of exportable goods has not grown by a lot. In fact even after 35 years of rigorous industrial policy, textile/cotton still remains the main export category having a share of more than 60 per cent in the overall exports. However the imports have been rising on an increasing pace. In fact the value of imports also increased due to the rising oil prices that in turn increased the cost of raw materials and dangering the growth rate of value addition in the industrial sector. Table 6 shows the long run trends in the commodity-based trade. The 1970s showed remarkable average growth rate of exports and imports. However as the industrialisation process slowed down latter on account of several issues the current account deficit started to pick up. Import balance has been a matter of concern for a very long time now. Its not only the absolute growth rate of imports but also the import to GDP ratio that explains the trade deficit. However Pakistan did manage to curtail its imports around 2001 after which the current account remained in surplus for another three years. Table 7 shows the economic classification of imports. This table actually explains why Pakistan has remained a consumption-based economy for so long. The import of industrial raw materials for the production of consumer goods (last column) has increased from 26 per cent in 1971 to 55 percent in 2001. The percentage share of overall capital goods (column 2) has been on a decreasing trend. However for the past two years the position has changed and the percentage share of capital goods imports has increased in 2005. If Pakistan has to move forward with a curtailed trade deficit, it needs to limit its absorption of consumer imports and restrict itself to raw material and machinery required for the production of exportable goods. The unit values of exports and imports along with the terms of trade index is given in Table 8. We can also see the contribution of each imported item towards the increase in trade deficit in Table 9.

The government has been continuously reducing the tariff rates to facilitate cheap import of raw material and to pass on the effects of free trade to the consumers. The maximum tariff has been brought down to 25 per cent in 2003 from 92 per cent in 1993. During the same time period the number of tariff slabs has been reduced from 13 to 4. The role of excise duties in the overall taxation structure has been minimised and will be phased out in near future.

11

3. CGE-MICROSIMULATION MODEL

Our model follows the framework developed in Lofgren *et al.* (2001). The model is tailored for the common specifications required for constructing a general equilibrium model for a developing country[6]. Some of the important features of low-income countries included in this model are: a) household consumption of non-marketed commodities, b) explicit treatment of transaction costs for marketed commodities, and c) a separation between production activities and commodities (which in fact allows an activity to produce multiple commodities and of course any commodity can be produced by multiple activities). The overall model specification follows the neo-classical structuralist tradition[7]. This methodology may be seen at length in Dervis *et al.* (1982). Production and consumption decisions are modelled using non linear optimality conditions i.e. production and consumption decisions are based on the maximisation of profits and utility respectively (subject to the underlying budget constraints). Production technology at the top uses a CES specification. If the available production techniques permit the mix between value added and intermediate inputs to vary, then the CES function is preferred (over Leontief function)[8]. The value addition has been treated as a CES function of primary inputs where as the overall intermediate input is a Leontief function of disaggregated intermediate inputs. Fixed yield coefficients determine if an activity produces one or multiple commodities. The aggregate revenue from an activity is then a function of the level of activity, yield and the producer prices of commodities. The factor market follows the microeconomic assumption of employing factors until the point where the marginal revenue product of a particular factor becomes equal to its wage. Factor wages are variable across

[6] A typical general equilibrium exercise involves five main stages namely, a) identification of the policy issue at hand, b) exploring the policy issue within the overall theoretical underpinnings of general equilibrium framework, c) model formulation, d) computer simulations, and e) Interpretation of results.

[7] What are Structuralist CGE models? According to Lustig (1988): "Structuralist thought considers that structural characteristics (the repetition is appropriate) of the economy are fundamental to its behaviour. Among the structural factors are the distribution of income and wealth, tenancy relationships on the land, the type and degree of specialization in foreign trade, the density of chains of production, the degree of concentration in markets, control of the means of production by distinct types of actors (the private sector, the state, or trans national capital), the functioning of financial intermediaries, and penetration of technical advance, as well as socio political factors associated with the extent of organization of the working class and other influential sectors and classes, the geographical and sectoral distribution of the population, and its level of skills".

[8] Leontief is a special (limiting) case of CES (with sigma = 0).

activities in order to correctly portray the cases where: a) markets are segmented, b) where factors are mobile, and c) where both the abovementioned possibilities exist. The activity specific wage is calculated by multiplying the wage with a distortion value. The distortion value will be different across activities.

The households are receiving: a) income from the factors via enterprises, and b) transfers from other institutions such as government and rest of the world. The household's income is exhausted in: a) consumption, b) savings, c) paying income taxes, and d) transfer payments to other institutions. Households are consuming two types of commodities that include the marketed commodities which are accounted at the market price (market price includes indirect taxes and transactions costs), and the home-produced commodities accounted at the producer prices. LES demand function is used to allocate the consumption across commodities.

The income received by enterprises is allocated to savings, payment of corporate (direct) taxes and transfers. Government is receiving taxes at fixed ad valorem rates and has a fixed consumption. However the transfer payments made by the government to households and enterprises are indexed with the level of CPI. The residual from government's income and consumption is treated as savings. The payments made by *rest of the world* to domestic institutions (government, households and enterprises) and factors are treated fixed.

The overall domestic output from all activities is allocated between domestic turnover and exports. In this case the assumption of imperfect transformability between exports and domestically sold goods is established using a CET function. Similarly on the import side a CES function is used for modelling imperfect sustainability (also referred to as the Armington assumption). The model is based on a SAM and we have used GAMS software for solving / running the model.

For our income generation and occupational choice model we follow the tradition from Alatas and Bourguignon (2000). Such a specification allows a consistent linkage with a CGE model. Due to its ease of estimation and transparency, this approach has been followed in numerous studies. For general discussion on this micro model, see Bourguignon, Ferreira and Lustig (1998), Bourguignon, Fournier and Gurgand (2001). For applications where this specification is used for linkage with a CGE model, see Robilliard *et al.* (2001), Bussolo and Lay (2003) and Hérault (2006). In

13

this paper we follow the form shown in Bourguignon, Robilliard and Robinson (2003), which is a companion paper of Robilliard *et al.* (2001) however the later provides a much more detailed CGE model to study the impact of financial crises in Indonesia.

The micro-macro models were linked in a top-down fashion shown in Bourguignon, Robilliard and Robinson (2003), which also provide details on how consistency is achieved between the SAM and household budget data. These data consistency requirements are an essential aspect of this top-down exercise which allows us to link the factor returns, prices and employment in the CGE model with the corresponding household level variables in the micro data.

For estimation of wage functions we have separate heckman selection models/regression for; a) labor_large farm, b) labor_medium farm_Sindh[9], c) labor_medium farm_Punjab, d) labor_medium farm_Other Pakistan, e) labor_small farm_Sindh, f) labor_small farm_Punjab, g) labor_small farm_Other Pakistan, h) labor_agricultural wage, i) labor_non_agricultural wage unskilled, and j) labor_non_agricultural wage skilled.

We obtained predicted earnings from the above income regressions and used them (amongst other characteristic variables)[10] as independent variables in the maximum likelihood multinomial logit regressions, thus allowing individual occupational choice to be influenced by returns in other activities. Our CGE model closure for factor markets also allows mobility of factor across activities. For a detailed discussion on income generation model and regression output, see Ahmed and O' Donoghue (2007)[11].

---

[9] Administrative structure of Pakistan has four provinces; Punjab, Sindh, NWFP, and Baluchistan. Islamabad (federal capital city) and Federally Administered Tribal Areas are also accounted for, but separately from provinces.
[10] Other variables include: age, age_squared, province, marital status, number of persons in the household, type of dwelling.
[11] Given the space constraint it was difficult to provide the regression tables for abovementioned 10 categories with this paper.

4. DATA

The SAM for our CGE model has been derived from Dorosh, Niazi and Nazli (2004). This SAM has been furnished from five different data sources. First the I-O table that provides information mainly on the activities and commodity accounts. This table has been published by the Federal Bureau of Statistics for the year 1990-91, however subsequent revisions have taken place. Second the national accounts data 2001 is used to compile information about the value addition in fifteen sectors. Third, for disaggregation of consumption, Pakistan Integrated Household Survey 2001 is used. This survey is conducted regularly by the FBS (since 1960). Fourth, Pakistan Rural Household Survey 2001 conducted by the Pakistan Institute of Development Economics is used to disaggregate household incomes and finally Pakistan Economic Survey 2001-02, published by the Ministry of Finance provides sector-wise and commodity-wise data on production, prices and trade.

The overall structure of this SAM provides sufficient disaggregation for constructing a detailed CGE model. On the activities side the matrix includes payments and receipts for 12 agriculture sectors, 16 industrial sectors and 6 services sectors. Similar sectoral detail follows in the commodity accounts. Factor accounts include labour, land and capital with labour disaggregated into 10 different categories. This categorical disaggregation is based on the criterion of farm size, agriculture/non-agriculture wage, and unskilled/skilled labour. Land again is disaggregated according to the farm size (in different provinces). Capital is categorised into livestock, other agriculture, 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, rural poor/rural non-poor. Urban households have been classified into poor and non poor. Other institutions in the SAM include enterprises, government and the rest of the world. Table 11 gives the macro SAM for Pakistan along with the control totals. We used the cross-entropy method developed in Robinson *et al.* (2000) to structure the SAM as required by our CGE model.

The main data source for the microsimulation model is Pakistan's Household Income Expenditure Survey 2001-02 and Pakistan Integrated Household Survey 2001-02. Historically both were stand alone surveys, however since 1998-99 they have been merged. A total of 16400 households were interviewed. The sample of household was

drawn from 1150 primary sampling units out of which 500 are urban and 650 are rural. According to the FBS this sample size has been found sufficient to produce estimates of key variables (at national and provincial level) at 95 per cent confidence level with 5 to 7 per cent margin of error. In line with the data consistency requirements given in Bourguignon *et al.* (2003) we reconciled the micro data with the available information in our SAM.

The selection of free parameters/elasticities poses a potential problem to the CGE exercises. As econometrically estimated elasticities for Pakistan were not available, therefore we have selected our figures keeping in line with studies conducted for comparable developing economies. The trade and production elasticities are given in Table 12. It should be noted that trade elasticities such as the value of Armington play a more important role in the relatively disaggregate models such as the one used in this study. This essentially gives rise to the need for conducting a detailed sensitivity analysis in order to assess the robustness of our results.

5. SIMULATIONS

In our experiments we study the impacts of two shocks that have opposite impact on the economy (at least in the broad macroeconomic terms). First, the changes in foreign savings, required by developing countries in order to augment the domestic savings and hence finance their infrastructure and social sector requirements in the overall economic development. Second, the changes in import prices that play a very important role in keeping the flow of foreign supplies smooth (or volatile) for domestic producers to produce at a level that is competitive vis-à-vis the other countries. Even in case of consumer goods, the import prices play their role via the domestic prices of commodity groups which may be a necessity such as food, or may be a luxury like automobiles.

In the post-2001 milieu the current account deficit of Pakistan was transformed in to a surplus in one of the shortest periods in economic history. This was largely due to multifarious factors such as an increase in remittances, unilateral transfers, and export receipts. However recently the current account deficit (and the composition of this deficit) has once again started to pose problems for the domestic economy. This is

mainly due to increase in import prices and declining exports. For the sake of experimentation we will increase the overall foreign savings by 50 percent and see their impact at the macro and micro level.

For our second (set of) simulation, we will evaluate the impact of import prices by main commodity groups that have potential backward and forward linkages in the economy. This analysis will explain how little a developing country can do in the face of exogenous price shocks in order to keep its production, employment and trade patterns stable. Table 1 gives an outline of our simulations:

Table 1

Simulations	Description
Sim-1	50 percent increase in foreign savings
Sim-2	10 percent increase in overall import price
Sim-3	10 percent increase in the import price of petroleum
Sim-4	10 percent increase in import price of industrial raw material
Sim-5	10 percent increase in import price of machinery

The closure rules remain the same for all simulations. For the factor market we assume labour to be fully employed and mobile across activities. Same closure is retained for land. Capital is fully employed and activity-specific. We have investment-driven savings where marginal propensity to save is allowed to change for selected institutions. Exchange rate is flexible and foreign savings are fixed. Government savings are flexible and direct tax rate is fixed. Consumer price index is treated as numeraire (i.e. fixed) and index of domestic producer prices is flexible.

We have sequenced our results below such that macroeconomic changes (providing aggregate demand, investment, consumption etc.) are followed by changes in prices and wages. Then we see the impact of changed price structure on the disaggregated value addition (in all activities given in SAM), import demand and export supply. In our case, given the assumption of full employment, changes in production do not impact the employment levels (however inter-sectoral changes in labour demand are allowed). We continue our analysis and see how changed production patterns impact

17

the household consumption expenditure and overall welfare. Finally we see the impact of our experiments on household-level poverty and inequality obtained from our microsimulation model.

Macroeconomic Results

Our macroeconomic results for the abovementioned experiments are given in Table 13. In Sim-1, a 50 percent increase in foreign savings leads to an increase in GDP value added by 0.1 percent. The private consumption measured in real terms increases by 2.8 percent. Given the greater amount of foreign exchange available, imports increase by 3.7 percent, however exports decline by 6.5 percent. The declining export indicates deterioration in trade balance. We can observe that trade deficit as a percent of nominal GDP increases by 1.8 percent. In nominal terms as the foreign savings to nominal GDP ratio increased by 2 percent, the investment and private savings to nominal GDP decline by 0.3 and 2.4 percent respectively. Private savings include household and enterprise savings.

Pakistan like many other developing economies requires a substantial level of investment to meet its development needs in infrastructure and social sectors. However it is a capital constrained country with low levels of domestic savings. Furthermore due to a narrow tax base it becomes very hard for the government to balance the needs of a growing economy. To augment the domestic private and government savings, Pakistan is often required to run a deficit on its current account and let the injection of foreign savings meet the development needs of the country.

Our macroeconomic results shown in Table 13 can be seen in the light of economic theory, which also suggests that foreign savings may not have short term impact on GDP, however these can significantly appreciate the real exchange rate that in turn causes the exports to decline. This also implies that production of domestically consumed goods will increase. This happens in our results because, absorption, which is defined as the total domestic spending on a good calculated at the prices paid by the domestic demanders increases by 2.2 percent in real terms. This increase to some extent was made possible from the price side as we can observe that the domestic (non-tradable) price index also decreases by 0.1 percent. We will explain how this impacts the disaggregated welfare levels later in this section.

The next four experiments focus on the increase in import prices. A steady flow of imports (particularly of production goods) is essential to maintain the momentum of development and economic growth. The imports of the production goods usually take the form of intermediate inputs and raw materials. Imports of finished production goods also contribute to technology transfer in low and middle income countries. As efforts towards trade liberalisation continue we have also seen that imports of consumption goods (although viewed as relatively adverse due to less multiplier effects in the economy) contributed to increased consumer welfare in terms of reduced prices.

In Sim-2 we see the impact of a 10 percent increase in overall import price index. Going back to theory we understand that the effects of an import price increase will be similar to an increase in tariffs (see Go 1991). We know from the Stolper-Samuelson theorem that rise in the relative price of a good will lead to a rise in the return to that factor which is used most intensively in the production of the good (and a fall in the return to the other factors). This theorem has been derived from the basic Heckscher-Ohlin model which is a general equilibrium model of international trade and shows that a country will export products that utilise its abundant factors of production and import products that employ a country's scarce factors and resources. A corollary to the Stolper-Samuelson theorem is the factor price equalisation theorem which tells us that regardless of the factor mobility across international borders, factor prices tend to equalise for countries that do not differ in technology[12].

While we will study the impact on factor market later in this section, however for now we are interested in answering two questions: a) In what circumstances import prices have little or no impact on export performance? b) How does the change in overall import price compare with changes in import prices by commodity groups, in terms of their macroeconomic impacts?

For the first question; as the import prices go up this in turn implies a rise in the domestic price level, which eventually leads to a terms of trade deterioration by 9.1 percent (Table 13), which is also translated in the depreciation of Pakistani Rupee by 7.8 percent. This makes Pakistani exports cheaper and hence attractive in the

---

[12] What will be the effect of an increase in the physical endowment of factors? Rybczynski theorem suggests that an increase in one of the two factors of production leads to a relative increase in the production of the good using more of that factor.

international market ultimately leading to an increase in the real exports (in this case the change is approximately zero). This change in real exports is also dependent on the trade elasticities, due to which the direction of the change can significantly alter. A sensitivity analysis therefore is an important aspect of such an analysis. The demand for foreign exchange will be more intense if a country wishes to keep itself at the level of imports it was at, before the price increase. In this case the demand for foreign currency increases and to meet this demand government may need to resort to borrowing or other sources, all of which can bring the local currency under pressure (except for the case where a country wishes to run a current account deficit).

For the second question we see that in macroeconomic terms, a 10 percent increase in import prices leads to a 0.4 percent decline in GDP, depressing the private consumption by 3.5 percent. By closure rule we know that investment is savings-driven which implies that marginal propensity to save changes to adjust. However this change only happens in selected institutions which includes government. Given that government savings are flexible (decrease by 0.2 percent of nominal GDP), the direct tax rate is treated as fixed. The incomes of firms / enterprises decline by 2.2 percent on account of decline in imports, exports as well as absorption in real terms. The terms of trade deteriorates by 9.1 percent causing the real exchange rate to depreciate. However this depreciation is not enough to trigger an increase in exports. How does the above results compare with the changes in import prices of selected commodity groups? We over here discuss three different groups namely; petroleum, industrial raw material, and machinery.

In Sim-3 we evaluate the impact of a 10 percent increase in price of petroleum imports. The rising international energy prices pose a threat to the production costs in the developing economies. As the indigenous energy resources are not well developed hence the reliance is heavily on imported forms of energy. In Pakistan the petroleum imports account for around 24 percent of the overall import bill[13]. This includes petroleum products as well as petroleum crude. Both are intensely used in the industrial process and are also required for consumer needs. As a raw material the rising cost of oil, has been a growing concern lately. However there is nothing much a developing country's government can do in the short-run in order to avoid the exogenous oil price shocks. Once the full thrust of rising import prices of petroleum

---

[13] 2006-07 estimated from Economic Survey of Pakistan. The figure is for July – April period.

are faced by the private sector producers, this in turn leads to crippling effects on domestic production, employment and trade.

We can see in Table 13 that a 10 percent increase in the import price of petroleum (Sim-2), brings about a 0.7 percent decline in GDP value added. The private consumption declines by 4.3 percent. As a percentage of nominal GDP, investment and private savings increased by 1.1 percent. Current account deficit as percentage of nominal GDP, also increases by 0.2 percent. As expected the direction of change in trade sector decreases both imports and exports by 11.2 and 1.8 percent respectively. The overall import price index increases by 11.9 percent. This increase also depends upon the weight of petroleum group in the overall imports. In relative terms domestic (non-tradables) price index decreases by 1.1 percent indicating that domestically produced goods are now cheaper. Given that the trade deficit to nominal GDP ratio increases by 0.2 percent, there is an impact on tariff revenue and government savings, both decreasing by 0.2 and 0.3 percent respectively.

The impact that increase in import price of petroleum has on the economy is greater than any other commodity group. This essentially is due to the intensity with which this good is used in the production process (as well as by the households), and the knock-on effects that petroleum prices have at the macro as well as micro level. In our next simulation (Sim-4) we increase the price of industrial raw material (excluding petroleum) by 10 percent. This commodity group includes; organic chemicals, inorganic compounds of precious metals, fertilizers, tanning or dyeing extracts, oils, resinoids, perfumery, albuminoidal substances, glues, enzymes, pyrotechnic products, pharmaceutical products and related goods. An increase in the import price of this group decreases GDP by 0.5 percent, where private consumption declines by 2.7 percent. The direction of change in major macroeconomic variables remains the same as in Sim-3. In Sim-5 we see the impact of a 10 percent increase in the import price of machinery group. This group includes; electrical machinery, appliances, boilers, and related mechanical equipment. The decrease in GDP this time is greater than Sim-4 (decreases by almost 0.7 percent) and the decline in consumption is also greater (3.9 percent). However this decrease is again less than what we have seen for the case of petroleum (Sim-3).

We infer two things from here. First, in a general equilibrium exercise, experiments with changes in overall import prices may give an indication of the direction of

21

changes, however they cannot give a true picture of the magnitude of changes that may occur at the disaggregate level. External price shocks are better studied in disaggregate models, where impacts of changes in world commodity markets can be seen to translate on the local economy. In our case we can readily see the benefit of using a disaggregate model with 34 sectors, where we are at an ease to alter the import prices by commodity groups.

Second, we find that external oil price shocks have the highest potential to impact the changes in the static economy. We have shown in Table 13 that the import prices of petroleum group had a much adverse impact in comparison with the same magnitude of change in raw material, machinery and overall import price. This is an indication of how vulnerable developing economies such as Pakistan are to external prices of essential inputs. Any volatility can cripple the industrial progress in these economies. However given that they are price takers there is very little they can do in order to hedge against short-term losses. Pakistan has provided a subsidy in the wake of rising oil prices, however this can only be a short term measure given the size of this transfer payment.

Impact on Prices and Wages

The impact of simulations on value added and output prices is given in Table 14. We saw from our explanation above that an increase in foreign savings (Sim-1) leads to an appreciation of local currency and also decreases domestic price index. This in turn increases private consumption and ultimately has a positive impact on GDP. We can now see this impact from the price side where for a 50 percent increase in foreign savings value-added prices decline across the board, with exceptions being livestock, wheat milling, commerce and private services. The sectors showing the highest decline in value added prices are; leather (10 percent), cotton lint / yarn (7.1 percent) and manufacturing (6.9 percent). The direction of change is similar for the case of output prices, however the magnitude of these changes is much smaller given the inclusion of other factors in output prices. Such a change seems pro-poor given that the prices of food and oil show a decline. However the price of housing increases by 6.9 percent in case of value added price and 5.5 percent in case of output price.

The import price shocks exhibit an almost opposite effect compared to Sim-1. In all four cases (Sim-2, 3, 4 and 5) we see that external price changes impact the agriculture prices adversely. Almost in all cases there is an above 3 percent increase in the prices of; wheat, rice, cotton, sugar cane, fruits and vegetables. Another concern is how these experiments impact the competitiveness of local manufacturing sector. The output prices increase for cotton lint, yarn, petroleum refining, chemicals, mining, vegetable oil, wood, and other manufacturing. As expected (after our macroeconomic analysis above) the most adverse impact on prices is for the case of increase in the import price of petroleum products, followed by import price of machinery group. In selected sectors such as construction, fishing, rice milling and other food, we see that the output price either increased or showed no changes once the overall import price was increased by 10 percent. However in case of import price changes by commodity groups the prices of these sectors declined. Such changes can be attributed to the shifts in resource usage when the prices of inputs are changed.

What is the impact of our experiments on factor returns? In response to the increase in foreign savings (Sim-1) the returns for labour with farm holding and return for land declines (Table 15). The return to capital does not change given our closure assumptions. Those who gain under this changes are agricultural wage labour and non-agricultural unskilled wage labour, whose wages increase by 1.5 and 0.5 respectively. Agricultural wage workers are regarded as the poorest of the rural poor (ILO 1996). The overall agriculture incomes are the second most important source, with almost 27 percent of total per capita household income (see Adams 1995). According to the Labour Force Survey 2003-04, 43 percent of the employed persons (10 years age and above) are working in the agriculture, forestry and fishing sectors. Given this statistics it seems that our simulation results indicate redistribution with-in the agriculture sector, where the returns for farm owners are declining, and the wages for employed labour in agriculture is increasing. The increase in the wages of non-agricultural unskilled labour also indicates a change in favour of urban poor, however we cannot ascertain the magnitude as the SAM data (in its present form) is not divided by urban/rural classification.

In the import price experiments, agricultural wage and non-agricultural unskilled labour become the main losers given that the activity levels are declining on the production side. Along with these two categories the wages for non-agricultural

skilled labour also decline. Return to land and profits for farm owners increase showing a change in favour of (agricultural) asset owners. The increase in factor prices is certainly highest for the simulation where import price of petroleum is increased by 10 percent. In this case the returns for labour having small farm, increase the most (6.7 percent) followed by labour having medium farm (6.3 percent). A similar pattern is observed in case of changes in returns to land. The small land category gains the most (7.9 percent) followed by medium and large land. In this case one may infer that there is a redistribution taking place within the agricultural asset owners, where those having small to medium ownerships are gaining. Does this lead to changes in the production pattern of goods using intensively those labour / land categories whose prices have now increased? In other words we want to see how factor prices impact output. We discuss this below and see the impacts on the production side. However we will not study the employment effects which are of little interest, given our closure settings. By assumption labour and land are fully employed and mobile. So while there may be inter-sectoral employment changes, there will not be an increase or decrease in the overall employed land or labour.

Impact on Production and Trade

The impact on the quantity of value added can be seen in Table 16. These changes are subject to the price changes and the underlying elasticities reported in Table 12. The value added results are mixed not only across the sectors but also with in the sectors. We start with the increase in foreign savings. In case of agriculture there is an increase in case of value added in wheat sector, sugar cane, fruits/vegetables and livestock. However there is a decline in rice, forestry and fishing. In case of manufacturing sector there is a general decline in value addition except for cement, energy, vegetable oils and wheat milling sectors. This trend almost reverses in case of import price changes (Sim-2, 3, 4 and 5). The highest increase is for leather, textile chemicals, other manufacturing, petroleum refining, wood products and vegetable oil. Given that more than 60 percent of Pakistani exports are concentrated in cotton, leather, and textiles, such a change in value addition in fact is favouring the exporting sectors. The magnitude of change in case of import price shocks for different commodity groups show that a 10 percent increase in import price of petroleum and a

10 percent increase in import price of machinery lead to almost the same level of changes.

Keeping with the subject of this paper, the changes in external balance are of primal importance here. This is why we should also go on to see the sector-wise impact on Pakistani imports and exports. In Table 17 we give the disaggregate changes in quantities of imports. The increase in foreign savings lead to an increase in imports for all sectors (except a marginal decline for mining sector). The highest increase is in leather, textiles, commerce and livestock (cattle). On the contrary (and in line with our expectation) the import price changes lead to a decline in imports from all sectors. In all four cases, the manufacturing sector is the worst affected, as this sector is relatively more dependent on imported inputs. The decline in imports is significant for the case of vegetable oil (over 60 percent for commodity group simulations) followed by declining imports in leather, textile, sugar etc. Such a change causes concern for the overall production in the country because the imported content (particularly in developing countries) is indispensable for activities having lower Armington elasticities[14]. In case of Pakistan, the exports embody a high degree of imported content. Which brings us to the next question of; how the changes in imports impact Pakistani exports?

This is shown in Table 18 where we see declining exports in all simulations. The magnitude is expectedly higher in case of increase in foreign savings where the appreciation of exchange rate adversely impacts the exporting sectors. In case of simulations with increased import prices we see a two-way effect. First the depreciation of exchange rate causes the exports to increase, however exporting sector, particularly those having a high imported content (as inputs) face a decline in their output. These results should be studied keeping under consideration Armington and CET elasticities given in Table 12. We can observe that the manufacturing-oriented export sectors provide varied results depending upon which commodity group is faced with an import price shock. In case of a 10 percent overall increase in import price (Sim-2) we see that the major exporting sectors such as leather, textile, rice, wheat milling, vegetable oil and cement see an increase in export quantities. In agriculture both (livestock) sectors; cattle and poultry (that contribute almost 50

---

[14] This is the degree of substitutability between domestic and imported sources of supply. A higher value for Armington implies a higher possibility of substitution and vice versa.

percent of value addition in overall agriculture) see an above 15 percent increase in their exports. In Sim-3 a 10 percent increase in the import price of petroleum shows the same results as far as the direction of change is concerned, however in this case the magnitude of decline in exports of agriculture sector seems to be higher, while the increase in the exports of the industrial products seem lower than Sim-2. This observation on the direction and magnitude of result applies also in case of a 10 percent increase in import price of machinery (Sim-5). In fact given the similarity of intensities with which machinery and petroleum are being combined in the production process both have very similar patterns of changes. Our results however differ for Sim-4, where a 10 percent increase in industrial raw material (excluding petroleum) leads to a general decline in export levels with exception being; livestock , fishery, leather and services sectors such as commerce, private services and transportation (Table 18).

Impact on Household Welfare

For evaluating the changes in the household welfare we first see how household incomes change for our experiments. These results can be seen in Table 19. We can observe that the change corresponds to what we have seen for changes in factor returns (Table 15). This implies that for Sim-1 we can see that households who own large or medium farms are the main losers, while all other household groups gain, most notably rural agricultural workers who are landless and small farm owners. We had explained above that this also represents redistribution in favour of low income households. However this redistribution is reversed in case of external import price shocks, where only those households who own large and medium farms see an increase in their incomes. All other groups face a decline.

The same pattern evolves in case of household consumption expenditure in Table 20 and disaggregated household-wise changes in equivalent and compensating variations in Table 21. We can in fact see a one to one mapping of results for household income and expenditure. We cannot say with certainty that import price changes act in a manner similar to a regressive tax, because we can see in Table 19 - Table 21 that urban non-poor and rural non-farm non-poor households also witness a decrease in their welfare levels. This result seems logical as only farm owners are the ones who

are least using the commodity groups that have seen changes in import prices. Farm owners also have low level of imported inputs in their output compared with industrial producers. Similarly in case of oil price hike, increase in import price of raw materials (such as chemicals), or import price of machinery, one can expect that farm owners will remain insulated to some extent. In case of Pakistan this in fact exhibits the low level of mechanized agriculture that prevails until today.

Impact on Poverty and Inequality (Microsimulation Results)

Our microsimulation results are given in Table 22. In line with the household welfare impacts explained above, poverty decreases in case of an increase in foreign savings (Sim-1), however increases sharply in case of import price changes. A surprising result is that poverty increases the most in case of overall import price increase (Sim-2) compared to import price increases for commodity groups[15]. This can be attributed to two effects that take place in Sim-2; a) highest decline in the wages of agricultural wage labour, b) lowest increase in wages of small farm labour (in comparison to import price changes of commodity groups). Given that Sim-2 has the worst impact on poverty levels, we may also see the province-wise poverty results for this experiment. Sindh province is regarded as the most industrially developed, and given its reliance on imports, this province faces the highest risk of increase in poverty. The head count ratio increases by 9.3 percent, followed by Baluchistan and Punjab provinces.

In case of an increase in foreign savings the highest decrease in poverty levels is witnessed for Punjab province (Table 22), which is home to 50 percent of the overall population and home to the largest proportion of people living below the poverty line. This evidence of redistribution can now be seen in the inequality results measured by percentile ratios, generalised entropy, and Atkinson class measures. The Gini coefficient in Sim-1 declines by 0.3 percent. If aversion to inequality is taken in to account then we see that Atkinson index shows a larger decline for the top end of the distribution. As the inequality aversion parameter increases beyond 0.5, there is lesser decline in Atkinson index (measured in percentage terms). We also compute the percentile ratios for the distribution of the post-shock incomes. The p90/p10 is the

---

[15] One expects a higher poverty-inducing effect of oil price changes, as established in our macroeconomic results.

decile ratio, p75/p25 relates to the middle part of the distribution and p90/p50 shows the dispersion at the upper tail. In Table 22 the largest decrease is in p90/p10 ratio, whereas the decrease is less than half of this at the middle part for the distribution.

6. CONCLUSION

The future scenario of Pakistan's current account problem depends on two fundamental issues; a) expansion in exports of dynamic goods, b) Reducing reliance on imported raw material / supplies that have a volatile trend in international markets. The achievement towards increasing the exports has been hampered in the past due to several reasons that include; decline in unit value of exports, adverse weather conditions (rice), competition with China, India and Bangladesh (textile), poor quality of cotton, increase in import price of prima cotton (used as input), less productive and outdated machinery in production process (manufacturing sector), no research and development investment towards achieving better economies of scale / higher value addition. Pakistani exports are not well-diversified due to which any change in world prices of cotton, leather, rice and synthetic textiles impacts the current account position.

On the side of imports, there has been an unprecedented increase due to the high economic growth in the past seven years. However increasing unit prices of imported commodities, mainly petroleum and machinery are now challenging the private sector's output. To maintain the imports at the existing level (particularly in case of petroleum requirements) the country has been forced to run a current account deficit. The rise in workers' remittances and foreign exchange reserves cannot keep pace with the increased world prices of inputs.

In this paper we studied the general equilibrium and micro-level impacts of; a) increase in foreign savings, b) increase in overall import price, c) increase in import price of petroleum, d) increase in import price of industrial raw material, and e) increase in import price of machinery.

Our main findings are:

> a. Amongst the abovementioned experiments, external oil price shocks have the highest potential to impact the socio-economy.

b. Import price changes in comparison to changes in foreign savings have an opposite effect at both micro and macro levels.

c. External price changes affect the agriculture sector prices relatively more than other sectors.

d. Changes in import price of petroleum affects export-oriented sectors such as cotton lint / yarn, relatively more than changes in overall import price, industrial raw material's price or machinery prices.

e. Import quantity of manufacturing sector (as a whole) are worst affected due to changes in import prices.

f. Given the similarity of intensities with which machinery and petroleum are being combined in the production process, both import price of machinery group and petroleum group have very similar potential to change the production and trade patterns.

g. Exports decline under both; increase in foreign savings, and increase in import prices.

h. Increase in foreign savings is pro-poor (at least in the short-term).

i. Poverty increases the most when overall import price increases. Inequality worsens the most when import price of petroleum increases.

j. An increase in foreign savings reduces poverty and highest decrease is seen in Punjab province (which is home to around 50 percent of Pakistan's population).

k. Poverty increases when import prices increase. Sindh province which is regarded as the most industrially developed (and consequently more reliant on foreign import of supplies) faces the highest rice of increase in poverty.

Pakistan cannot rely on foreign savings as a tool for poverty reduction in the medium to long run. It has to develop its industrial base to a level which is export-oriented and has the ability to sustain external short-term shocks. This is only possible if indigenous raw material resources are developed at costs that decrease with the

expansion in production scale. The use of oil in production of for example electricity generation can be avoided with timely development of alternate power sources. Export related activities need to be facilitated in the area of law and order stability, prudent management of exchange rates and government facilitation towards research and development initiatives. Furthermore an increase in foreign direct investment is urgently required in a) infrastructure sector, and b) export-oriented sectors.

7. TABLES AND FIGURES

Table 2 Fiscal Indicators of Pakistan

Year	GDP Growth	Fiscal Deficit	Total Revenue	Tax Revenue
	Percentage of GDP			
1991	5.4	8.8	16.9	12.7
1992	7.6	7.5	19.2	13.7
1993	2.1	8.1	18.1	13.4
1994	4.4	5.9	17.5	13.4
1995	5.1	5.6	17.3	13.8
1996	6.6	6.5	17.9	14.4
1997	1.7	6.4	15.8	13.4
1998	3.5	7.7	16.0	13.2
1999	4.2	6.1	15.9	13.3
2000	3.9	5.4	13.5	10.7
2001	1.8	4.3	13.3	10.6
2002	3.1	4.3	14.2	10.9
2003	4.7	3.7	14.9	11.5
2004	7.5	2.4	14.3	11.0
2005	8.6	3.3	13.7	10.0

*Source: Economic Survey (various issues)

Table 3 Combined Consumer Price Index by Groups (Base: 2001=100)

Period	General	Food	Textile	House Rent	Energy	T & C*	Medicare	Recreation
1995	65.48	67.24	67.64	66.19	49.20	59.17	69.61	61.37
1996	72.55	74.05	75.59	72.37	56.99	64.66	76.26	71.00
1997	81.11	82.86	82.82	79.71	64.10	73.43	86.10	80.49
1998	87.45	89.20	86.50	87.38	71.16	76.93	90.57	88.09
1999	92.46	94.46	92.27	93.21	80.95	76.98	92.02	92.20
2000	95.78	96.56	97.31	97.15	90.36	81.06	93.14	96.46
2001	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002	103.54	102.5	103.23	102.8	107.76	103.80	102.37	106.30
2003	106.75	105.4	106.75	103.8	118.39	105.29	105.59	107.21
2004	111.63	111.7	109.69	108.2	120.26	115.72	106.89	106.08
2005	121.98	125.7	112.98	120.4	128.46	120.18	107.94	105.93

*Transport & Communication
Source: i) Federal Bureau of Statistic, ii) Economic Survey 2006

Table 4 Exchange Rate Stability*

Period	US Dollar	Euro	UK Pound	Saudi Riyal	Japanese Yen
1998	43.19	-	71.14	11.52	0.341
1999	46.79	-	76.81	12.49	0.380
2000	51.77	-	82.49	13.81	0.481
2001	58.44	-	84.74	15.59	0.511
2002	61.43	54.99	88.57	16.38	0.488
2003	58.50	61.30	92.74	15.60	0.489
2004	57.57	68.62	100.17	15.35	0.520
2005	59.36	75.54	110.29	15.80	0.556

*Pak. Rupee in terms of one unit of foreign currency

Table 5 Balance of Payments (US $ million)

	1996	2000	2002	2005
1. Trade balance	-4604	-1412	-294	-4352
Exports	8311	8190	9140	14401
Imports	12915	9602	9434	18753
2. Services (net)	-3249	-2794	-2617	-5841
Receipts	2100	1501	2027	3837
Payments	5349	4295	4644	9678
Shipment	1045	802	809	1713
Investment Income	2137	2135	2430	2823
Others	2167	1358	1405	5142
3. Private unrequited transfers (net)	2378	3063	4249	8440
(Workers remittances)	(1461)	(983)	(2389)	(4168)
4. Current account balance	-5475	-1143	1338	-1753
5. Long term Capital (net)	2599	525	1280	2552
Private capital (net)	1534	277	-177	1221
Official capital (net)	1065	248	1457	1331
6. Basic balance	-2876	-618	2618	799
7. Errors and Omissions (net)	1096	-2282	961	-854
8. Balance requiring official financing	-880	-2900	3579	-55
9. Official assistances and debt relief	449	-996	-925	482
Medium and short run capital	341	-221	-334	147
Other short term assets	108	-775	-591	335
10. Exceptional financing	0	3966	138	-55
11. Change in reserves	431	-71	-2792	-372

*Source: Pakistan Economic Survey

Table 6 Commodity-based Trade

Period	Percentage growth		As Percent of GDP			
	Exports	**Imports**	**Exports**	**Imports**	**Trade Deficit**	**Current Account Deficit**
1970s	13.5	16.6	-	-	-	-
1980s	8.5	4.5	9.8	18.7	8.9	3.9
1990s	5.6	3.2	13.0	17.4	4.4	4.5
1981	19.6	14.5	10.0	19.8	9.8	3.7
1985	-7.9	0.3	7.9	19.3	11.4	5.4
1990	6.3	2.8	12.4	18.6	6.2	4.7
1994	-1.4	-13.6	12.9	16.8	3.9	3.8
1996	7.1	16.7	13.2	19.0	5.9	7.2
1997	-2.6	-6.4	13.0	18.0	5.0	6.2
1998	4.2	-8.4	13.6	16.6	3.0	3.1
1999	-10.7	-6.7	12.8	16.4	3.5	4.1
2000	8.8	-0.1	11.2	13.1	1.9	1.6
2001	9.1	6.2	12.5	14.3	1.8	0.7
2002	2.3	-7.5	12.7	13.2	0.4	+1.9
2003	19.1	20.1	13.2	13.7	0.5	+3.8
2004	13.8	20.1	12.9	14.2	1.3	+1.4
2005	14.3	-18.7	13.0	16.9	3.9	1.6
2006	11.4	29.7	9.4	16.0	6.6	3.7

Source: Pakistan Economic Survey

Table 7 Economic Classifications of Imports

Year	Percentage Share		Industrial Raw Material (% Share)	
	Capital Goods	**Consumer Goods**	**Capital Goods**	**Consumer Goods**
1971	52	11	11	26
1981	28	15	8	50
1991	33	16	7	44
1994	38	13	6	43
2001	25	14	6	55
2005	36	10	8	46

Source: Pakistan Economic Survey

Table 8 Unit Value Indices and Terms of Trade (Base Year 1990-91=100)

	Unit Value Indices		Terms of Trade
Year	Exports	Imports	
1991-92	119.9	131.9	90.9
1993-94	142.9	141.2	101.2
1995-96	185.4	185.5	99.9
1997-98	245.6	198.9	123.5
1998-99	258.4	223.3	115.7
1999-00	253.8	259.0	98.0
2000-01	271.5	298.4	91.0
2001-02	271.2	298.6	90.8
2002-03	254.0	309.5	82.1
2003-04	279.6	355.4	78.7
July – December			
2004-05	285.2	372.8	76.5
2005-06	296.1	446.0	66.4

Source: Federal Bureau of Statistics

Table 9 Major Contributors to Increase in Trade Deficit

	Absolute Increase ($ Million)	% Contribution
A. Trade Deficit in Jul – March 2004-05	4263.4	-
B. Trade Deficit in Jul – March 2005-06	8620.2	-
Absolute Increase in Trade Deficit (B – A)	4356.8	100.0
Major Contributors		
Petroleum Group	1809.2	41.5
Machinery Group	935.9	21.5
Consumer Durable	400.5	9.2
Raw Materials		
- Iron Steel and Scrap	520.8	12.0
- Fertilizer	213.2	4.9
- Chemical Products	200.1	4.6
- Plastic Materials	170.1	3.9
Other	107.0	2.4

Source: Federal Bureau of Statistics

Table 10 Foreign Reserves Accumulation in Pakistan ($ Million)

Year	Current Account Balance	Capital Account Balance	Overall Balance	Change in Reserves
2000	-217	-163	-380	-380
2001	326	400	726	+726
2002	2833	-116	2717	+2717
2003	4070	841	4911	+4911
2004	1811	-1389	422	+422
2005	-1409	925	-484	-484
Total	7414	498	7912	+7912

Calculations: Hussain (2005).

Table 11 Social Accounting Matrix for Pakistan 2001-02 (Dorosh *et al.* 2004)

	Activities	COM	Factors	HOU	ENT	GCUR	ROW	CAP	Total
Activities (ACT)	0	7,200,551	0	0	0	0	0	0	7,200,551
Commodities (COM)	3,823,453	0	0	2,698,992	0	408,939	677,840	534,113	8,143,337
Factors (FAC)	3,377,098	0	0	0	0	0	0	0	3,377,098
Households (HOU)	0	0	3,377,098	0	0	0	184,769	0	3,561,867
Enterprises (ENT)	0	0	0	0	0	0	0	0	0
Government GCUR)	0	251,633	0	146,152	0	0	0	0	397,785
Dom ind taxes	0	203,533							203,533
Import duties		48,100							48,100
Direct taxes				146,152					146,152
Rest of world (ROW)	0	691,153	0	0	0	0	0	0	691,153
Saving	0	0	0	716,723	0	-11,154	-171,456	0	534,113
Total	7,200,551	8,143,337	3,377,098	3,561,867	0	397,785	691,153	534,113	23,905,903

Table 12 Elasticities and Output Shares

	Armington Elasticity	CET Elasticity	Prod_e*	Share in Value Added	Value added/Output
Wheat irrigated	4.0	4.0	0.75	1.9	51.6
Wheat non_irrigated	-	-	0.75	0.1	53.0
Paddy IRRI	4.0	4.0	0.75	0.3	59.9
Paddy basmati	4.0	4.0	0.75	0.5	59.6
Cotton	4.0	4.0	0.75	1.4	61.8
Sugarcane	4.0	4.0	0.75	1.0	60.5
Other major crops	4.0	4.0	0.75	2.9	70.8
Fruits_ vegetables	4.0	4.0	0.75	3.6	64.5
Livestock_cattle_dairy	4.0	4.0	0.75	10.3	53.4
Poultry	4.0	4.0	0.75	0.7	49.0
Forestry	4.0	4.0	0.75	0.3	75.3
Fishing Industry	4.0	4.0	0.75	0.5	51.0
Mining	3.0	3.0	0.75	0.6	66.6
Vegetable oil	3.5	3.0	1.50	0.3	8.5
Wheat milling	3.5	3.0	1.50	1.2	21.3
Rice milling IRRI	3.5	3.0	1.50	0.2	27.6
Rice milling Basmati	3.5	3.0	1.50	0.5	27.3
Sugar	3.5	3.0	1.50	1.4	31.5
Other food	3.2	3.0	1.50	1.8	36.1
Cotton lint_yarn	3.2	3.0	1.50	1.5	21.4
Textiles	3.5	3.0	1.50	3.6	22.3
Leather	3.5	3.0	1.50	0.1	9.3
Wood products	3.5	3.0	0.50	0.7	34.5
Chemicals	3.0	3.0	0.50	0.5	27.5
Cement_bricks	3.5	3.0	0.50	1.4	53.0
Petroleum refining	3.0	3.0	0.50	0.6	19.8
Other manufacturing	3.2	3.0	0.50	2.6	25.3
Energy	3.0	3.0	0.50	3.4	60.2
Construction	3.2	3.0	1.50	3.2	41.1
Commerce	3.0	2.0	0.50	15.0	83.4
Transport	3.2	2.0	1.25	11.9	54.2
Housing	3.2	2.0	1.25	4.8	80.4
Private services	2.0	2.0	1.25	12.7	53.5
Public services	2.0	2.0	1.25	8.5	65.8

*Prod_e: Elasticity of substitution between factors - bottom of technology nest.

Prod_e_2: Elasticity of substitution between agg. factor & intermediate - top of tech nest = 0.6

Elasac: output aggregation elasticity = 4

Frisch   = - 2

Table 13 Macroeconomic Changes (% Change over base)

	BASE	Sim-1	Sim-2	Sim3	Sim-4	Sim-5
GDP (mp)*	3645	0.1	-0.4	-0.7	-0.5	-0.7
Private Consumption	3053	2.8	-3.5	-4.3	-2.7	-3.9
Real absorption (LCU at base prices)	4001	2.2	-2.7	-3.3	-2.1	-3.0
Real household consumption (LCU at base prices)	3053	2.8	-3.5	-4.3	-2.7	-3.9
Total real exports (LCU at base prices)	692	-6.5	-0.2	-1.8	-1.9	-1.8
Total real imports (LCU at base prices)	1054	3.7	-9.2	-11.2	-7.4	-10.4
Enterprise Income	798	-0.8	-2.2	-3.3	-2.5	-3.1
PPP real exchange rate (LCUs per FCU)	99	-4.0	7.8	8.4	4.5	7.5
Nominal exchange rate (LCUs per FCU)	102	-4.1	1.1		-0.7	-0.2
Imports price index (FCU -- 100 for base)	100		10.0	11.9	7.1	10.9
World (tradables) price index (FCU -- 100 for base)	100		6.0	7.2	4.3	6.6
Domestic (non-tradables) price index (100 for base)	103	-0.1	-0.6	-1.1	-0.9	-1.1
Terms of trade (ratio pwe index & pwm index) (100 for base)	100		-9.1	-10.7	-6.7	-9.8
Investment (% of nominal GDP)	14	-0.3	1.1	1.1	0.5	0.9
Private (household + enterprise) savings (% of nominal GDP)	16	-2.4	1.0	1.1	0.6	1.0
Foreign savings (% of nominal GDP)	5	2.0	0.2	0.2	0.1	0.1
Trade deficit (% of nominal GDP)	11	1.8	0.4	0.2		0.1
Government savings (% of nominal GDP)	-6	0.1	-0.2	-0.3	-0.2	-0.2
Tariff revenue (% of nominal GDP)	1			-0.2	-0.2	-0.2

*In real terms

**LCU: local currency unit, FCU: foreign currency unit.

***Sim-1: 50 percent increase in foreign savings, Sim-2: 10 percent increase in overall import prices, Sim-3: 10 percent increase in import price of petroleum, Sim-4: 10 percent increase in import price of industrial raw material, Sim-5: 10 percent increase in import price of machinery

Table 14 Changes in Prices

	Value Added Price (% Change from Base)						Output Price (% Change from Base)					
	Base	Sim1	Sim2	Sim3	Sim4	Sim5	Base*	Sim1	Sim2	Sim3	Sim4	Sim5
Wheat irrigated	1.01	-1.9	2.4	4.0	3.1	3.8	1.01	-1.8	2.7	3.9	2.7	3.6
Wheat non_irrigated	1.02	-3.0	3.5	3.7	2.1	3.3						
Paddy IRRI	1.01	-2.8	3.2	5.8	4.6	5.6	1.01	-2.3	3.2	5.0	3.7	4.7
Paddy basmati	1.01	-2.6	3.1	6.2	5.1	5.9	1.01	-2.2	3.2	5.3	4.0	5.0
Cotton	1.02	-3.3	3.4	6.2	4.9	5.9	1.01	-3.0	4.2	6.5	4.7	6.1
Sugarcane	1.02	-2.1	2.9	5.8	4.8	5.6	1.01	-2.0	3.2	5.5	4.2	5.2
Other major crops	1.02	-2.6	3.4	6.1	4.8	5.9	1.02	-2.1	2.8	4.9	3.8	4.7
Fruits_ vegetables	1.01	-2.5	3.5	7.9	6.7	7.7	1.02	-1.7	2.1	4.9	4.2	4.8
Livestock_cattle_dair	0.99	4.5	-4.8	-5.1	-2.7	-4.5	1.00	2.0	-2.5	-2.3	-1.0	-2.0
Poultry	0.99	5.4	-6.8	-7.7	-4.5	-7.0	1.01	2.2	-3.1	-3.0	-1.6	-2.7
Forestry	1.02	-3.9	4.4	3.2	1.1	2.8	1.02	-3.3	3.9	2.9	1.1	2.5
Fishing Industry	1.04	-3.1	-0.2	-1.4	-1.4	-1.4	1.01	-2.0	0.1	-0.8	-0.9	-0.8
Mining	1.05	-5.4	10.8	7.2	2.1	6.1	1.03	-4.0	7.8	5.1	1.4	4.3
Vegetable oil	1.19	0.5	5.7	43.9	44.4	44.1	0.99	-0.8	1.3	6.3	6.1	6.3
Wheat milling	1.04	5.4	-8.8	-13	-9.1	-12	1.02	0.3	-0.8	-1.4	-1.0	-1.3
Rice milling IRRI	1.06	-3.4	-3.4	-7.2	-6.0	-7.0	1.02	-2.0	0.0	-0.6	-0.7	-0.7
Rice milling Basmati	1.04	-0.7	-5.5	-9.7	-7.5	-9.2	1.02	-1.2	-0.6	-1.1	-0.9	-1.0
Sugar	1.11	4.3	-7.3	-10	-7.0	-9.5	1.05	0.9	-2.2	-2.9	-1.9	-2.7
Other food	1.18	-5.8	2.2	1.3	0.2	1.0	1.05	-2.7	0.8	0.5	0.1	0.4
Cotton lint_yarn	1.14	-7.1	-1.0	-4.3	-4.1	-4.3	1.01	-3.5	1.8	1.5	0.6	1.3
Textiles	1.09	-4.7	-2.2	-3.7	-2.8	-3.5	1.01	-2.5	0.6	-0.1	-0.5	-0.2
Leather	1.02	-10	3.0	1.8	0.4	1.5	1.02	-0.5	-0.6	-1.0	-0.7	-0.9
Wood products	1.08	-4.6	7.5	5.1	1.5	4.3	1.04	-2.7	4.4	2.9	0.8	2.4
Chemicals	1.09	-4.7	7.5	12.3	8.3	11.4	1.02	-2.8	5.3	6.3	3.6	5.7
Cement_bricks	1.27	4.5	-8.2	-9.7	-6.0	-8.9	1.12	1.9	-3.2	-4.8	-3.5	-4.5
Petroleum refining	1.23	-3.9	10.6	10.9	5.8	9.8	1.01	-2.6	6.1	4.5	1.5	3.8
Other manufacturing	1.10	-6.9	5.0	4.4	1.7	3.8	1.02	-3.5	4.9	4.2	1.7	3.6
Energy	1.11	0.2	-4.3	-5.8	-3.9	-5.4	1.03	-0.7	-1.0	-2.6	-2.3	-2.5
Construction	1.09	-0.2	-3.2	-4.5	-3.1	-4.2	1.00	-0.6	0.1	-1.1	-1.3	-1.1
Commerce	1.08	0.3	-3.3	-4.2	-2.8	-3.9	1.07	0.4	-3.0	-4.0	-2.7	-3.7
Transport	1.10	0.9	-5.5	-6.9	-4.5	-6.3	1.00	-0.5	-0.5	-1.8	-1.7	-1.8
Housing	1.01	6.9	-8.9	-12	-7.7	-11	1.01	5.5	-7.1	-9.5	-6.4	-8.8
Private services	1.06	0.8	-3.1	-4.7	-3.4	-4.4	1.04	0.5	-1.8	-3.3	-2.5	-3.1
Public services	1.09	-0.8	-2.8	-4.1	-2.9	-3.8	1.06	-0.8	-1.5	-2.7	-2.2	-2.6

*Represents average output price.

Table 15 Factor Wages / Returns (% Change from Base)

	BASE	Sim-1	Sim-2	Sim-3	Sim-4	Sim-5
Labor_large farm	1.02	-3.1	3.5	4.9	3.5	4.6
Labor_medium farm_Sindh	1.02	-3.1	3.8	6.0	4.5	5.7
Labor_medium farm_Punjab	1.02	-3.3	3.8	6.5	5.0	6.2
Labor_medium farm_Other Pakistan	1.01	-2.2	2.7	3.5	2.4	3.3
Labor_small farm_Sindh	1.02	-3.1	3.6	6.3	4.9	6.0
Labor_small farm_Punjab	1.02	-2.8	3.5	6.7	5.4	6.4
Labor_small farm_Other Pakistan	1.01	-2.7	4.0	6.7	5.1	6.4
Labor_agricultural wage	1.00	1.5	-1.9	-1.5	-0.5	-1.3
Labor_non_agricultural wage unskilled	1.08	0.5	-3.7	-4.9	-3.3	-4.5
Labor_non_agricultural wage skilled	1.09	-0.8	-2.8	-4.1	-2.9	-3.8
Land_large farm_Sindh	1.02	-2.4	2.7	4.5	3.5	4.3
Land_large farm_Punjab	1.02	-3.0	3.6	5.5	4.0	5.2
Land_large farm_Other Pakistan	1.02	-3.6	3.7	2.6	0.8	2.2
Land_irrigated_medium farm_Sindh	1.02	-2.8	3.7	6.6	5.2	6.3
Land_irrigated_medium farm_Punjab	1.02	-2.9	3.5	7.2	5.9	6.9
Land_irrigated_medium farm_Other Pakistan	1.01	-2.0	2.7	4.6	3.6	4.4
Land_irrigated_small farm_Sindh	1.02	-2.8	3.6	7.3	6.0	7.0
Land_irrigated_small farm_Punjab	1.01	-2.6	3.5	7.9	6.7	7.7
Land_irrigated_small farm_Other Pakistan	1.01	-2.4	3.9	7.9	6.5	7.6
Land_non_irrigated_small farm_Sindh	1.02	-4.4	5.1	2.7	0.1	2.1
Land_non_irrigated_small farm_Punjab	1.02	-4.2	4.9	2.7	0.3	2.2
Land_non_irrigated_small farm_Other Pakistan	1.02	-5.2	5.9	2.5	-0.5	1.8

Table 16 Quantity of Value Added (% Change from Base)

	BASE	Sim-1	Sim-2	Sim-3	Sim-4	Sim-5
Wheat irrigated	63	0.7	-1.0	-2.6	-2.3	-2.6
Wheat non_irrigated	4	2.5	-2.1	-0.1	1.1	0.2
Paddy IRRI	9	-0.8	-0.1	-0.9	-0.9	-0.9
Paddy basmati	17	-0.1	-0.8	-1.9	-1.6	-1.8
Cotton	49	-2.7	0.8	0.1	-0.3	0.0
Sugarcane	35	1.8	-1.6	-2.2	-1.5	-2.1
Other major crops	96	-0.5	1.0	0.4	-0.2	0.3
Fruits_ vegetables	123	0.2	0.6	2.9	2.9	2.9
Livestock_cattle_dair	347	0.3	-0.3	-0.3	-0.2	-0.3
Poultry	24	0.4	-0.5	-0.6	-0.4	-0.6
Forestry	10	-1.8	1.7	-0.7	-1.7	-0.9
Fishing Industry	18	-1.5	0.6	0.0	-0.3	0.0
Mining	20	-1.2	3.0	2.5	1.2	2.2
Vegetable oil	9	0.2	2.9	15.8	15.3	15.7
Wheat milling	40	2.0	-2.0	-3.1	-2.2	-2.9
Rice milling IRRI	8	-1.5	-0.1	-1.4	-1.4	-1.4
Rice milling Basmati	16	-0.2	-1.0	-2.4	-2.0	-2.3
Sugar	48	2.3	-2.1	-2.9	-1.9	-2.6
Other food	60	-1.9	1.9	2.0	1.1	1.8
Cotton lint_yarn	49	-3.1	0.9	0.0	-0.6	-0.2
Textiles	121	-2.4	0.5	0.3	0.1	0.3
Leather	4	-6.1	4.1	4.2	2.3	3.8
Wood products	22	-1.2	2.8	2.6	1.3	2.3
Chemicals	17	-1.2	2.7	4.2	2.9	3.9
Cement_bricks	49	0.6	-0.7	-0.7	-0.4	-0.7
Petroleum refining	21	-1.2	4.4	4.9	2.9	4.5
Other manufacturing	86	-2.3	2.8	3.0	1.7	2.7
Energy	115	0.2	-0.3	-0.4	-0.2	-0.3
Construction	106	0.0	0.0	0.0	0.0	0.0
Commerce	506	0.0	0.3	0.6	0.5	0.6
Transport	401	0.6	-1.7	-1.9	-1.1	-1.7
Housing	162					
Private services	426	0.5	0.3	0.0	-0.2	0.0
Public services	285	0.6	-0.5	-0.5	-0.3	-0.5

Table 17 Quantity of Imports (% Change from Base)

	BASE	Sim1	Sim2	Sim3	Sim4	Sim5
Wheat Irrigated	2.9	11.9	-27.6	-13.4	1.4	-10.3
Other major crop	6.2	8.6	-25.8	-7.2	7.9	-4.0
Fruits/Veg	17.2	11.3	-28.2	-64.0	-57.2	-62.6
Cattle	7.0	28.6	-41.0	-42.8	-26.3	-39.5
Forestry	2.9	3.9	-17.8	-10.3	-1.6	-8.4
Fishery	0.2	12.9	-35.6	-28.2	-11.7	-24.8
Mining	98.3	-0.4	0.4	1.0	0.8	1.0
Vegetable Oil	32.6	13.1	-25.7	-68.5	-62.8	-67.3
Wheat non-irrigated	8.5	20.2	-34.5	-27.9	-12.0	-24.7
Sugar	3.4	22.5	-37.5	-31.4	-14.4	-28.0
Other food	16.0	10.5	-26.8	-39.2	-29.3	-37.2
Cotton Yarn/Lint	7.3	0.2	-22.5	-13.4	-2.3	-11.1
Textile	18.2	11.2	-30.9	-51.8	-42.4	-49.9
Leather	1.7	20.3	-33.8	-57.0	-47.4	-55.0
Wood	6.3	4.1	-17.5	-11.3	-3.0	-9.5
Chemical	122.6	4.6	-9.3	-12.4	-8.4	-11.5
Petroleum refining	104.6	3.8	-9.2	-10.1	-5.9	-9.2
Other manufacturing	571.0	1.8	-5.7	-6.2	-3.6	-5.6
Commerce	2.7	14.9	-33.5	-27.9	-12.7	-24.8
Private services	52.5	10.4	-21.7	-18.7	-8.8	-16.6

Table 18 Quantity of Exports (% Change from Base)

	BASE	Sim1	Sim2	Sim3	Sim4	Sim5
Wheat Irrigated	4.9	-8.6	-7.1	-16.3	-14.3	-15.9
Other major crop	3.8	-8.4	-5.8	-17.2	-16.2	-17.0
Fruits/Veg	7.3	-9.2	-3.5	-15.2	-15.1	-15.3
Cattle	0.6	-21.8	15.1	9.2	1.2	7.3
Poultry	0.2	-22.2	17.7	12.2	3.3	10.2
Forestry	3.1	-5.2	-8.9	-11.7	-8.3	-11.0
Fishery	8.2	-9.8	4.7	3.2	0.6	2.6
Mining	5.2	-1.6	-15.0	-11.8	-4.9	-10.3
Vegetable Oil	0.2	-9.6	2.2	-3.7	-5.5	-4.2
Wheat Milling	3.6	-11.0	3.8	0.9	-1.1	0.5
Rice milling Irri	10.4	-7.9	3.2	0.5	-1.3	0.0
Rice milling basmati	14.8	-8.9	3.9	0.8	-1.4	0.3
Sugar	0.3	-12.4	8.1	5.9	1.8	5.0
Other food	76.1	-6.2	2.8	0.5	-1.1	0.1
Yarn / Lint	62.8	-4.8	-1.3	-4.4	-4.1	-4.4
Textile	217.9	-7.2	2.0	0.6	-0.5	0.4
Leather	13.6	-16.0	9.3	7.3	2.5	6.2
Wood	0.4	-5.5	-6.6	-5.9	-3.0	-5.3
Chemical	9.4	-5.2	-9.0	-13.4	-9.4	-12.6
Cement	0.3	-16.2	13.2	15.0	8.5	13.6
Other manufacturing	111.7	-4.3	-8.0	-8.9	-5.3	-8.1
Commerce	0.6	-8.7	9.0	9.2	4.7	8.2
Transport	122.2	-6.6	1.5	1.8	1.0	1.6
Private Services	0.3	-8.5	6.3	6.8	3.7	6.1

Table 19 Household Income (% Change from Base)

	BASE	Sim-1	Sim-2	Sim-3	Sim-4	Sim-5
Large Farmers_Sindh	23	-1.1	1.0	2.4	2.2	2.4
Large Farmers_Punjab	68	-0.7	0.3	1.3	1.3	1.3
Large Farmers_Other Pakistan	14	-0.1	-0.2	-0.1	0.1	0.0
Medium Farmers_Sindh	48	-0.6	0.5	2.0	1.9	2.0
Medium Farmers_Punjab	151	-0.3	-0.8	0.0	0.5	0.1
Medium Farmers_Other Pakistan	39	-0.7	0.5	1.5	1.4	1.5
Small Farmers_Sindh	61	1.1	-1.7	-1.1	-0.2	-0.9
Small Farmers_Punjab	323	0.5	-1.6	-1.1	-0.2	-0.9
Small Farmers_Other Pakistan	129	1.2	-2.4	-2.6	-1.4	-2.3
Small Farm Renters_landless_Sindh	47	1.0	-1.5	-0.8	0.0	-0.6
Small Farm Renters_landless_Punjab	50	0.4	-1.7	-1.4	-0.5	-1.2
Small Farm Renters_landeless_Other Pakistan	19	1.0	-1.7	-1.4	-0.5	-1.2
Rural agricultural workers_landless_Sindh	24	1.7	-3.2	-3.7	-2.2	-3.4
Rural agricultural workers_landless_Punjab	72	1.4	-3.3	-4.0	-2.4	-3.6
Rural agricultural workers_landess_Other Pakistan	12	3.0	-4.0	-4.5	-2.5	-4.0
Rural non_farm non_poor	423	0.7	-3.7	-5.1	-3.4	-4.7
Rural non_farm poor	143	1.0	-3.9	-5.2	-3.5	-4.8
Urban non_poor	1830	0.3	-3.0	-4.2	-3.0	-4.0
Urban Poor	194	0.4	-3.5	-4.8	-3.2	-4.5

Table 20 Household Consumption Expenditure (% Change from Base)

	BASE	Sim-1	Sim-2	Sim-3	Sim-4	Sim-5
Large Farmers_Sindh	20	1.2	0.0	1.3	1.5	1.4
Large Farmers_Punjab	59	1.6	-0.8	0.2	0.7	0.3
Large Farmers_Other Pakistan	13	2.3	-1.2	-1.2	-0.5	-1.0
Medium Farmers_Sindh	44	1.7	-0.5	0.9	1.3	1.0
Medium Farmers_Punjab	137	1.9	-1.7	-1.0	-0.1	-0.8
Medium Farmers_Other Pakistan	36	1.5	-0.4	0.4	0.8	0.5
Small Farmers_Sindh	55	3.4	-2.6	-2.2	-0.8	-1.9
Small Farmers_Punjab	293	2.8	-2.6	-2.1	-0.8	-1.8
Small Farmers_Other Pakistan	117	3.5	-3.4	-3.6	-2.0	-3.3
Small Farm Renters_landless_Sindh	42	3.3	-2.4	-1.9	-0.6	-1.6
Small Farm Renters_landless_Punjab	46	2.7	-2.7	-2.4	-1.1	-2.1
Small Farm Renters_landeless_Other Pakistan	17	3.3	-2.6	-2.4	-1.1	-2.1
Rural agricultural workers_landless_Sindh	22	4.0	-4.1	-4.8	-2.8	-4.3
Rural agricultural workers_landless_Punjab	65	3.7	-4.2	-5.0	-3.0	-4.5
Rural agricultural workers_landess_Other Pakistan	11	5.4	-4.9	-5.5	-3.1	-5.0
Rural non_farm non_poor	363	3.2	-4.7	-6.1	-4.0	-5.7
Rural non_farm poor	130	3.3	-4.8	-6.2	-4.1	-5.7
Urban non_poor	1407	2.7	-4.0	-5.3	-3.6	-5.0
Urban Poor	176	2.7	-4.5	-5.8	-3.8	-5.4

Table 21 Equivalent and Compensating Variation

	EV						CV				
	BASE*	Sim1	Sim2	Sim3	Sim4	Sim5	Sim1	Sim2	Sim3	Sim4	Sim5
Large Farmers_Sindh	20	1.5	-0.2	1.1	1.4	1.2	0.3	0.0	0.2	0.3	0.2
Large Farmers_Punjab	59	1.8	-1.1	-0.2	0.5		1.1	-0.7	-0.1	0.3	0.0
Large Farmers_Other Pakistan	13	2.7	-1.9	-1.9	-0.9	-1.6	0.3	-0.2	-0.2	-0.1	-0.2
Medium Farmers_Sindh	44	1.8	-0.6	0.8	1.3	0.9	0.8	-0.3	0.4	0.6	0.4
Medium Farmers_Punjab	138	2.1	-2.1	-1.4	-0.3	-1.1	2.9	-2.9	-1.9	-0.4	-1.6
Medium Farmers_Other Pakistan	36	1.9	-1.1	-0.2	0.4	-0.1	0.7	-0.4	-0.1	0.2	0.0
Small Farmers_Sindh	55	3.5	-2.5	-2.0	-0.7	-1.7	1.9	-1.4	-1.1	-0.4	-0.9
Small Farmers_Punjab	293	2.7	-2.3	-1.9	-0.7	-1.6	7.9	-6.7	-5.5	-2.1	-4.7
Small Farmers_Other Pakistan	117	3.5	-3.1	-3.4	-1.9	-3.0	4.0	-3.6	-3.9	-2.2	-3.6
Small Farm Renters_landless_Sindh	42	3.3	-1.9	-1.4	-0.4	-1.2	1.4	-0.8	-0.6	-0.2	-0.5
Small Farm Renters_landless_Punjab	46	2.7	-2.5	-2.4	-1.1	-2.1	1.2	-1.2	-1.1	-0.5	-1.0
Small Farm Renters_landeless_Other Pakistan	17	3.5	-2.8	-2.6	-1.3	-2.3	0.6	-0.5	-0.4	-0.2	-0.4
Rural agricultural workers_landless_Sindh	22	3.9	-3.7	-4.3	-2.6	-4.0	0.9	-0.8	-0.9	-0.6	-0.9
Rural agricultural workers_landless_Punjab	65	3.6	-3.7	-4.5	-2.8	-4.2	2.3	-2.4	-3.0	-1.9	-2.7
Rural agricultural workers_landess_Other Pakistan	11	5.5	-5.0	-5.6	-3.2	-5.1	0.6	-0.6	-0.6	-0.4	-0.6
Rural non_farm non_poor	363	3.2	-4.7	-6.1	-4.1	-5.7	11.7	-17.2	-22.3	-14.8	-20.7
Rural non_farm poor	130	3.3	-4.5	-6.0	-4.0	-5.5	4.3	-5.8	-7.8	-5.2	-7.2
Urban non_poor	1407	2.7	-4.0	-5.2	-3.6	-4.9	38.2	-55.9	-73.9	-50.0	-68.8
Urban Poor	176	2.6	-4.1	-5.5	-3.7	-5.1	4.6	-7.3	-9.7	-6.5	-9.0
Total	3053	2.8	-3.5	-4.3	-2.8	-4.0	86	-109	-133	-84	-122

*Only represents base for EV.

45

Table 22 Poverty and Inequality Results (% Change from Base)

	Sim-1	Sim-2	Sim-3	Sim-4	Sim-5
Poverty Indices					
Overall Pakistan					
FGT (0)*	-3.683	5.632	4.054	3.426	4.597
FGT (1)	-2.955	6.136	5.008	4.060	6.000
FGT (2)	-2.794	5.633	4.597	3.695	5.498
Punjab Province					
FGT (0)	-3.258	4.284	2.844	2.559	3.548
FGT (1)	-1.484	3.185	2.613	2.232	3.185
FGT (2)	-0.894	1.899	1.583	1.341	1.918
Sindh Province					
FGT (0)	-2.843	9.342	8.250	6.345	8.250
FGT (1)	-3.694	6.905	6.081	4.177	6.650
FGT (2)	-2.908	5.102	4.541	3.061	4.898
NWFP Province					
FGT (0)	-2.701	1.897	1.089	1.031	1.297
FGT (1)	-1.214	2.715	2.045	1.752	2.571
FGT (2)	-0.957	1.987	1.504	1.263	1.882
Baluchistan Province					
FGT (0)	-0.687	5.968	0.558	0.558	1.488
FGT (1)	-1.270	2.304	1.881	1.458	2.187
FGT (2)	-0.512	1.052	0.863	0.674	0.998
Inequality Measures					
Gini coefficient	-0.322	0.314	0.382	0.158	0.314
Relative mean deviation	-0.324	0.342	0.416	0.169	0.342
Coefficient of variation	-0.300	0.366	0.428	0.189	0.362
Standard deviation of logs	-0.350	0.067	0.162	-0.045	0.083
GE (1)	-0.574	0.611	0.726	0.312	0.611
GE(0)	-0.649	0.467	0.618	0.186	0.478
GE(-1)	-0.835	-0.469	-0.231	-0.697	-0.428
GE(2)	-0.600	0.732	0.857	0.378	0.726
Percentile Ratios					
p90/p10	-1.005	0.060	0.502	-0.100	0.000
p90/p50	-0.220	0.309	0.265	0.309	0.309
p10/p50	0.658	0.219	-0.219	0.439	0.219
p75/p25	-0.228	0.913	0.913	0.639	0.958
p75/p50	0.000	0.874	0.336	0.672	0.874
p25/p50	0.147	0.000	-0.589	0.000	-0.147
Atkinson Measure					
A(0.5)	-0.579	0.532	0.657	0.258	0.539
A(1)	-0.570	0.410	0.539	0.164	0.419
A(2)	-0.470	-0.265	-0.130	-0.395	-0.242

*FGT (0) : Headcount Ratio (proportion poor), FGT(1): average normalised poverty gap, FGT(2): average squared normalised poverty gap.

8. REFERENCES

Adams R. H. (1995), "Sources of Income Inequality and Poverty in Rural Pakistan". Research Report 102, IFPRI, Washington D.C.

Adelman I., and S. Robinson (1978), "Income Distribution in Developing Countries: A Case Study of Korea". Oxford University Press, 1978.

Ahmed, V. and C. O' Donoghue (2007) "Linking CGE and Microsimulation Model for Pakistan: A Computational Analysis of PRISM", Working Paper, Department of Economics, National University of Ireland, Galway.

Alatas V. and Bourguignon F. (2000), "The Evolution of the Distribution of Income During Indonesian Fast Growth: 1980 – 1996", Mimeo. Princeton University.

Bourguignon F., Ferreira F. and Lustig N. (1998), "The Microeconomics of Income Distribution Dynamics, A Research Proposal", The Inter-American Development Bank and the World Bank, Washington.

Bourguignon F., Fournier M. and Gurgand M. (2001), "Fast Development with a Stable Income Distribution: Taiwan, 1979 – 1994", Review of Income and Wealth, 47(2), pp. 139-163.

Bourguignon F., Robilliard, A-S. and Robinson, S. (2003), "Representative versus Real Households in the Macro-Economic Modelling of Inequality", Document de Travail 2003-10, DIAL.

Bussolo, M. and J. Lay (2003) "Globalization and Poverty Changes in Colombia". OECD Development Center Working paper no. 226.

Coady, D.P. and R. Lee Harris (2004) "Evaluating Targeted Cash Transfer Programs: A General Equilibrium Framework with an Application to Mexico". International Food Policy Research Institute, Research Report 137.

Dervis, K., J. de Melo, and S. Robinson (1982), "General equilibrium models for development policy", New York: Cambridge University Press.

Dorosh, P., M. K. Niazi, H. Nazli (2004), "A Social Accounting Matrix for Pakistan, 2001-02: Methodology and Results", a background research paper for the Pakistan Rural Factor Markets Study, World Bank, South Asia Rural Development Unit, 2004.

Go, D. S. (1991) "External Shocks, Adjustment Policies, and Investment: Illustrations from a Forward-Looking CGE Model of the Philippines". WPS 737, World Bank 1991.

GoP (2004) "Trade Policy of Pakistan 2003-04", Issued by Ministry of Commerce in Islamabad, 2004, http://www.phdeb.org.pk/download/TradePolicy2003-04.pdf.

Hérault, N. (2006) "Building and Linking a Microsimulation Model to a CGE Model for South Africa", South African Journal of Economics, Vol. 74-03.

ILO (1996) "Wage Workers in Agriculture: Conditions of Employment and Work". International Labour Office, Geneva, 1996.

Khan, M.Z. (2005) "Pakistan's share only 0.06pc: Services sector", Article published in the daily Dawn, July 15, 2005.

Lofgren, H., R. Lee Harris, S. Robinson, M. Thomas, M. El-Said, (2002) "A Standard Computable General Equilibrium Model in GAMS", Microcomputers in Policy Research 5, International Food Policy Research Institute, Washington D.C. 2002.

Robilliard, A.-S., F. Bourguignon and S. Robinson (2001) "Crisis and Income Distribution: A Micro-Macro Model for Indonesia". Paper presented at the OECD Development Centre Conference, 9-10 December 2002, Paris, France.

Robinson, Sherman and Moataz El-Said (2000) "GAMS Code for Estimating a Social Accounting Matrix (SAM) Using Cross Entropy Methods (CE)" Discussion Paper 64, Trade and Macroeconomics Division, IFPRI, December 2000.

Saeed, K.A., (2005) "Economy of Pakistan", 2005 Edition, Lahore, Pakistan.

Voyvoda, E. and E. Yeldan (2005) "Turkish Macroeconomics under the IMF Program: Strangulation of the Twin-Targets, Lopsided Growth and Persistent Fragilities". Paper presented at the 9th Congress of the Turkish Social Sciences Association, December 2005, Ankara.