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“La crisi dei prezzi e i Paesi in via di sviluppo: un’analisi degli impatti”

AGRICULTURE REFORM AND FOOD CRISIS IN SYRIA: IMPACTS ON POVERTY AND INEQUALITY

Benedetto Rocchi*, Donato Romano*, and Raid Hamza†

*DiPSA, University of Florence, Italy
†National Agricultural Policy Center, Damascus, Syria

Abstract: Il paper utilizza una matrice di contabilità sociale (SAM) appositamente stimata per l’economia siriana con riferimento al 2004 per analizzare (i) l’effetto delle riforme di liberalizzazione intraprese dalla fine degli anni ’90 dal governo siriano e (ii) il potenziale impatto della crisi finanziaria e dell’instabilità dei prezzi internazionali delle principali commodities agricole sulla distribuzione del reddito e sui livelli di povertà. Il modello lineare del tipo fixed price (Pyatt and Round, 1979) è costruito a partire da una SAM dell’economia siriana opportunamente disaggregata al fine di rappresentare appropriatamente il settore agricolo (31 merci e 28 settori produttivi) ed il settore istituzionale delle famiglie (disaggregato per decili di reddito pro-capite equivalente e per residenza dell’ambito rurale o urbano).


I risultati consentono una valutazione degli effetti redistributivi (Roland Holst and Sancho, 1992) e dell’impatto sui livelli di povertà (Pyatt and Round, 2006), che mostrano come il maggior impatto della crisi è sostenuto dalle famiglie rurali.

Keywords: social accounting matrix, policy impact simulations, multipliers, Syria.

JEL codes: D57, O18, O53, R15.
1. Introduction

The commodity price spikes of 2007-2008 and the recent financial and economic crisis of 2008-2009 have heavily affected people’s lives all over the world. However those impacts are quite differentiated according to the level of poverty and livelihood strategy of a given household. As a result any study aiming at estimating the impacts of those changes in the economic scenario is required to adopt an estimation framework suitable to capture the transmission mechanisms of those shocks to different income and livelihood groups. This is particularly true for rural people, whose livelihood is characterized by a variety of source of living and whose income level can be very different from each other, especially in middle income countries, i.e. countries that are already on their own way towards modernization and differentiation of the economic structure. In such contexts the cross-sectoral and multi-occupational diversity of rural livelihoods is the cornerstone of any intervention aiming at mitigating the impacts of such economic downturns as well as of any rural development policy.

A suitable model for this exercise is the social accounting matrix (SAM), that is “a comprehensive, flexible and disaggregated framework that elaborates and articulates the generation of income by activities of production and the distribution and redistribution of income between social and institutional group” (Round, 2003: 162). Generally speaking the flexibility of the SAM accounting framework enables the researcher to choose the proper level of disaggregation, according to the research question to be addressed.\(^1\) Specifically, the SAM approach seems fairly effective in taking into account important features of rural economies, such as the diversification of production activities or the presence of social groups with alternative livelihood strategies. Moreover, once a SAM has been constructed, it can be used to simulate also the impacts of any policy intervention, both sectoral and economy-wide as long as they can be modeled as an exogenous shock.

Syria is an ideal case study for this kind of analysis. It is a lower-middle income country (GNIpc = 2,160 USD in 2008) with a quite diversified economic system and a rural economy characterized by agricultural as well as non-agricultural activities (NAPC, 2007). The income distribution in the country is relatively unequal: on 2003-2004 with a Gini index of expenditure equal to 0.374 the bottom 20% of population consumed only 7.24% of Syria total expenditure, while the richest 20% consumed more than 40%. The poverty headcount ranges between one tenth and one third of population (according to the extreme or standard poverty line, respectively), but with significant differences across regions (El Laithy and Abu-Ismail, 2005). Moreover, the country has already entered a process of economic reform since the 90s, which aims at transforming what used to be a centrally planned economy into a so-called “social market economy”, i.e. a market economy characterized by an active role of the Government of Syria. Last but not least, a social accounting matrix of Syrian economy with a proper disaggregation of production activities and institutional sectors is already available (NAPC, 2008) and can be used as a basis for modelling agricultural policy reform both at the sectoral and at the economy-wide level.

The overall objective of this paper is to assess the impacts on poverty and inequality of policy reform (namely, agricultural policy reforms), commodity price volatility and financial and economic crisis, with specific reference to rural households. The paper is organized as

\(^1\) All the same the construction of a SAM is often an extremely data-demanding exercise, especially if regional disaggregation of accounts is attempted (as in the rural-urban case). Therefore, the construction of a SAM can be attempted only where suitable data are available at a reasonable cost.
follows. Section 2 provides some background info on the Syrian economy and recent economic developments. Section 3 describes data sources. Section 4 recalls the theoretical framework of SAM modelling and simulations, whose hypotheses are described in the policy scenario section (section 5). The results of policy simulations are reported in section 6, that are discussed in section 7.

2. Background and Recent Economic Development

Syria is a lower-middle income country (World Bank, 2010) whose 20.6 million population had on average an annual income of 2,160 US$ in 2008 (4,490 US$ in PPP, Table 1). Between 1960 and the turn of the century, the Syrian Arab Republic has experienced a fairly high rate of growth (4.6 percent per year), which however did not exceed much the population growth rate (3.3 percent per year) over the same period (NAPC, 2003). Over the last decade the economy of Syria has been growing at a healthy pace: during the period 2000-08 on average GDP grew by 4.4 percent annually while population growth rate was 3.1 percent per year. By international comparisons, these are very satisfactory figures and suggest a continuous process of real income growth for the average Syrian.

The national absolute poverty declined from 14.3 percent in 1996-97 to 11.39 percent in 2003-04 (El Laithy and Abu-Ismail, 2005). Over the same period in rural areas overall poverty declined from 22.6 to 11.1 percent (despite a 2% increase in Northern-eastern region), while in urban areas, poverty declined from 14.8 to 9.0 percent. Most of the poor (61.2 percent) are living in rural areas. The Syrian poverty profile also reveals strong regional disparities in the distribution of poverty.

Inequality in Syria remains unfair. The unequal distribution of growth in per-capita expenditure leaded to an increase in the Gini coefficient from 0.337 to 0.374 in the period between 1996-97 and 2003-04. Only in Rural Southern and Urban Coastal regions the growth experienced in the considered period resulted in a less unequal distribution.

<table>
<thead>
<tr>
<th>Table 1. Syria selected indicators, 2008</th>
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<tbody>
<tr>
<td>Land area (sq. km) (thousands)</td>
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<tr>
<td>Population, total (millions)</td>
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<tr>
<td>Population growth (annual %)</td>
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<tr>
<td>GDP (current US$) (billions)</td>
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<tr>
<td>GDP growth (annual %)</td>
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<td>Inflation, consumer prices (annual %)</td>
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<tr>
<td>Agriculture, value added (% of GDP)</td>
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<td>Unemployment, total (% of total labor force)</td>
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<td>Merchandise trade (% of GDP)</td>
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<td>GNI, Atlas method (current US$) (billions)</td>
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<td>GNI per capita, Atlas method (current US$)</td>
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<td>GNI, PPP (current international $) (billions)</td>
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<td>GNI per capita, PPP (current international $)</td>
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<tr>
<td>Life expectancy at birth, total (years)</td>
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<tr>
<td>Mortality rate, under-5 (per 1,000)</td>
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<td>Fertility rate, total (births per woman)</td>
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<td>Literacy rate, adult total (% of people ages 15 and above)</td>
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</table>

*Year 2003.

Source: World Development Indicators 2010a.
The dynamics of GDP per capita has been influenced over the last decades mainly by the performances of the oil sector and agriculture.\textsuperscript{2} In fact, until relatively recently agriculture has been Syria’s main industry. However, beginning in the seventies, trade followed by mining and to a lesser extent industry, started to grow at higher rates than agriculture. Nevertheless, agriculture continues to be an important sector of the Syrian economy, still contributing one fifth to country’s GDP in 2008. Furthermore, agriculture plays a strategic role in generating foreign exchange, or saving foreign exchange via import substitution, as well as for implementing domestic welfare policy, especially as it concerns food subsidies.\textsuperscript{3}

Syria’s growth performance has strengthened in recent years, reflecting the hitherto favorable external environment for oil-producing countries as well as the country’s own reform efforts. In fact, despite a long period of political stability since seventies, the new globalization drive, regional competition for access to global markets, and internal socio-economic challenges prompted a debate within the government to initiate drastic economic reforms. The dominant factor of change in the macroeconomic context has been the steady evolution of the planning system towards greater openness and flexibility,\textsuperscript{4} including cutting lending interest rates, opening private banks, consolidating all of the multiple exchange rates, raising prices on some subsidized items, most notably gasoline and cement, and establishing the Damascus Stock Exchange - which was set to begin operations in 2009. In addition, President Assad signed legislative decrees to encourage corporate ownership reform, and to allow the Central Bank to issue Treasury bills and bonds for government debt. This implied a greater openness to private initiatives and foreign economic relations\textsuperscript{5} and paved the way for an easier adaptation of the Syrian economy to the fast evolving domestic and international context. Nevertheless, the economy remains highly controlled by the government.

Syria’s recent macroeconomic performance has been affected by ongoing external and domestic shocks, particularly the impact of the global financial crisis and a prolonged drought that has been affecting agricultural output (IMF, 2010). While inflation reached 15.2 percent\textsuperscript{2} For instance, the slow-down registered in the last two years of the nineties was mainly the result of a general drought which has had a very negative impact on agricultural production, but also a decline in the world oil price.

\textsuperscript{3} The links between agriculture and the macroeconomy can be summarized as follows (Sarris, 2003: 28): “While agricultural production is almost totally privately based, the bulk of marketing and processing for the main products as well as fertilizer distribution are publicly controlled. Via the process of public control of the upstream and downstream activities relevant to agriculture, the government can exercise considerable control on production and distribution of the agricultural products [and] can also generate considerable income through explicit and implicit taxation, as well as foreign exchange earnings through exports or import substitution.” However, the extensive degree of state control on foreign trade has also served to ensure protection of Syrian agriculture at least for the so-called “strategic crops” (…), showing a clear preference for food self-sufficiency.

\textsuperscript{4} This process started at the turn of the century but has been officially endorsed in the Tenth Five Year Plan (2006-2010) with the objective of making the transition to a “social market economy” with an indicative planning policy. The economic policy should fully rely upon market mechanisms of supply and demand to achieve a more efficient distribution of resources and economic activities, but will continue to place a strong emphasis on government intervention. According to the tenth FYP, the government will no longer dominate or control investment and market activities, but will work towards creating an environment for free activities and competitiveness, while ensuring that market players behave responsibly.

\textsuperscript{5} Although the country has important relations with neighboring countries and concluded a set of bilateral or regional (Arab Free Trade Area) trade agreements, the EU is a significant partner for Syrian agricultural trade (36 percent of Syrian exports, 29 percent of imports in 2008, \textit{cfr.} IMF, 2010) and the issues raised by the perspective of a greater opening to economic relations with Europe are well illustrative of the type of problems that trade liberalization presents to the country. Yet the Syrian Arab Republic has decided to move outward and to seek WTO accession.
in 2008, reflecting Syria’s high dependence on imports of food and fuel combined with a three year drought and the removal of some subsidies, inflationary pressures were contained via prudent macroeconomic policies and the decline in oil prices until the second half of the year. An inflation rate of 2.5 percent in 2009 confirms that the hike was only temporary. Yet, inflation is expected to increase over the next years as commodity prices recover, fuel prices rise and a VAT is introduced (in 2011). Foreign assets remain high, but their coverage of imports is declining. Although debt remains moderate at 22 percent of GDP, the recourse to debt to finance budget deficit is likely to increase with the progressive decline in oil revenues. While growth slowed by more than 1 percentage point in 2009 compared to 2008, and unemployment increased to 11 percent, the Syrian economy did continue to grow at a rate of 4 percent in the midst of the global crisis. This in part reflects countercyclical fiscal measures aimed at reducing the impact of the crisis, including increases in public investments and the wage bill (IMF, 2010).

Long-run economic constraints include declining oil production, high unemployment, rising budget deficits, and increasing pressure on water supplies caused by heavy use in agriculture, rapid population growth, industrial expansion, and water pollution. In incoming years Syria will face the dual challenges of: (i) keeping strong growth and developing non-oil sectors to cope with still important demographic pressures and with the decline in oil production, and (ii) maintaining fiscal sustainability (World Bank, 2010b). To sustain growth, Syria will need to further develop the non-oil sector and diversify its economy, away from the oil sector, improve private sector development, and exports. Much has been done, but more needs to be done in terms of further structural reforms, including in the fields of export diversification and institutional reform. In addition, Syria will need to increase its productivity by raising the skills of its labor force and improving its overall technological base. To maintain fiscal sustainability, Syria needs to continue on the path of fiscal consolidation. The current budget still relies on oil revenues, and the depletion of oil reserves renders the sustainability of the current fiscal policy difficult. Fiscal consolidation towards an adjustment of non-oil budget deficit requires a continuation of the reform process, through conservative budgeting, and by reducing the fuel subsidies and broadening the tax base for the consumption tax.

3. Data

The model is based on a Social Accounting Matrix of Syrian economy estimated by the National Agricultural Policy Center of Damascus with reference to year 2004 (NAPC, 2008), which includes accounts for 51 commodities, 41 production activities, 2 factors of production, and 22 institutions (see Annex for details). Specific attention has been given to the disaggregation of agriculture (31 commodities and 28 activities) and food sector (15 commodities and 8 activities). Despite the lack of a complete urban-rural disaggregation of accounts, a regional criterion has been used in the classification of households’ accounts according to where they live.

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6 More precisely, creating the business environment needed for the development of a diversified, competitive and export oriented private sector becomes crucial in face of the negative impact of the decline in oil exports on external and fiscal accounts.

7 For the complete classification of activities and commodities see the appendix.
Moreover, given the objective of the study, households are also classified by deciles of per capita equivalent expenditure.\(^8\)

The analysis on poverty effects of exogenous shocks was carried out using also a specific source of microeconomic information drawn from a representative sample of Syrian population, i.e. the Survey on Households’ Budgets made available by Central Bureau of Statistics (..., ...), which is suitable to be used for living standard measurement studies (Grosh and Glewwe, 2000).\(^9\) In 2004, 29,800 households were asked to fill two questionnaires on the composition of households’ expenditure and on the households characteristics (composition by sex and age, education level, occupation, sources of income, owned assets) respectively. Individual poverty lines had been estimated for each observed household, according to the household composition (affecting consumption needs) and the region where the household lives (affecting the cost of living) (El Laithy and Abu-Ismail, 2005).

In our study these poverty lines have been used to compute ‘personal’ poverty lines for household members (elderly, adult male and female and child) and for each region. Then, according to their composition, all the households included in the sample were reclassified as poor and non poor. Finally the same data set has been used to estimate the poverty elasticity to be used in simulations for each households group represented in the SAM. Poor are concentrated in the lower four deciles and mostly in the first two. As expected, poverty elasticity larger in higher deciles (Table 2).

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>% poor within groups</th>
<th>% poor of total population</th>
<th>Poverty elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urb dec 1</td>
<td>97.28</td>
<td>28.56</td>
<td>-0.25</td>
</tr>
<tr>
<td>Urb dec 2</td>
<td>67.12</td>
<td>19.87</td>
<td>-4.34</td>
</tr>
<tr>
<td>Urb dec 3</td>
<td>11.36</td>
<td>3.52</td>
<td>-8.19</td>
</tr>
<tr>
<td>Urb dec 4</td>
<td>0.04</td>
<td>0.01</td>
<td>-10.00</td>
</tr>
<tr>
<td>Rur dec 1</td>
<td>93.21</td>
<td>28.17</td>
<td>-0.56</td>
</tr>
<tr>
<td>Rur dec 2</td>
<td>57.79</td>
<td>17.34</td>
<td>-4.57</td>
</tr>
<tr>
<td>Rur dec 3</td>
<td>8.80</td>
<td>2.52</td>
<td>-8.48</td>
</tr>
</tbody>
</table>

Source: own results

### 4. SAM Modelling

The first step for in the definition of the model is the identification of endogenous and exogenous accounts. Usually, for small economies and for policy analysis purposes, the government and the rest of the world are considered as exogenous, i.e. their behaviour is not explained by the model itself: the former, because its behaviour is essentially determined by

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\(^8\) These two classification criteria have been hierarchically applied: first households are assigned to deciles of total population; then, they are classified as urban/rural. As a consequence the 20 groups resulting from the classification (and represented in the SAM) do not include the same number of households, the population included in each group depending on the relative importance of rural-urban regions in each deciles of total population.

\(^9\) Indeed, the survey had been used for a research on poverty in Syria jointly carried out by the State Planning Commission of Syria and the United Nation Development Programme (El Laithy and Abu-Ismail, 2005).
the policy the model aims to assess; the latter, because the external sector is rarely under domestic control. The process of capital formation should be considered as endogenous when dynamic effects are important in answering to the research question, so that investments need to be endogenously-determined. In the proposed model accounts for government, capital formation and rest of the world have been considered as exogenous.

The model was built following the approach proposed by Pyatt and Round (1979): an estimate of marginal propensities to final consumption expenditures was used to replace the average ones that could be directly derived from the SAM (for details see NAPC, 2008). The model was calibrated using the modified matrix of consumption expenditure propensities $C$ where each element is calculated as follows:

$$c_{ij} = \eta_{ij} a_{ij}$$

where $\eta_{ij}$ is the expenditure elasticity of sector $j$ towards sector $i$. In the model presented in this study the marginal propensities have been used only to represent households’ final consumption expenditures, while for all other flows marginal propensities have been set equal to average ones, i.e. relevant elasticity have been assumed equal to 1. Using micro-data from a survey on Households’ Budgets (El Laithy and Abu-Ismail, 2005), the expenditure elasticity for different groups of goods have been estimated for the deciles of total populations and then used to calculate the matrix $C$.

A first linear model could be calibrated using the modified matrix of propensities $C$:

$$y = (I - C)^{-1}x = M_c x$$

where $M_c$ is the matrix of ‘fixed price’ multipliers (Pyatt and Round, 1979). The system in equation (1) may be used as a basis for policy analysis simulations as follows:

$$dy = M_c dx$$

where $dx$ is a vector of changes in exogenous injections, representing different policy scenarios.

The model represented by equation (1) assumes a perfectly elastic supply in all sectors. As a consequence in simulations carried out using equation (2) increases in output are fully demand-driven, i.e. any increase in the exogenous demand for commodities/activities is sufficient to stimulate a corresponding increase in output, according to multipliers of matrix $M_c$. This assumption can be considered as unrealistic when applied to developing economies and to agricultural sector (Lewis and Thorbecke, 1992). Indeed, many agricultural activities are often heavily supported and their level of output should be considered completely determined by policy. In Syria this is for example the case of “strategic crops”.

The presence of constraints on the supply side for one or more sectors can be taken into account in a linear model calculating a so-called mixed multiplier matrix (Lewis and Thorbecke, 1992). Suppose to identify $k$ (out of $n$) sectors that are supply-constrained. The matrix $C$ can be partitioned as follows:

$$C = \begin{bmatrix} C_{nc} & Q \\ T & C_e \end{bmatrix}$$
where the $C$ blocks with subscripts $nc$ and $c$ identify the marginal expenditures propensities of non supply-constrained and supply-constrained sectors, with dimensions $[(n-k) \times (n-k)]$ and $[k \times k]$ respectively; $T$ is the $[k \times (n-k)]$ matrix of expenditure propensities of factors, institutions and non supply-constrained sectors on supply-constrained sectors; $T$ is the $[(n-k) \times k]$ matrix of supply-constrained sectors expenditures on factors, institutions and non supply-constrained sectors output. The matrix of mixed multipliers can be calculated as follows:

$$M_m = \left[\begin{array}{cc}
(I-C_{nc}) & 0 \\
-T & -I
\end{array}\right]^{-1}\left[\begin{array}{c}
I \\
0 \\
0
\end{array}\right]$$

(4)

where $I$ and 0 are the identity and null matrices with appropriate dimensions. The mixed multiplier matrix can be used to replace matrix $M$, in equation (2) for policy simulations.

A fixed price, mixed multiplier model (assuming different hypotheses about constraints on the supply side: cf. section 5) was used to simulate the distributive impacts of a range of possible reforms of agricultural policy in Syria. First of all the matrix $M_m$ was used to calculate the impact on output and incomes of different policy scenarios, according to equation (2). Furthermore, to better highlight the distributive features of the simulated impacts, two further analysis were carried out.

The first is a particular transformation of matrix $M_m$ proposed by Roland-Holst and Sancho (1992) to show the changes in the relative position in income distribution of different households groups represented in the model. According to these authors, the change in a normalized measure of income shares $\tilde{y}$ induced by an exogenous injection $dx$ is given by

$$d \tilde{y} = \left[y'\right]^{-1}\left[I - \tilde{y}i'\right] M_{inst} dx = Rdx$$

(5)

where $M_{inst} (n\times m)$ is the submatrix of $M_m$ corresponding to income multipliers of the $n$ institutions considered for $m$ different exogenous shocks$^{10}$ (on sectors, factors and institutions). According to (5) the matrix of absolute (non normalized) values of redistributive effects is given by

$$R^* = \left[y'\right] R = \left[I - \tilde{y}i'\right] M_{inst}.$$  

(6)

Equation (6) yields the value of the redistribution induced by an additional unit of exogenous inflow while total income is held constant at its initial level.$^{11}$ The redistribution matrix $R^*$ shows the changes of income that each group would perform if only the redistributive effects of exogenous impacts were taken into account, excluding changes in the total output/incomes due to exogenous shocks.$^{12}$

A second analysis was carried out to assess the potential impacts of reforms on poverty, following the approach recently proposed by Pyatt and Round (2006). Given a measure of

$^{10}$ That is, exogenous injection on a given account.

$^{11}$ $R^*$ is a sign-preserving transformation of $R$ and the elements of each column sum to zero, as in the case of the original matrix, since only redistributive effects are accounted for.

$^{12}$ In other words the effect of exogenous shocks is represented as a redistributive zero-sum game among different socio-economic groups. An application of the $R$ matrix to the analysis of distributive effects of agricultural policy can be found in (Rocchi et al., 2005).
poverty $Q$ based on the definition of a poverty line we can assume that the measure itself is additively decomposable across groups of households. Therefore

$$Q = \sum_i Q_i$$  \hspace{1cm} (7)

where $i$ denotes a generic household group. Defining $n_i$ the number of people included in a socio-economic group and $P_i$ the proportion of poor in the same group we can write:

$$Q_i = n_i P_i$$  \hspace{1cm} (8)

so that the change in the poverty measure for each group is given by

$$dQ_i = n_i dP_i + P_i dn_i.$$  \hspace{1cm} (9)

Excluding for the moment the effect of population growth (the second term in the right side of equation 9) the variation in the proportion $P_i$ of people that are poor will depend both on changes in the average income and on changes in prices able to move poverty lines differentially across socio-economic groups. As changes in prices cannot be represented in a ‘fixed-price’ model, the analysis will account only for the effect on poverty of changes in the scale of incomes within each household group. The cited authors show that the change in the number of poor in a generic socio-economic group is given by

$$\frac{dQ_i}{Q} = (1 + \varepsilon_i) \frac{dn_i}{y_i} - \frac{1}{y_i} \varepsilon_i \cdot M_{m1} dx$$  \hspace{1cm} (10)

where

- $\varepsilon_i$ is the partial elasticity of $P_i$ with respect to changes in the average income within the $i$-th group (poverty elasticity);
- $y_i$ is the total income of households in the $i$-th group;
- $z_i$ is a vector with the $i$-th element equal to 1 with all the other elements equal to 0;
- $M_{m1}$ is the sub-matrix ($g \times n$) of income mixed multipliers for households groups with $g$ is the number of households groups and $n$ is the number of row/columns of matrix $M_m$;
- $x$ is the vector of inflows from the exogenous sectors in the original SAM.

The expression in (10) implies that the number of poor in a socioeconomic group decreases only if the increase in the average income stimulated by the growth of the economy (second term of the right side of the equation) is able to counterbalance the negative effect of population growth on poverty. Figures in table 2 were used to calculate the second term of the right side of the equation (10), i.e. the effect of exogenous changes on poverty with constant population.

5. Policy scenarios and simulation approach

The definition of a vector $dx$ of exogenous shocks is the first step necessary to carry out simulations for policy analysis. According to recent evolution in Syrian policy environment, we hypothesized the elimination/reduction of three policies currently carried out by Syrian Government, namely:
a) elimination of subsidies to production activities\textsuperscript{13} which will turn out into an increase in production costs. These direct impacts on production sectors will also affect households’ welfare determining an economy-wide increase in the prices of commodities.\textsuperscript{14} The estimated vector of price increases was then multiplied by the (SAM-derived) matrix of expenditure shares of households to obtain an ‘equivalent’ decrease of income in real terms, to be applied as an exogenous shock in policy simulations;  

b) a 20 percent reduction of currently subsidized prices of strategic crop (cotton, tobacco and sugar beet). Assuming intermediate costs and wages as fixed in the short-run, the reduction of output prices can be mimicked by a decrease in incomes accruing to ‘other factors’ (capital, self-employed labour). A first component of the vector of exogenous shocks corresponding to this policy scenario was then defined as a reduction of incomes distributed to ‘other factors’ to households, according to shares accruing to each household group. At the same time a counterbalancing increase of real incomes, due to the general reduction of prices generated via the input-output linkages by the reduction in prices of previously subsidized commodities, was added. This second component was calculated following the same procedure used for scenario a).  
c) the elimination of the existing food stamp scheme (Price Stabilization Fund, PSF), represented again as a decrease in households’ real incomes.\textsuperscript{15} The direct effect of the elimination of food consumption subsidies was distributed among households groups as a ‘real’ income decrease, according to shares in expenditures for subsidized products resulting from households budgets in the El Laithy and Abu-Ismail (2005) sample.  

Each policy option was considered according to different ‘closure rules’ (i.e. effects on Government budget) following the approach proposed by Rose \textit{et al.} (2001). Indeed, within an input-output framework the simulation of policy options implying changes in the Government budget and with relevant distributive consequences can be remarkably improved including in the $dx$ vector also the direct effect of alternative budget strategies.  

By and large the selected policies would result in a decrease of public expenditure. The financial resources set free could be used by Government in alternative ways having different distributive effects. Three alternative uses of budget savings were hypothesized in the analysis, namely:  

i) a reduction in government deficit that increases previously crowded-out private investments (Rose \textit{et al.}, 2001). This alternative can be represented as an exogenous injection in the final demand for investment goods (according to SAM shares) of the same amount of financial resources previously allocated to the policy;  

ii) an increase in government expenditure equal to the amount of money previously allocated to the selected policy was transformed in exogenous inflows to SAM

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\textsuperscript{13} Subsidised activities whose accounts are included in the SAM are: soft wheat, cotton ginning, milling, sugar industry and sugar refinery.  

\textsuperscript{14} Indeed, looking at the transpose of the multiplier matrix as a Leontief model in prices, makes possible to transform an output cost increase as an equivalent commodity price increase (Roland Holst and Sancho, 1995; Dietzenbacher, 2002).  

\textsuperscript{15} The balance of PSF revenues and expenditures was derived applying shares derived from the SAM included in a study on trade liberalization in Syria (Lucke, 2001) to the total value of PSF expenditures projected for 2007 (IMF, 2007).
accounts according to Government expenditure shares (both for public final consumptions and for transfers to institutions);

iii) an increase of transfers to households according to shares in the original SAM. This budget rule is to some extent similar to the compensative payments introduced by Syrian Government with the institution of the Agricultural Support Fund (IMF, 2010).

The combination of the three policy options for agriculture and food and the three ‘closure rules’ for Government budget yields the following nine policy mixes:

a) Elimination of subsidies to agriculture and food industry
   i) with reduction of Government deficit
   ii) with increase of public expenditure
   iii) with increase of transfers to households

b) Price reduction for strategic crops
   i) with reduction of Government deficit
   ii) with increase of public expenditure
   iii) with increase of transfers to households

c) Elimination of PSF
   i) with reduction of Government deficit
   ii) with increase of public expenditure
   iii) with increase of transfers to households.

Finally, the simulations were carried out taking into account also a set of policy-driven constraints on the supply side, using different matrices of mixed multipliers calculated according to equation (4).

First of all, production activities for the three strategic crops were considered as supply-constrained in scenarios a) and c), while the constraint was not operating under scenario b), assuming that the reduction of price support was combined with a liberalization of production decisions of previously ‘strategic’ crops, whose supply is currently centrally planned.

A second constraint was included for the ‘Public Administration’ sector (PA). Despite general services managed by Government are usually modelled as an activity in a SAM framework, the figures in the relevant column/row are generally determined by the policy maker. Indeed, in National Accounts the output value of PA is conventionally set equal to its production cost (cf. United Nations et al., 1993). As a consequence, modelling PA as a supply-constrained sector can be interpreted as the representation of a policy-driven effort towards efficiency in public administration activities. The changes induced by exogenous shocks are calculated assuming that in the short-run PA could support the overall economy without changing the nominal value of its output. According to financial stabilization goals stated by the Syrian Government this seems to be a reasonable assumption for the near future.

The introduction of supply-side constraints is expected to reduce the multiplier effect generated by exogenous shocks on the economy: indeed, indirect and induced effects cannot be transmitted to the rest of the economy through the constrained sectors.\(^{16}\)

\(^{16}\) A sensitivity analysis carried out to assess the effect of the removal of supply-side constraint on PA showed an average increase of output multiplier of about 20 percent.
6. Simulation results

6.1. Multiplier analysis

The simulation results strictly depend on structural relationships as modelled in matrix $M_m$ of mixed multipliers. Therefore, a preliminary view at output multipliers generated exogenous shocks on demand directed towards the output of production activities\(^{\text{17}}\) (table 3) can be useful for the interpretation of results of the subsequent policy simulations.\(^{\text{18}}\)

Table 3
Output multipliers resulting by an increase in final demand of selected industries

<table>
<thead>
<tr>
<th>Total value and % shares</th>
<th>TOTAL</th>
<th>agriculture</th>
<th>food industry</th>
<th>other activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>2.04</td>
<td>58.0</td>
<td>5.9</td>
<td>36.1</td>
</tr>
<tr>
<td>Food beverage and tobacco</td>
<td>2.97</td>
<td>10.4</td>
<td>58.1</td>
<td>31.5</td>
</tr>
<tr>
<td>Other manufactures</td>
<td>2.28</td>
<td>8.3</td>
<td>8.5</td>
<td>83.3</td>
</tr>
<tr>
<td>Utilities</td>
<td>2.48</td>
<td>5.7</td>
<td>5.3</td>
<td>89.0</td>
</tr>
<tr>
<td>Building and construction</td>
<td>2.17</td>
<td>5.3</td>
<td>4.9</td>
<td>89.8</td>
</tr>
<tr>
<td>Services</td>
<td>1.86</td>
<td>7.0</td>
<td>5.9</td>
<td>87.1</td>
</tr>
<tr>
<td>Public administration</td>
<td>2.01</td>
<td>8.1</td>
<td>6.8</td>
<td>85.1</td>
</tr>
</tbody>
</table>

The first column in table 3 displays the multipliers. The values for agriculture and food industries are averages of the relevant entries of the multiplier matrix. As expected industries with a lower share of intermediate costs on output value (agriculture, services) show a lower value. The industry showing the highest multiplier effect is ‘Food, beverage and tobacco’, although it should be stressed that this sector includes activities like ‘sugar refinery’ and ‘milling’ that are mainly public owned and/or heavily subsidized: as a consequence the ratio between intermediate costs and the value of output in the input-output block of the SAM is higher than it would be in absence of policy interventions. The remaining columns show how the output increase is distributed among different industries. An asymmetry clearly emerges between the agro-food sub-system and the rest of the economy: the former showing a higher ability to generate output increase also in other industries through backward linkages.

Output multipliers are a good indicator for ‘growth’ potential intrinsic to the production structure of Syrian economy and suggest the importance of economic policies directed to increase final demand. Another important feature of the economy can be assessed looking at income multipliers, i.e. multipliers accounting for increases in incomes distributed to institutions as a result of final demand increases. Table 4 displays the estimated income multipliers resulting by a (unitary) increase in the final demand for selected outputs.

Table 4
Income multipliers resulting by an increase in final demand of selected industries

<table>
<thead>
<tr>
<th>Total</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
</table>

\(^{\text{17}}\) The final demand directed towards a given production activity is the weighted average of the demand for each commodity produced by the activity itself net of leakages (imports and relevant taxes).

\(^{\text{18}}\) For a more in-depth analysis of multipliers see (NAPC, 2008).
The income multipliers for all Syrian households are shown in the first column of Table 4. Manufacturing activities (both food and non-food) typically show a higher capacity to increase incomes. Comparing urban vs. rural multipliers, a common pattern emerges: the multiplier effect on incomes of urban households is significantly larger than that for rural households (at least 50 percent larger). Furthermore, the impacts are larger on incomes of richer households, with a ratio between the top and bottom quintiles that ranges from ten in urban areas and four in rural areas.

6.2. Impact of liberalization policy reforms

Table 5 shows the results of simulations carried out according to policy scenarios as defined in section 5. The impacts are presented as a percentage variation in the value of output, income and in the level of poverty.

<table>
<thead>
<tr>
<th>% impact on</th>
<th>output</th>
<th>incomes</th>
<th>poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elimination of subsidies to agriculture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deficit reduction</td>
<td>3.10</td>
<td>2.00</td>
<td>-0.20</td>
</tr>
<tr>
<td>public expenditure increase</td>
<td>1.11</td>
<td>0.78</td>
<td>-0.08</td>
</tr>
<tr>
<td>transfers to households increase</td>
<td>2.07</td>
<td>6.43</td>
<td>-0.85</td>
</tr>
<tr>
<td><strong>Price reduction for strategic crops</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deficit reduction</td>
<td>0.43</td>
<td>0.32</td>
<td>-0.04</td>
</tr>
<tr>
<td>public expenditure increase</td>
<td>0.16</td>
<td>0.16</td>
<td>-0.02</td>
</tr>
<tr>
<td>transfers to households increase</td>
<td>0.30</td>
<td>0.90</td>
<td>-0.12</td>
</tr>
<tr>
<td><strong>Elimination of PSF</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deficit reduction</td>
<td>0.56</td>
<td>2.00</td>
<td>0.49</td>
</tr>
<tr>
<td>public expenditure increase</td>
<td>-0.38</td>
<td>0.78</td>
<td>0.55</td>
</tr>
<tr>
<td>transfers to households increase</td>
<td>0.08</td>
<td>6.43</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Both the elimination of subsidies to production activities and the reduction of prices support for strategic crops show a potential positive effect on Syrian economy. All alternative uses of financial resources made available by the elimination of any of these two policies generate a multiplicative effect exceeding the negative direct impacts on household incomes included in the vector of exogenous shocks (decrease of incomes in real terms for changes in prices and for reductions in the income accruing to factors). Specifically, the elimination of subsidies to production activities determines the largest increases of output and income. These
overall impacts result in a reduction of poverty (holding the population constant). The multiplier effect is larger for ‘budget rules’ corresponding to the increase of direct transfers to households and to the reduction of Government deficit, although the long run impact on the economy structure caused by these two alternatives would likely be different.

The impacts generated by the third policy scenario (elimination of PSF) are more controversial. The elimination of subsidies to food consumptions generates an increase of poverty whatever the adopted ‘budget rule’. Only the allocation of financial resources made available by the elimination of a pre-existing policy to transfers to households seems able to minimize the adverse effects of this policy on poverty. Even in this scenario however, the direct (monetary) support to households’ income is not large enough to generate, via the multiplier effect in the whole economy, an expenditure increase offsetting the direct cut of real incomes resulting the elimination of the food stamp scheme: the overall impact is a 0.19 percent increase in the poverty headcount ratio.

The redistributive impacts on inequality implied by alternative policy scenarios can be assessed looking at figures in table 6, where the redistribution across population income deciles have been expressed in percentage terms.\(^{20}\)

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Redistributive impacts of selected policies</th>
<th>% shares and total absolute values (MSP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elimination of subsidies to agriculture and food industry</td>
<td>Price reduction for strategic crops</td>
</tr>
<tr>
<td></td>
<td>deficit reduction</td>
<td>public exp increase</td>
</tr>
<tr>
<td>Urb dec 1</td>
<td>-3.58</td>
<td>6.86</td>
</tr>
<tr>
<td>Urb dec 2</td>
<td>0.42</td>
<td>5.39</td>
</tr>
<tr>
<td>Urb dec 3</td>
<td>4.40</td>
<td>7.99</td>
</tr>
<tr>
<td>Urb dec 4</td>
<td>0.07</td>
<td>7.61</td>
</tr>
<tr>
<td>Urb dec 5</td>
<td>1.94</td>
<td>11.90</td>
</tr>
<tr>
<td>Urb dec 6</td>
<td>-0.48</td>
<td>4.10</td>
</tr>
<tr>
<td>Urb dec 7</td>
<td>3.95</td>
<td>4.53</td>
</tr>
<tr>
<td>Urb dec 8</td>
<td>8.69</td>
<td>6.74</td>
</tr>
<tr>
<td>Urb dec 10</td>
<td>53.41</td>
<td>30.06</td>
</tr>
<tr>
<td>Rur dec 1</td>
<td>-6.02</td>
<td>-4.23</td>
</tr>
<tr>
<td>Rur dec 2</td>
<td>-8.46</td>
<td>-5.22</td>
</tr>
<tr>
<td>Rur dec 3</td>
<td>-11.84</td>
<td>-6.43</td>
</tr>
<tr>
<td>Rur dec 4</td>
<td>-7.21</td>
<td>-5.89</td>
</tr>
<tr>
<td>Rur dec 6</td>
<td>-16.79</td>
<td>-15.73</td>
</tr>
</tbody>
</table>

\(^{19}\) The initial shocks (increase of direct transfers less real income reduction due to the elimination of food subsidies) negatively impacted one half of households, mainly in rural areas.

\(^{20}\) In table 6 the ‘redistributive game’ resulting by the implementation of each policy is a zero sum game, that is the winners show a positive value while the losers show a negative value, but the algebraic sum of these percentage change in income shares across population deciles is equal to 0.
The magnitude of the total redistributive effect in absolute terms (last row) obviously depends on the different amount of financial resources allocated to the three alternative policies. Nonetheless, the choice of different budget strategies seems able to significantly determine the ‘redistributive power’ of each policy. As expected, allocating the financial resources made available by the elimination of a pre-existing policy to household transfers sharply increases the total redistributive effect of the first two policy options (elimination of subsidies to production and reduction of strategic crops price).

Furthermore, the redistributive profiles are different under alternative policy scenarios. The strategic crops price reduction is the most equitable policy determining an improvement in the relative position of poorer households and rural households. Vice versa, the first and the third policy options negatively affect the relative position of rural households in income distribution whatever the adopted ‘budget rule’. Not surprisingly the worst redistributive impact is determined by the elimination of PSF. In this case, the redistribution of financial resources made available for increasing transfers to households, positively impact urban households (including most of lower urban deciles), but negatively affects all rural deciles but the highest one: this results clearly call for a careful targeting of transfers to households to prevent adverse distributive effects.

Table 7 shows that the overall impact on poverty is small. The first two policy options reduce poverty whatever the closure rule adopted for Government budget. The elimination of production subsidies with an equivalent increase in transfers to households is the most effective alternative in terms of poverty reduction (-0.85%). Conversely the elimination of food stamps may increase poverty up to 0.55% (in the case of a proportional increase in public expenditure as budget rule). The transformation of PSF budget into transfers to households almost offsets this negative effect but with different outcomes on different household groups. Indeed, poverty is reduced only in the urban areas, while the rural poor are negatively impacted.

Table 7
Impacts on poverty of selected policies
% changes

<table>
<thead>
<tr>
<th></th>
<th>elimination of subsidies to agri-food</th>
<th>price reduction for strategic crops</th>
<th>elimination of PSF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>deficit red.</td>
<td>public xp incr.</td>
<td>transf incr.</td>
</tr>
<tr>
<td>Urb dec 1</td>
<td>-0.01</td>
<td>0.00</td>
<td>-0.04</td>
</tr>
<tr>
<td>Urb dec 2</td>
<td>-0.10</td>
<td>-0.04</td>
<td>-0.48</td>
</tr>
<tr>
<td>Urb dec 3</td>
<td>-0.23</td>
<td>-0.11</td>
<td>-1.13</td>
</tr>
<tr>
<td>Urb dec 4</td>
<td>-2.78</td>
<td>-1.30</td>
<td>-13.66</td>
</tr>
<tr>
<td>Rur dec 1</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.01</td>
</tr>
<tr>
<td>Rur dec 2</td>
<td>-0.11</td>
<td>-0.04</td>
<td>-0.38</td>
</tr>
<tr>
<td>Rur dec 3</td>
<td>-0.37</td>
<td>-0.13</td>
<td>-1.32</td>
</tr>
<tr>
<td>Rur dec 4</td>
<td>-2.56</td>
<td>-0.89</td>
<td>-8.37</td>
</tr>
</tbody>
</table>

21 As stated in the previous section, simulations were carried out assuming that transfers were distributed among households groups according to shares present in the SAM.
6.3. Impact of cereal price spike and global recession

In the last 5 years the macroeconomic dynamics at the global level heavily affected output and incomes in developing countries. For this purpose, the simulations were repeated including in the vector of exogenous shocks alternatively: the change in real incomes generated by an increase of 100 percent in cereal prices (as it was the case in 2007); a 10 percent decrease in the households’ current transfers from abroad; a 10 percent decrease in export; the last two shocks simulating two possible effects of a global recession.

The distributive impacts of these three global scenarios on the Syrian economy are quite differentiated (Table 8). The equity and rural bias for each scenario are expressed as the percentage of the negative distributive effects accruing to households in the first four deciles of total population considered as poor (equity bias) and to all rural households (rural bias), respectively.

Table 8
Redistributive impacts of alternative macroeconomic scenarios
% values

cereals price price transfers transfers export export +100% from abroad -10% -10%

| Urb dec 1 | 10.12 | -5.47 | 14.56 |
| Urb dec 2 | -6.60 | 8.48 | -3.50 |
| Urb dec 3 | -17.72 | 18.95 | -14.24 |
| Urb dec 4 | -3.45 | 3.45 | 3.95 |
| Urb dec 5 | -8.05 | 11.85 | -1.63 |
| Urb dec 6 | 6.39 | -10.12 | 14.37 |
| Urb dec 7 | 7.25 | -8.60 | 10.26 |
| Urb dec 8 | 4.13 | -2.10 | 2.50 |
| Urb dec 9 | 12.80 | 6.61 | -3.83 |
| Urb dec 10 | 46.35 | 33.71 | -41.06 |
| Rur dec 1 | 1.82 | -2.00 | 1.94 |
| Rur dec 2 | 1.31 | -4.40 | 5.24 |
| Rur dec 4 | -6.62 | 3.29 | -4.04 |
| Rur dec 5 | -1.21 | -6.02 | 4.39 |
| Rur dec 6 | -4.51 | -7.95 | 4.37 |
| Rur dec 7 | -1.56 | -12.15 | 9.16 |
| Rur dec 8 | -10.88 | -10.32 | 3.55 |
| Rur dec 9 | -1.97 | -16.63 | 9.62 |
| Rur dec 10 | -37.43 | 13.65 | -31.71 |

| Tot abs value (MSP) | 802 | 500 | 162 |
| Equity bias | 34.4 | 26.1 | 21.8 |
| Rural bias | 64.2 | 73.7 | 35.7 |
| Poverty | 0.39 | 0.07 | 0.33 |

From an equity point of view all the three scenarios imply a redistribution improving the relative position of poorer households (i.e. negative impacts larger for richer households), especially in the case of the two global recession scenarios (reduction in transfers and
exports). A decrease in exports is the worst scenario for richer households: more than 70 percent of negative redistributive effect is ‘paid’ by households included in the highest deciles of total population, even if in absolute terms the redistributive power of this scenario is less than half of the other global recession one (162 vs. 500 MSP).

Another noticeable asymmetric effect of macroeconomic scenarios refers to rural-urban impact. The relative position of rural households in income distribution is clearly worsened by a price crisis (rural bias 64.2 percent) as well as in the case of a 10 percent decrease of transfers to households from abroad (73.7 percent); vice versa, the export contraction caused by the global recession determine a relative improvement in the distributive position of rural households.

All scenarios cause an increase of the poverty headcount. The larger impact on poverty is generated by the increase of cereals’ price (+0.39 percent), that is likely to generate a larger reduction in the real income of poorer households. Conversely, a global recession is more likely to indirectly affect poverty through a reduction of export (and the consequent slow down of internal production) than through a direct reduction of workers remittances.

How these undesirable dynamics of the global macroeconomic scenario could affect the outcomes of the alternative options in agricultural policy reforms considered in this study? Table 9 contrasts the impacts of mixed scenarios for all policy options, inclusive of the effects of different macroeconomic changes, with those computed in absence of macroeconomic changes. Mixed scenarios are simulated including alternatively the effect of a 100 percent cereals’ price increase and the effect of the ‘2009 recession’ scenario on Syrian exports and workers remittances defined according to real data.\(^{22}\)

<table>
<thead>
<tr>
<th>Table 9</th>
<th>Impacts of alternative policy scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poverty</td>
</tr>
<tr>
<td></td>
<td>no macro-economic change</td>
</tr>
<tr>
<td>Pure scenarios</td>
<td>-</td>
</tr>
<tr>
<td>Mixed scenarios</td>
<td>elimination of subsidies to agriculture</td>
</tr>
<tr>
<td>deficit reduction</td>
<td>-0.20</td>
</tr>
<tr>
<td>publ exp increase</td>
<td>-0.08</td>
</tr>
<tr>
<td>transf to hhold increase</td>
<td>-0.85</td>
</tr>
<tr>
<td>price reduction for strategic crops</td>
<td></td>
</tr>
<tr>
<td>deficit reduction</td>
<td>-0.04</td>
</tr>
<tr>
<td>publ exp increase</td>
<td>-0.02</td>
</tr>
<tr>
<td>transf to hhold increase</td>
<td>-0.12</td>
</tr>
</tbody>
</table>

\(^{22}\) The preliminary estimates included in the IMF Staff Report for the 2009 Article IV consultation (IMF, 2010) record a 16 percent decrease in exports of goods and a 4 percent decrease in workers remittances from abroad: these changes were applied to totals in SAM to obtain a vector of exogenous shocks. The simulated impact of this scenario on total output is about -5 percent, a magnitude compatible with the deceleration of growth in the Syrian GDP recorded by the IMF Staff.
Overall the pure macroeconomic scenarios led to a relative inequality improvement but at cost of an increase in poverty and with an adverse rural bias. The first two liberalization reform options are likely to alleviate the adverse effects on poverty and equity of macroeconomic changes. However, they show a trade-off between poverty reduction and equity improvement: the best result in terms of poverty alleviation is achieved by the elimination of support to production activities compensated by an equivalent transfer to households, while the liberalization of strategic crops (price reduction plus removal of policy-driven supply constraints) shows the lowest equity bias.

Looking at rural bias, the only policy option able to offset the adverse effect of macroeconomic changes is the liberalization of strategic crops, associated both with a reduction of Government deficit and with a proportional increase of public expenditure.

Finally, the elimination of the PSF leads to the worst impacts in terms of poverty and equity, at the same time showing a largely adverse rural bias (more than 74 percent irrespective of the adopted ‘budget rule’). This result clearly shows that without a careful targeting of transfers to households, the achievement of the potential positive effects in terms of growth of the elimination of food stamps (see table 5) would be socially controversial.

7. Concluding remarks

In this paper a multi-sector, extended input-output model of Syrian economy was used to assess the impact of alternative policy and macroeconomic scenarios on poverty and inequality. The model was based on a Social Accounting Matrix of Syrian economy estimated by the National Agricultural Policy Center of Damascus with reference to year 2004. The matrix of multipliers was calculated following the “fixed-price” approach proposed by Pyatt and Round (1979) and assuming a variable set of constraints on the supply side, as suggested by Lewis and Thorbecke (1992). Simulations of policy scenarios were carried out imposing alternative ‘closure rules’ to assure the constancy of Government deficit (Rose et al., 2001); furthermore the economy-wide effects of changes in prices (modelled within the SAM approach according to Roland-Holst and Sancho, 1995) were included in the vector of exogenous shocks as equivalent changes in real incomes of households.

In general terms the results show that liberalization reforms aiming at reducing the distortions generated by agricultural policy (such as subsidies to production activities and price support for strategic crops) could have a positive effect both on growth (output and incomes) and poverty, while a controversial impact would be generated by the elimination of food security interventions (such as the food stamp scheme financed by the Price Stabilization Fund).

The re-distributive profile of alternative policy scenarios is diversified in a remarkable extent and heavily affected by the ‘budget closing rules’ adopted by the Government. While the elimination of price support yields the best distributive profile of impacts on an equity ground, improving the relative position of poor both in urban and rural areas, the reduction of subsidies to production activities and the elimination of the food stamp scheme show an adverse distributive bias towards rural households. Furthermore, the elimination of food stamps is likely to generate an increase in poverty no matter what budget rule is adopted: only
increasing the transfers to households may partially offset this negative effect, but only in the urban context.

Relevant changes in the global macro-economic scenario are likely to affect poverty and inequality in Syria: both the simulation of a price spike for cereals and of a global recession lead to relative positive equity effect but at cost of an increase in poverty and with an adverse bias against rural households in income distribution. Should the liberalization reforms be in place at the moment of the crises, the overall impact of food price spike and global recession would be less negative, while the elimination of food security measures (PSF) is likely to worsen the impacts of the crisis.

Two fundamental policy implications can be drawn by the analysis. First, the liberalization of agricultural sector shows an appreciable growth potential and is likely to generate positive effects on poverty via a general increase of average incomes; furthermore, the elimination of measures such as subsidies to production activities and price support for strategic crops would make available financial resources to be used to pursue alternative policy goals. Second, a structural trade-off between equity improvement and poverty alleviation seems to emerge: policy options more likely to reduce absolute poverty show undesirable distributive biases (both on overall inequality and towards rural households). A careful design of how to use budget savings is needed along with the implementation of agricultural policy reform.

Despite the linear nature of the model, the flexible approach to modelling adopted in the analysis allowed to simulate a variety of scenarios, leading to results that are relevant for policy assessment. Improvements could be pursued both improving the information base and refining the modelling approach. A complete rural-urban classification of accounts for production activities would allow the researcher to fully represent structural asymmetries between the two regions and the effects of spillovers between rural and urban context. With reference to modelling approach, further improvements could be achieved within the input-output approach adopting “optimization” rules (according to some desirable distributive rules) in designing policies to be financed by budget savings generated by a progressive liberalization of agricultural sector. Finally, a more in-depth analysis of price effects, adopting a long-run analytical perspective, could be achieved moving towards a computable general equilibrium model.

References


Appendix

List of Accounts of the Social Accounting Matrix of Syrian economy, 2004

COMMODITIES

RAW AGRICULTURAL PRODUCTS

Crops
- Raw cotton
- Hard wheat and durum
- Soft wheat
- Tobacco
- Barley
- Sugar beet
- Checkpeas
- Lentil
- Cumin
- Tomato
- Potato
- Garlic
- Soybean
- Sunflower
- Sesame
- Olives
- Citrus
- Grapes
- Apples
- Apricot
- Pistachio
- Crops by-products
- Other crops

Animal Products
- Beef
Cow milk
Lamb
Sheep milk
Poultry meat
Poultry eggs
Manure
Other animal products

**Processed Agricultural Commodities**
- Wheat flour
- Cotton lint
- Cotton seeds
- Olive oil
- Raw sugar
- Refined sugar
- Processed tobacco
- Canned vegetables
- Packed tomato
- Tomato paste
- Packed citrus
- Agricultural industry by-products
- Other agricultural processed products

**Other Commodities**
- Other processed food
- Beverages
- Other industries
- Water, electricity, gas
- Building and construction
- Services
- Public administration

**Activities**
AGRICULTURE

Crops
Cotton crop
Hard wheat and durum
Soft wheat
Tobacco
Barley
Sugar beet
Chick peas
Lentil
Cumin
Tomato
Potato
Garlic
Soybean
Sunflower
Sesame
Olive
Citrus (lemon&naval)
Grapes
Apples
Apricots
Pistachio
Other trees
Other crops
Packaging fruit and vegetables
Cotton ginning

Livestocks
Cattle
Sheep
Other livestock

FOOD INDUSTRY
Milling durum
Tobacco industry
Canning
Sugar industry
Sugar refinery
Olive oil industry
Tomato paste industry
Other food and beverages

OTHER PRODUCTIVE ACTIVITIES
Other industries
Utilities
Building and constructions
Services
Public administration

FACTORS
Hired labor
Other factors
Taxes less subsidies

INSTITUTIONS
HOUSEHOLDS
Urban HH decile 1
Urban HH decile 2
Urban HH decile 3
Urban HH decile 4
Urban HH decile 5
Urban HH decile 6
Urban HH decile 7
Urban HH decile 8
Urban HH decile 9
Urban HH decile 10
Rural HH decile 1
Rural HH decile 2
Rural HH decile 3
Rural HH decile 4
Rural HH decile 5
Rural HH decile 6
Rural HH decile 7
Rural HH decile 8
Rural HH decile 9
Rural HH decile 10

ENTERPRISES
GOVERNMENT
OTHER TRANSFERS WITHIN COUNTRY

CAPITAL
CHANGES IN INVENTORIES
CAPITAL FORMATION
NET LENDING-BORROWING

REST OF THE WORLD
GOODS AND SERVICES
FINANCIAL FLOWS