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Food prices, government subsidies and fiscal balances in South Mediterranean countries

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Abstract

Soaring food and energy prices sparked the revolts in Northern African countries at the end of 2010. Despite government subsidies, consumer price inflation rose, which reduced consumers' purchasing power. This article empirically investigates the impact of world food prices on inflation and government subsidies for Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, the occupied Palestinian territories and Tunisia during the ten-year period 2002-2011. Our findings show an asymmetry in the response of consumer price inflation to world food price shocks, in that soaring world food prices made inflation rise fast while nominal rigidities prevented inflation from falling. Moreover, this paper shows that government balances deteriorated up to 2% of GDP in 2008 and 2011 due to the incremental government food subsidies while they hardly improved in value terms when world food prices sharply fell in 2009.

Key words: Food prices, energy prices, inflation, government subsidies, public finances, MENA.

JEL-codes: E31, E37, 62, H23, H62, L66, L71.

¹ The first version of this paper (Albers and Peeters, 2011) was written while the authors both worked at the Directorate General Economic and Financial Affairs of the European Commission in Brussels. The views expressed are the authors' and should not be attributed to the European Commission. Marga Peeters is Research Fellow at the Netherlands Institute for Advanced Study of the Royal Netherlands Academy of Arts and Sciences (NIAS-KNAW) in Wassenaar. Correspondence is welcome at huber@TinaMargaPeeters.eu. Thanks go to two anonymous referees, participants of a Mediterranean Research Meeting workshop, Antonio de Lecea, Stylianos Dendrinis, José Eduardo Leandro, Maria Inmaculada Montero Luque, Andreas Papadopoulos and Sirpa Tulla.

1. Introduction

In many developing countries and in particular in South Mediterranean countries, consumer food subsidies are a major part of the social security safety net schemes (see Gutner, 2002).² The upward trend in food prices that started to emerge worldwide in the course of 2007, just before the global crisis, caused riots in the streets of Egypt until the Egyptian authorities intervened by among others the army baking additional bread. In the course of 2010, during the recovery from the global crisis, basic commodity prices started rising again on the back of the upsurge in global demand and were among the reasons for uproar in Tunisia and Algeria, leading to regime change in Tunisia and Egypt. The eruption of social unrest is one of the tangible externalities of the scarcity of food. In several countries, concerns about the potential social and political effects of a rapid overhaul of the subsidy system in part account for inertia in implementing reforms.

The consequence of this is that persistent fiscal deficits and high public debt stocks have resulted in debt accumulation and structural pressure on public budgets. Sharp swings in prices, driven by commodity prices, have added to strains on the public budget in the period. The seriousness of the strains can be traced back to more serious structural vulnerabilities in the area of public finances pre-existing in the South Mediterranean . Although encouraging public finance reforms have been initiated in the region, public finance reform remains high on the public finance agendas. Basically, the challenges faced by South Mediterranean countries in designing and controlling public expenditure are not unlike those in, for example, the EU.

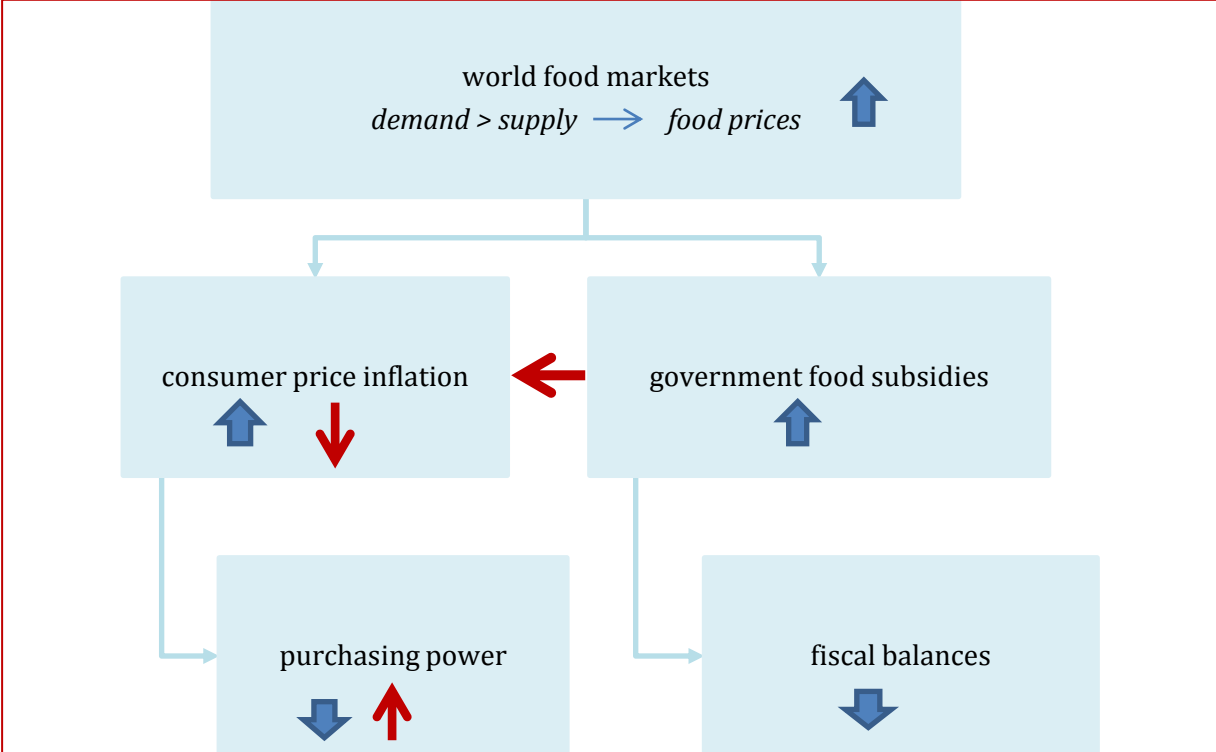
However, the sheer size of the price and terms-of-trade shocks that the South Mediterranean region has suffered in the wake of the historically huge swings in food and energy commodity prices have added a new dimension to the policy debate. Soaring prices have not only had a sizeable macroeconomic and budgetary impact, but also a distributional effect. Under prevailing policies the upsurge in prices also heavily affected government budgets in the South Mediterranean region, notably via subsidy systems. Admittedly, the impact of price shocks in the South Mediterranean countries has been differentiated according to the structure of public spending in individual countries, and also in function of past and on-going reforms. Nevertheless, in view of the relatively high prevalence of subsidies in the South Mediterranean region, the impact on public finances has been large by comparison to other regions in the

² The same holds for energy prices, though we limit ourselves mainly to the impact of world food prices in this study. Food is one of the basic human needs and studies in this field are still scarce. Energy prices themselves affect world food prices due to the transport costs of food, so studying world food prices captures to some extent developments in energy prices.

world. The sharp fall of the world economy into recession in the latter part of 2008 and 2009 led to a sudden and sharp reversal of commodity prices which to an extent mitigated the acute strains that had arisen. Whereas falling commodity prices in first instance add to purchasing power and relief strains on the public purse, the eventual effect is more uncertain.

Flow chart 1 illustrates the two-fold effect of commodity prices in the short run, in this case a rise in world food prices. At the top of the chart the world food market shows a shortage for which reason world food prices rise. This rise feeds into the consumer price inflation rises (left lower part). At the same time, the government compensates the people for the world food price rise by means of subsidies (right lower part). This leads to higher government spending and therefore a deterioration of the fiscal balances (right lowest part). The ultimate effect on consumers' purchasing power (left lowest part), depends on the size of the world food price rise and its impact on the consumer price inflation *and* on the size of the government food subsidy. In case the government compensates generously, consumer prices may not rise, in which case the purchasing power stabilises. We investigate in this study whether consumer price inflation rises in response to rising world food prices, despite rising government subsidies.

Flow chart 1 World food prices, consumer price inflation and government subsidies



Source: Authors.

Note: See text for the explanations.

Oppositely to a world food price rise, a *fall* in world food prices can transmit in lower consumer price inflation, lower government food subsidies and hence, improvements in fiscal balances. As follows from the results in our study here, this is not so obvious (see sections 3 and 4).

This paper aims to shed more light on the impact of the price swings on the economies in the South Mediterranean region, with a heavy emphasis on the feed-through to public finance, in particular government balances. The main aim is to analyse the impact of world food prices on consumer price inflation and government balances. We quantify the effects over the full cycle of ten years, from 2002 up to and including 2011 (so this is our cut-off point), for each of the South Mediterranean countries, as far as data are available. To the best of our knowledge, the literature has not yet shown such a comparative analyses on world food prices and government subsidies across these South Mediterranean countries.

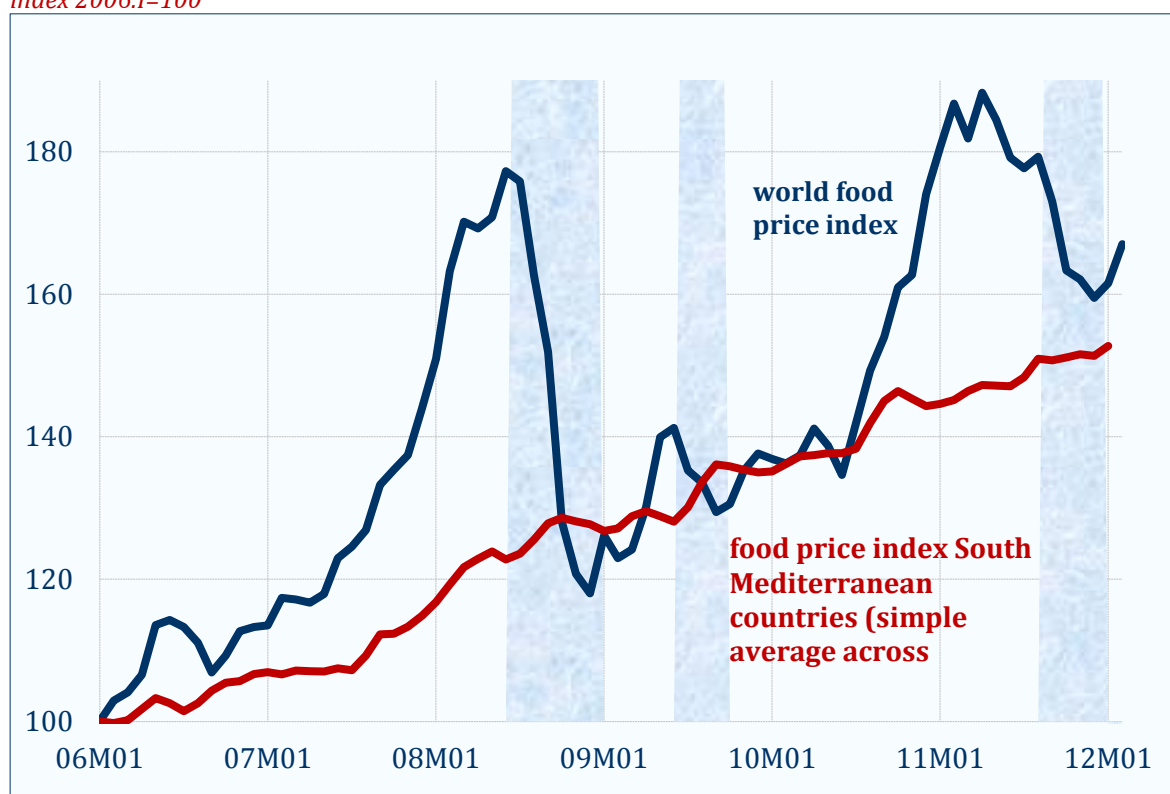
The outline of this paper is as follows. Section 2 investigates the pass-through of world food price shocks on the individual South Mediterranean countries and compares it with the effects on other middle income country groups. In section 3 the impact of commodity prices on government budgets in the South Mediterranean countries is analysed in depth. Whilst acknowledging the pitfalls in making such comparisons across countries, we quantify the direct fiscal impact of soaring commodity prices because of the high relevance for the fiscal stance, and briefly discuss prospects. Finally, section 4 lists some main issues for policy discussion and proposes some issues for future research. Section 5 summarizes and draws conclusions.

2. The pass-through of world food prices on total inflation in South Mediterranean economies

An upward trend in food inflation started to emerge worldwide in the course of 2007, just before the global crisis. This trend was interrupted by the global crisis but re-emerged shortly thereafter (see Graph 1). The causes and policy reactions of the soaring prices have been hotly debated (Worldbank, 2009, Peeters and Strahilov, 2008) and these rises are also not unprecedented (see European Commission, 2010, International Monetary Fund, 2008a,b). An increasing world population, a growing demand for higher “value added” food (including meat and dairy) products in emerging economies in fast catch-up as well as the emergence of alternative market outlets (in particular for biofuels) all contributed to dynamic demand for agricultural commodities outstripping the growth in global supply. This led to tight agricultural commodity markets with historically low levels of international stocks that have apparently been unable to cushion a string of major weather-related supply shortfalls in important producing countries. Further contributing factors have been the surge in energy prices, export restrictions imposed by a number of countries to avoid domestic shortages and the depreciation of the US dollar. Speculation has also been mentioned as a potential factor, although there is no conclusive evidence that it has had a structural as compared to transitory impact on world food prices (or on commodity prices more generally). The subsequent fall of food and commodity prices in the second half of 2008 in the wake of the global crisis in 2009 is generally seen as a response to the rapid cooling of global demand and easing of expectations, still leaving the question of what structural driving forces would determine price trends once cyclical conditions get more stable.

Benchmarking the swings in global food price inflation depends on the time perspective. World food prices as measured by the world food price index in dollars were on average 33% higher in 2008 than in 2007, having no less than some 60% between June 2006 and June 2008 (when the peak was reached). By end-2008, the average index of food commodity prices had declined by a third from the summer peak, , testifying to the speed of the price decline. However, as recovery took hold, global food prices also increased again and by end-2010 the world food price index had reached again the nominal level of the earlier peak in mid-2008, indicating substantial price pressures in the pipeline.

Graph 1 World food prices and food prices in the South Mediterranean
index 2006.I=100



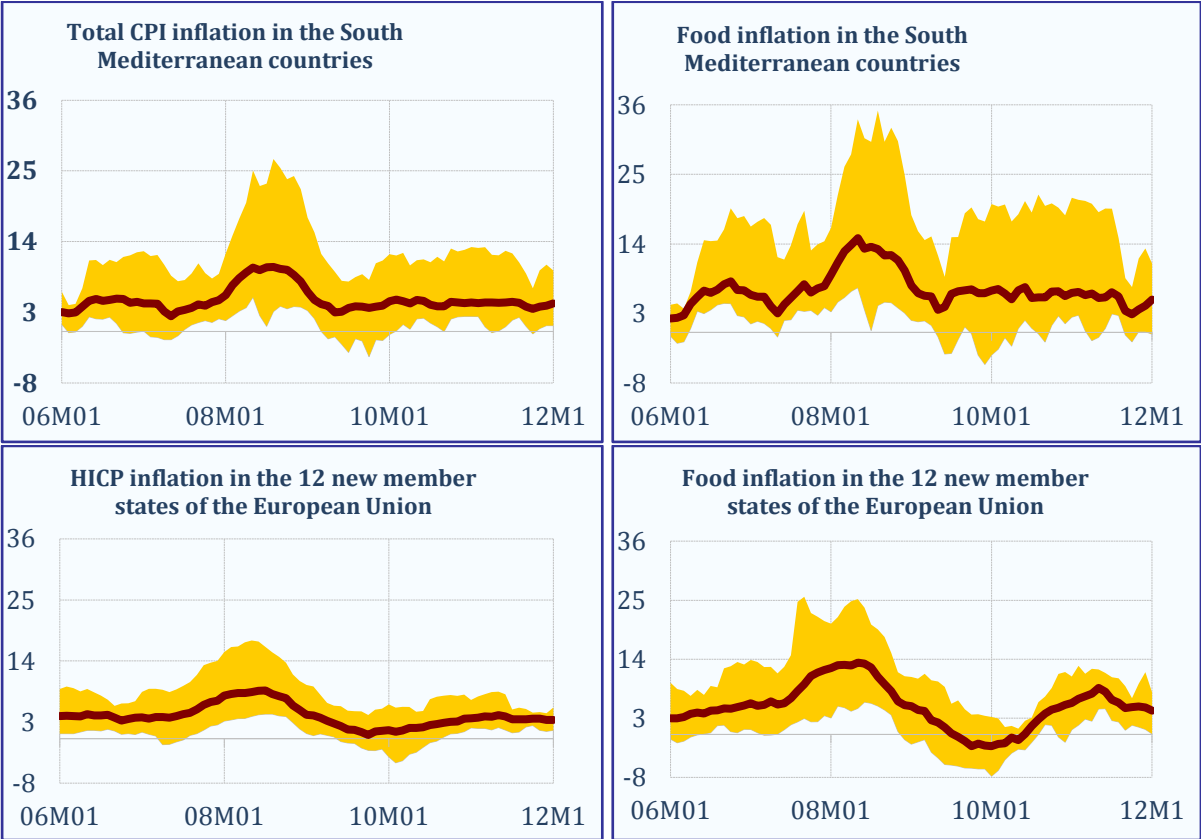
Sources: IMF, national statistical offices of the individual MENA countries and authors' calculations (available upon request).

Food and overall inflation in the South Mediterranean countries are driven by international developments, but with some differences in timing and obviously with country-specific factors causing disparate impacts across the region. Notably, price subsidies for food staples have been an important determinant. On average, world food prices exhibited strong increases outpacing the growth of overall inflation between end-2005 and mid-2008. Average overall consumer price inflation in the South Mediterranean countries was 3.4% in July 2007 and it increased almost 7 percentage points to 10.0% in July 2008 (left figure in upper panel in Graph 1). This went hand in hand with the rise in world food prices by 9% points, from 5.8% to 14.8%, during this 12-months period (right figure in upper panel in Graph 1). At the back of lower global demand due to the global crisis, world food prices came down in 2009. Then, again, in the course of 2010, world food price inflation started soaring. In middle income South Mediterranean countries (apart from Israel) real GDP has been growing faster than in developed countries and faster growth tends to go hand in hand with higher inflation. Nonetheless, an increase in inflation of 7% points during one year is substantial and can not only be accounted for by catch-up related factors. Moreover, the easing inflationary pressures in the second half of 2008 is not reflected in the South Mediterranean inflation

While agricultural commodity prices were the key driving force for world food price developments in the South Mediterranean region, there are visible divergences in price developments across countries. Over the period examined, food prices in Algeria, Egypt, Israel, Jordan, Lebanon and the occupied Palestinian territories (oPt) have shown stronger increases than in countries such as Tunisia or Morocco where the agricultural sectors are larger. Government subsidies on food products have mitigated the price rises, so that actual agricultural commodity prices had soared even more in case these subsidies would not have been provided.

The sharp fall in oil and agricultural commodity prices in the aftermath of the financial crisis resulted in a sharp deceleration of inflation in the twelve most recently acceded EU countries (figures in lower panel of see Graph 2). Average food inflation was in the group of these countries even negative, for some months in a row, and average HICP inflation dropped until 0.6%. In sharp contrast, the downward adjustment of inflation in the Mediterranean region was less pronounced pointing at stickiness or downward rigidities in prices. In some South Mediterranean countries total inflation did not even dropped under 14% as the bands show.

Graph 2 Food and total inflation in South Mediterranean and EU12 countries



Sources: Authors' calculations on the basis of the National Offices of Statistics of the South Mediterranean economies and Eurostat.

Note: These figures illustrate the annual growth rate of the consumer price index at a monthly basis, for total CPI and food prices respectively, since January 2006. The “total – Mediterranean” and “food – Mediterranean” (in the upper figures) are calculated as the simple averages of the national price indices of the South Mediterranean countries Algeria, Egypt, Israel, Jordan, Morocco, the oPt and Tunisia. Similarly, the indices “CPI – EU12” and “food – EU12” (in the lower figures) are simple averages of the respective indices of the 12 most recently acceded EU member states. The measurement of “food” here mostly includes non-alcoholic beverages, but excludes alcoholic beverages and tobacco. The ranges indicate the minima and maxima inflation across the countries. The price index for the 12 most recently acceded EU countries is the official Harmonised Index of Consumer Prices (HICP). Food prices include both unprocessed and processed food.

The information in Graph 2 further shows that not only average inflation is far higher in the South Mediterranean countries than in the most recently acceded EU countries, but that also the dispersion of inflation within the groups of countries is larger. Although the group of Mediterranean countries only counts seven countries, while the EU12 contains 12 countries, the range is wider. This points at big differences in price dynamics across the South Mediterranean countries. In particular, in times where average inflation goes up, the dispersion increases substantially across the South Mediterranean countries.

We now study the pass-through of world food price shocks on consumer price inflation in the South Mediterranean economies in more depth (see also Jongwanich and Park (2011) on the pass-through in Asia). We specify the equation

$$\begin{aligned} \Delta_{12} \log CPI_{j,t} = & \alpha + \beta_{j,1} \Delta_{12} \log CPI_{j,t-1} + \beta_{j,2} \Delta_{12} \log CPI_{j,t-2} + \\ & \gamma_1 P_j * \Delta_{12} \log W_FOODP_{j,t-1} + \gamma_2 N_j * \Delta_{12} \log W_FOODP_{j,t-1} + \varepsilon_{j,t} \end{aligned} \quad (1)$$

The endogenous variables here is the twelfth difference of the logarithm of the consumer price index for each of the countries, as illustrated in Graph 2. Subscript t refers to the time and j to the country (so j =Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, oPt, Tunisia). Explanatory variables are a constant (α), the first and second lagged endogenous variable and the world food prices. The two lagged endogenous variables are included per country to account for residual autocorrelation. The world food price variable (W_FOODP) is split into increasing and decreasing prices. Variable P is a dummy that equals one in case the annual growth rate of the world food price is positive and zero otherwise, and $N=(1-P)$ is the complement, that is a dummy that equals one in case the twelfth difference of the world food price index is negative and zero otherwise. The β 's and γ 's are parameters that we estimate econometrically. In case $\gamma_1 = \gamma_2$ the effect of a positive world food price shock is as big as the effect of a negative world food price shock on total inflation in country i . In addition to this, across the equations the restriction that the reaction coefficient of the world food price is the same for all South Mediterranean countries is imposed in order to have sufficient degrees of freedom for estimating this system of regressions.

Table 1. Seemingly Unrelated Regressions results of inflation equations

	Algeria	Egypt	Israel	Jordan	oPt	Morocco	Tunisia
<i>constant</i>	0.01 (3.75)	0.01 (2.57)	0.00 (1.99)	0.00 (1.99)	0.00 (2.10)	0.00 (2.22)	0.00 (2.27)
$\Delta_{12} \log CPI_{t-1}$	0.89 (8.96)	1.36 (13.4)	1.25 (12.8)	1.25 (13.4)	1.16 (11.7)	1.19 (12.9)	1.21 (10.7)
$\Delta_{12} \log CPI_{t-2}$	-0.21 (-2.12)	-0.45 (-4.56)	-0.33 (-3.40)	-0.36 (-3.88)	-0.37 (-3.67)	-0.29 (-3.19)	-0.35 (-3.04)
$P * \Delta_{12} \log W_FOODP_{t-1}$	0.013 (3.75)	0.013 (3.75)	0.013 (3.75)	0.013 (3.75)	0.013 (3.75)	0.013 (3.75)	0.013 (3.75)
$N * \Delta_{12} \log W_FOODP_{t-1}$	0.006 (1.94)	0.006 (1.94)	0.006 (1.94)	0.006 (1.94)	0.006 (1.94)	0.006 (1.94)	0.006 (1.94)
<i>Number of obs.</i>	71	71	71	71	71	71	72
<i>Adjusted R²</i>	0.45	0.92	0.92	0.89	0.74	0.91	0.82

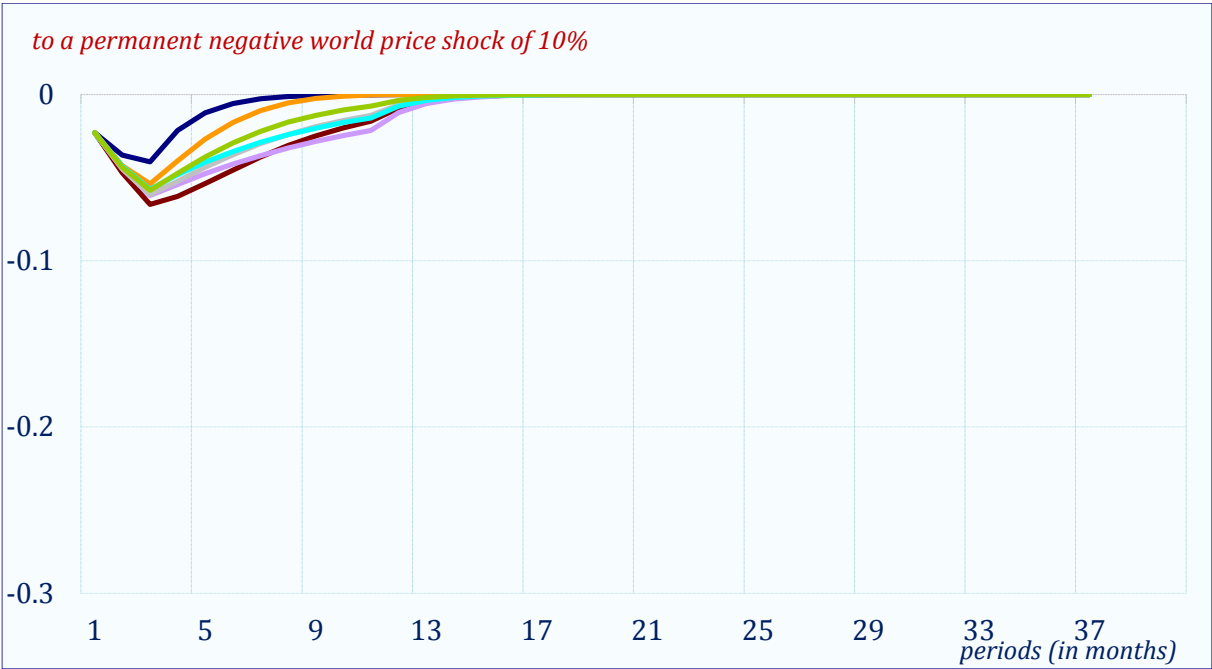
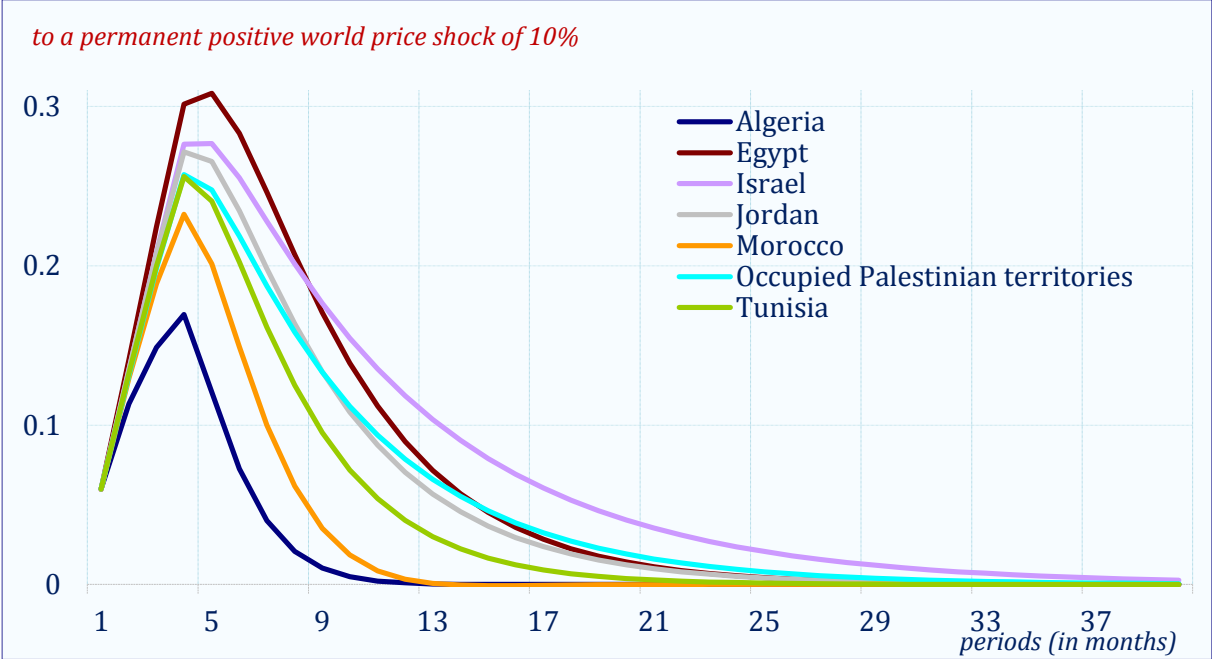
Source: Authors' calculations, that are available upon request.

Table 1 reports the estimation results of Seemingly Unrelated Regressions on the system of equations that exists of a total inflation equation for each of the seven South Mediterranean economies.. The Student-*t*-values are reported in brackets. The sample period is January 2005 – January 2012 (until February 2012 for Tunisia), though fourteen months get lost due to the two-period lagged dependent variables and annual growth rates.

The results show that the overall goodness of fit across the seven countries, as measured by the adjusted R-square, is good as it ranges from 0.45 for Algeria to 0.92 for Egypt and Israel. Tests statistics on autocorrelation in residuals show that the hypothesis of no autocorrelation is accepted for each country. The constant and the lagged endogenous variables are highly significant. Most important result for our analyses here is the impact of world food prices on domestic inflation. The estimates show that that γ_1 is much higher and highly significant while γ_2 is just insignificant at the 5%-level, being 0.013 in comparison with 0.006 (with *t*-values 3.75 and 1.94). This implies that the total CPI inflation goes up substantially more in case of positive world price shocks than it goes down in case of negative world price shocks. There is thus an asymmetric reaction . In case world food prices rise, this rise translates in higher total inflation, while a drop in world food prices does not push consumer prices downwards with the same magnitude. Consumer prices are thus sticky downwardly.

Graph 3 Response of total CPI inflation

in % changes in deviation from the base



Source: Authors' calculations, that are available upon request.

On the basis of our econometric results the response of consumer price inflation in the South Mediterranean countries to shocks in the world food price is illustrated in the upper figure in Graph 3. A shock of 10% in comparison with the baseline is simulated in periods 0 to 3. This shock puts pressure on consumer price inflation in comparison with the baseline, but to different degrees across the countries. CPI inflation in Egypt reacts strongest with up to 0.3% in comparison with the baseline. CPI inflation in Algeria increases the least. In Israel and the oPt the impact of the shock on CPI inflation lasts longest. The subsequent figure illustrates the response of consumer price inflation to a negative shock in world food prices of 10% in comparison with the baseline. The simulated shock takes again place in periods 0 to 3. This shock leads to a minor decrease in consumer price inflation (and is just insignificant).

It underlines the downward rigidities in consumer price inflation in the South Mediterranean countries. With the exception of Israelis, people in the South Mediterranean countries spend a relatively large share of their income on food: 35% to 55%. In Israel, this number is far lower, at 17%, but it has a higher GDP per capita (comparable with Slovenia). The share of food inflation in total inflation in the region has been extremely high at some points during the price upsurge, as much as 60% and 80%. This shows once more the extent to which food inflation had put considerable upward pressure on total prices in the South Mediterranean countries. Our results here are partly corroborated by Crowley (2010), who also estimates CPI inflation for South Mediterranean countries, though does not distinguish between world food price increases and decreases. See e.g. also Coutinho (2012) on other determinants of inflation in the individual economies of the Mediterranean region.

This phenomenon of downward stickiness is worrisome for several reasons. It makes it hard for central banks to achieve price stability. Such monetary instability is not helpful and can easily have a detrimental impact on the real side of the economy. Moreover, higher world food prices translating in higher consumer price inflation put pressure on the fiscal authorities to alleviate the higher cost from a social perspective. Soaring world food prices already led to shortages on the primary food product markets, such as bread and rice, that had an immediate and drastic impact on the ability of households under the poverty line to meet their basic needs. In addition to these problems, the soaring consumer prices have been forcing countries to make strategic policy choices. Moreover, due to the delays in the pass-through to consumer prices, consumers have been the last to reap the benefits from the easing of commodity and staple prices in the wake of the global crisis. The next section investigates whether the fiscal authorities managed to gain fiscal breathing space from the decline in commodity prices in terms of lower subsidy outlays.

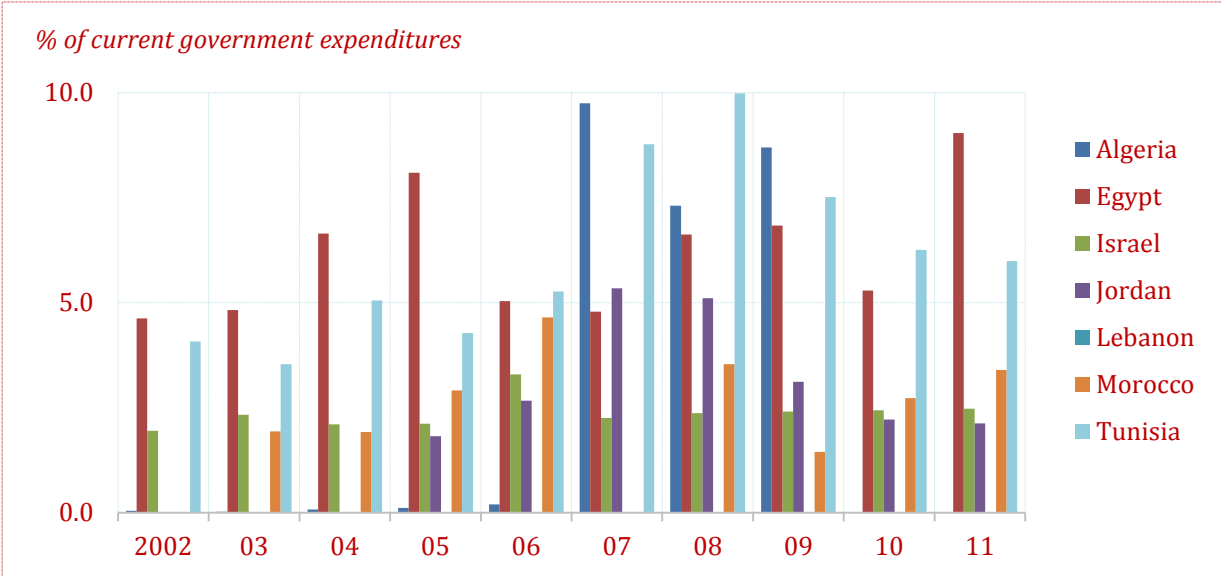
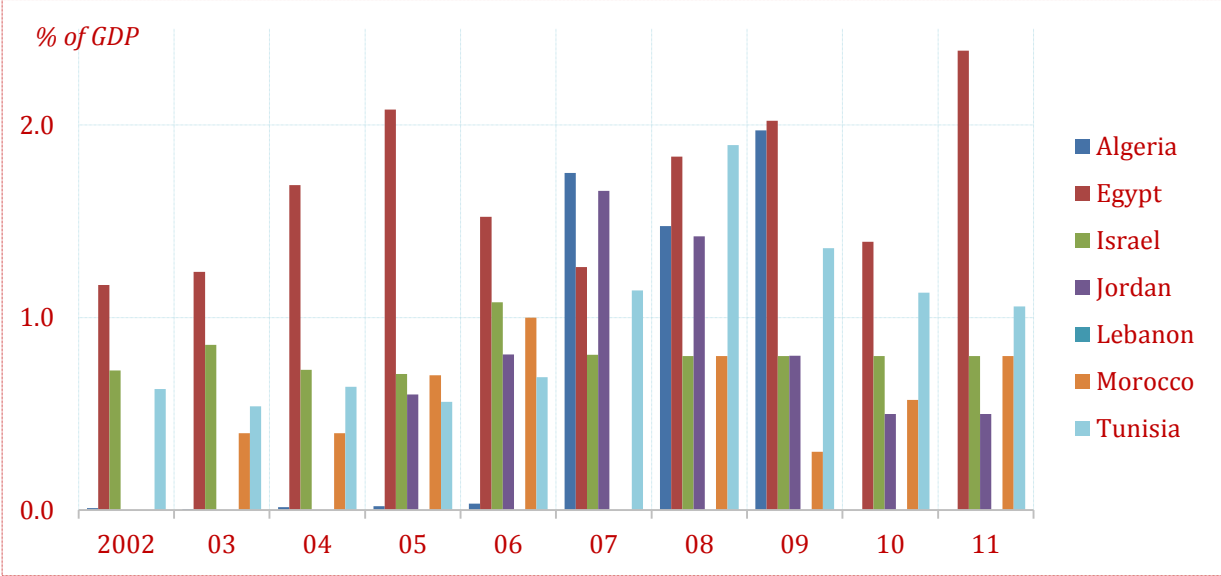
3. The impact of world food prices on government budgets and subsidies

Government subsidies, especially on food products, have played an important role for decades in most of the South Mediterranean countries. Subsidies were stepped up in the 1970s. Although largely unaffected by the oil price shocks during the two oil crises, some countries were nevertheless faced with a sharp world food price crisis at the end of the 1970s. Food policy was oriented towards “food security” and food management institutions such as the so-called *Caisses Générale de Compensation* (CGC) were set up or reorganised and intensified across the region in that period. The CGCs make up the difference between the market price and the fixed, below market, price set for these food products to compensate food distributors.

In the South Mediterranean region, the food subsidy system is therefore still a major component of the social safety net for the poor, guaranteeing the availability of affordable staples, helping to reduce infant mortality and malnutrition and mitigate the adverse effects of economic reform and structural adjustment. The history of how the currency subsidy systems came into being puts their size in perspective. Because of their institutional entrenchment, only pre-announced and carefully communicated steps will make it possible for the governments to successfully and smoothly reform the subsidy systems.

In reaction to the surge in world food prices that culminated initially in 2008 and in 2010, governments were faced with higher outlays for subsidies, notably on food products (see also Dabrowski, 2010). Apart from the higher-than-planned fiscal expenditures on food and fuel subsidies, several governments in South Mediterranean countries took other policy measures to counter the price impact. These consisted of a varying mix of measures, including the diminishing or abolishing of tariffs and duties on imported food, the imposition of export taxes on certain grains or even the banning of exports of certain grains. Several of these proved ill-conceived and arguably heightened overall distortions in the economy. Also, some countries in the region switched to a more flexible exchange rate arrangement, so that the macroeconomic effects of the initial shock on the domestic economy could pass through in a more mitigated and cushioned way.

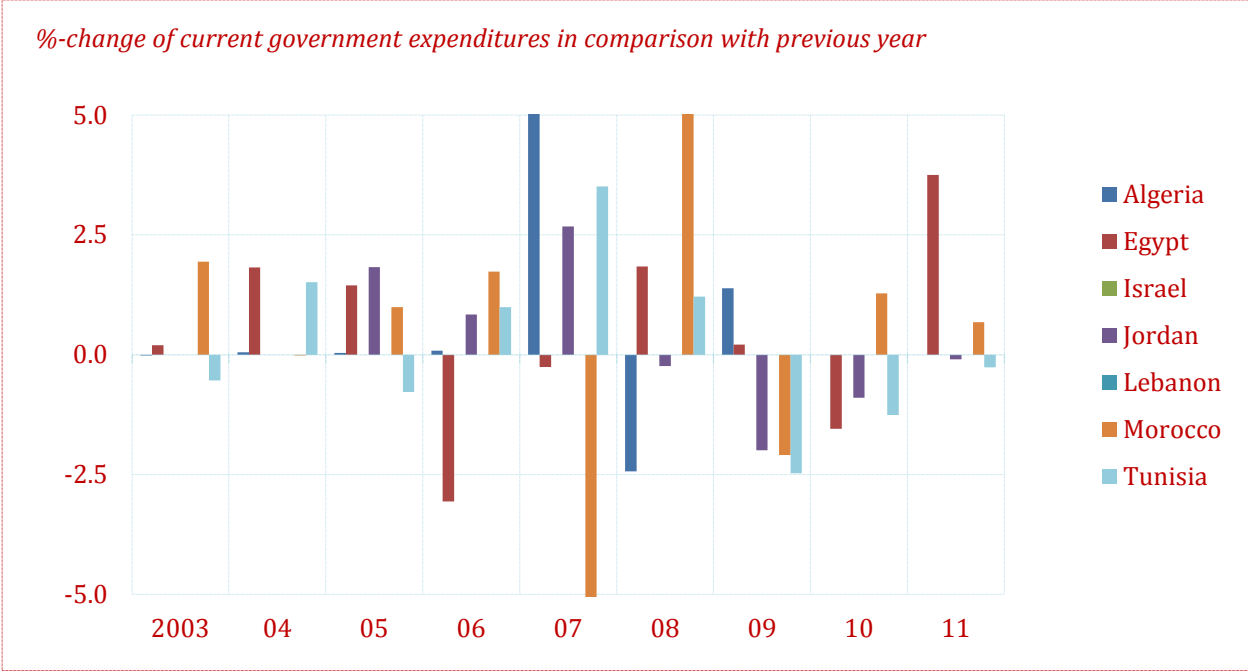
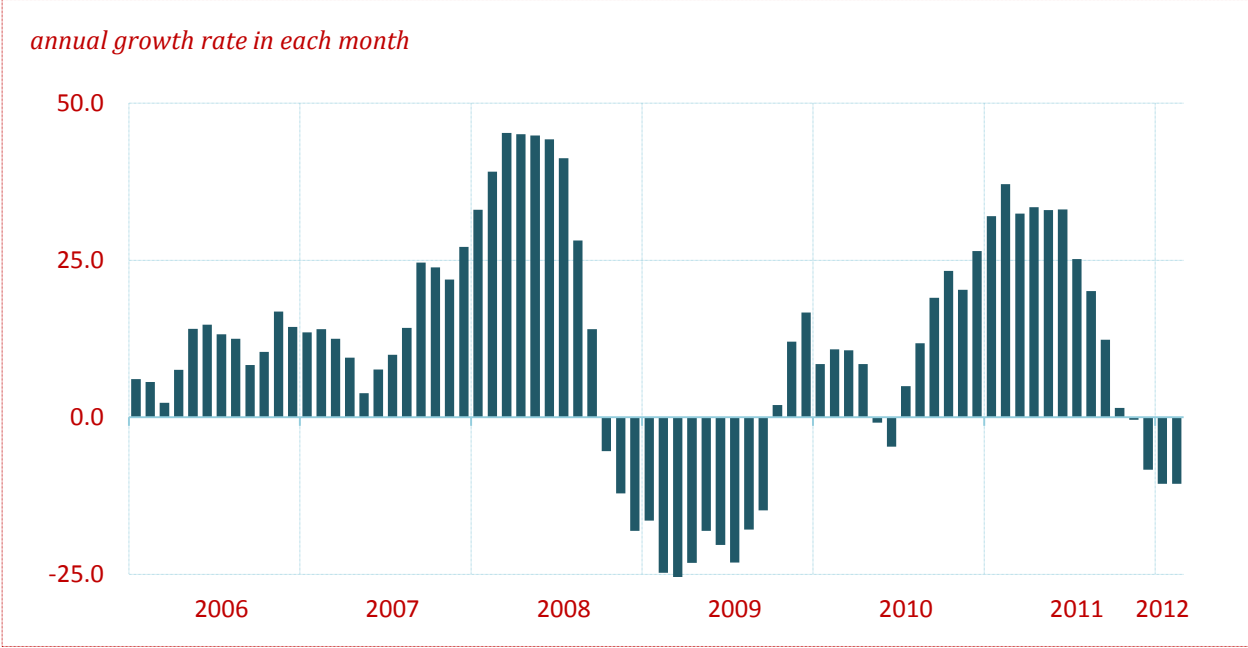
Graph 4 Food subsidies in individual South Mediterranean countries



Sources: Ministries of Finance, Central Banks of the respective Med countries, IMF Article IVs and GFS and authors calculations. Information available upon the authors' request.

Note: We check and balance when using the multiple data sources, that include information from the Ministries of Finance, the country Article IVs and Government Finance Statistics (GFS) from the International Monetary Fund (IMF). In some countries, EU Delegations assisted in gathering data. The cross-country and cross-time comparability of the different data sets is complicated by presentation of data at different levels of aggregation, sudden changes in classification, interruptions in the time series, extra-budgetary accounts and, sometimes, missing information for specific budget items or most recent years. Unfortunately, this contribution does not cover the whole period 2002-2011 for each of the countries due to the lack of information on subsidies in the (draft) budgets. Moreover, a note of caution must be given concerning the definition of "subsidies" and the blurred distinction between subsidies, transfers and other fiscal instruments (like "other" or "tax arrears" or "negative taxes"). Against this background, in our views, government subsidies will be far higher than shown in the figures here.

Graph 5 Incremental food subsidies and world food price inflation



Sources and notes: See Graphs 1 and 4.

Graph 4 shows our calculations of the developments of food subsidies in South Mediterranean countries, first as a percentage of GDP and thereafter as a percentage of current government expenditures. It follows that food subsidies were quite high in 2007-2008 – as could be expected because of the upward price trends for these products– in comparison with the preceding years. This follows from Graph 1 that illustrates the world price index or 5 that illustrates the world price inflation (that is the growth rate of the index). It is evidently the case for Algeria, Jordan and Tunisia, as follows more clearly from the second chart in Graph 5 that shows the increments in subsidies (as a percentage of current government spending).

Expressing subsidies in terms of the current government expenditures shows the potential room for manoeuvre for other expenditures. In 2007, subsidies on food in the South Mediterranean countries ranged from 2.3% of the current government expenditures in Israel (including fuel), to 5.4% in Jordan and 4.8% in Egypt. Also, the oPt and Syria spend more than 20% of their current expenditures on subsidies (see Albers and Peeters, 2011).³ On the basis of available information it is clear that the uptrend in world food prices led to notable increases in subsidies paid out by governments in the southern Mediterranean region, in particular in the few years just before the global crisis. In the wake of the strong surge in prices in the first half of 2008, budgets in several countries were adapted to take the expected impact on outlays into account. Yet, in several south Mediterranean countries concerns about possible social and political ramifications may have induced reluctance to quickly overhaul the subsidies system.

For some countries, years of lower commodity prices went hand in hand with higher government subsidies to government expenditures (Algeria). Price increases for food and commodity during the recovery from the crisis in 2009 and in particular in 2010 show a marked increase in public outlays on subsidies (Egypt). At the same time, the higher food and fuel prices did not always have a negative impact on the government budget in that subsidies increased (Egypt and Jordan). These may be seen as the effect of successful reforms in the subsidy systems achieved in difficult conditions.

We test for the impact of world food prices on the government food subsidies, as presented in Graph 4, as a percentage of the current government expenditures, and denote it here by **SUBSFOOD**_{j,t}. The system of equations that we estimate, by Ordinary Least Squares, is in similar to equation (1) in that we test for the reaction of world food price *increases* and world food price *decreases* on the endogenous variable. This gives the following result:

$$\begin{aligned}
 \text{SUBSFOOD}_{j,t} = & 0.66 * \text{SUBSFOOD}_{j,t-1} + 0.014 P_j * W_{FOODP}_{j,t-1} + 0.008 N_j * W_{FOODP}_{j,t-1} \\
 (4.24) & \qquad \qquad \qquad (2.71) & \qquad \qquad \qquad (0.94)
 \end{aligned}$$

$$R^2_{adj} = 0.33 \tag{2}$$

³ We cannot include the occupied Palestinian territories and Syria here, as we lack a consistent time series for the period 2002-2011.

The figures in brackets are Student-*t*-values and subscript j =Algeria, Egypt, Israel, Jordan, Morocco, Tunisia and t =2006-2011 (where available). In total, we have 32 observations and 3 estimated parameters, so sufficient degrees of freedom. The goodness of fit is satisfactory at 33%. As it reads, the lagged dependent variable is highly significant and has an estimated reaction coefficient equal to 0.66. It further follows that the impact of the world food price is significant in case of world food price increases and insignificant in case of world food price decreases. From these econometric analyses thus follows that food subsidies were not significantly affected by world food price decreases, such as occurred in global recession year 2009 (see Graph 5). Evidently, other factors may have played a role in explaining food subsidies, such as increases in the number of persons in need for subsidies. But, apart from these volume effects, the asymmetric response to world food price increases and decreases is highly relevant. Government subsidies that only move upwards and are not affected significantly in response to falling prices, give structural budgetary problems that hamper sound fiscal policy.

In order to do further research, statistical information has to improve. To some extent, data issues hinder the comparability of the figures presented. The issue of administered prices is not incorporated in the estimates presented below. In Algeria, for instance, the government budget does not show energy subsidies while the authorities provide energy price “support” or “implicit subsidies” by keeping energy prices fixed at prices that are lower than the market prices. Nevertheless, the bottom line emerging from the data gathered is quite clear. Soaring commodity prices in 2007-2008 and 2010-2011, but also in recession year 2009, entailed a substantial increase in subsidies and the government balances in some countries. The burden that subsidies impose on the government balances had already been heavy in most countries in the region before the price surges, but became even heavier. The future will show to what extent the latent soaring commodity prices after the global crisis may bring additional pressure on government budgets.

The importance of subsidies for government finances and economic policy in the southern Mediterranean is underlined by international comparisons. In general, the expenditure on subsidies in the region is high compared to other groups of middle income countries. Just to take the EU as a reference, in the 10 Central and Eastern European Countries (CEEC) countries that joined the European Union in 2004 subsidies were also key elements of the centralised system of economic planning. Subsidy reform in these countries started in the early 1990s. From 1995 until 2005 the CEEC countries reduced subsidies on average by almost 50%, from 2.1% of GDP to 1.2%. Of these countries, Slovakia had the heaviest subsidy system and reformed most, from 4.7% to 1.3% of GDP (so 3.4 percentage points) in a decade (see Mulas-Granados *et al.*, 2008).

4. Policy options for subsidy systems

In order to recommend policy makers on the policy options concerning subsidy systems that are most cost efficient and fairest from the point of view of income distribution, this section gives an overview of a spectrum of systems (see also Yitzhaki, 1990, IMF, 2008a,b). Due to the complexity of possible subsidy systems this overview is neither complete nor exhaustive. Instead, the aim is to describe the key mechanisms of subsidy systems, pointing out the pros and cons from the point of view of cost efficiency and income distributional fairness in order to have the main ingredients for a subsequent discussion.

Empirically, this basic question is already difficult to frame in a theoretical approach. Given the many nuances in the systems that prevail in the Southern Mediterranean region the blurred line between subsidies, direct and indirect price support, administrative controls, trade and market interventions and transfers cannot be drawn without leaving room for interpretation. For the purposes of our argument, we classify both untargeted direct price subsidies as well as so-called self-targeted subsidies (for goods or varieties of which consumption declines with rising income) as clearly falling within the definition. Also included (albeit of a different nature) are what one could call indirect or implicit subsidies via price controls (benchmarked against world market-based yardsticks) and import or export restrictions or monopolies directly controlled by the government (already here the distinction can easily become blurred in practical terms). In the region, many countries operate some form of equalisation or special funds which pool centralised budgetary resources and direct them to specific uses (often channelled via various layers of administration) that fall within our broad definition of subsidies. Obviously, the complicated operations involved blur the distinction between subsidies and other public financial operations. So does the interpretation of a subsidised 'shadow price' calculated against world market benchmarks. Evidence on quotas (or rationed subsidies) via targeted and limited access to subsidised items (e.g. via vouchers) is more rare. Conversely, transfers or income support that are not directly linked to the consumption of goods and services would clearly fall outside the scope of subsidies as defined for the purpose of this paper, even if in the statistics the dividing line between subsidies and transfers cannot always be clearly made.

Despite these caveats, the various subsidy forms outlined above can be identified to a substantial degree. The next issue is to examine what purpose they serve and how they would be impacted by changes in the system.

In case a country has a heavy subsidy system in place, with a substantial burden on public finances, it will be hard to abolish the system within a certain time horizon. For such a country a gradual approach seems the only feasible one and initially it will typically be easier to move to an “intermediate” kind of subsidy system. For this reason we wish to review the (dis-)advantages of the different types of subsidy systems from one extreme (very costly and/or unfair) to the other extreme (least costly and/or fair).

From a theoretical perspective, the rationale for subsidies stems from some form of market failure that they aim to address, that is when a difference exists between the actual price without government intervention and what is deemed the socially optimal price, for instance due to externalities not fully reflected in market prices. Subsidies can also be considered as a second-best solution in cases where other instruments to correct market failures would be less optimal. In any event, for policy makers it is also important to consider the implementation and transaction costs associated with subsidies. For instance, administrative hurdles in identifying target groups can pose burdens while identifying recipients of subsidies and implementing subsidies in such a way that abuses are avoided are not costless. Set-ups where these costs of implementation are minimised reduce distortions. In addition, flexible systems that can be adjusted relatively rapidly - also to reduce the costs to the public budget - help mitigate the budgetary impact of unforeseen adverse shocks to the system.

Most countries that provide food price subsidies maintain a *universal system*. In its most basic form it means that the subsidy applies to anybody buying the product. A main disadvantage of universal price subsidies is that price signals are distorted. Also, there is no distributional fairness as richer people can also buy the product at the lower price. As another disadvantage, this system can be costly for governments because of the incentive for people to take advantage. The economy-wide distortions associated with such a system tend to be large.

A universal system can also be targeting *implicitly* certain income groups. This happens in case a product is targeted which is disproportionately bought more by poor households. Here similar disadvantages in terms of cost inefficiency and distortions apply as under the universal system, although the extent to which they occur will be less. In a *targeted* subsidy system the subsidies are only paid to those that can afford the least to pay for the scarce products (e.g. basic food). Among the targeted subsidy systems there is the *administered targeting* approach and, even better, the *self-targeted* approach (see Adams, 2000, and Jha *et al.*, 2011 on India).

The advantage of the self-targeted system is that the households themselves determine whether they need the subsidy or not, while the government decides on their eligibility (see also Tuck and Lindert, 1996). This has the preference over an administered targeting approach, where the government will decide on the eligibility of households for a subsidy, for instance on the basis of their income. A self-targeted subsidy system outperforms other subsidy systems in terms of distributional fairness⁴ and costs to the government, but is quite hard to implement.

In general, short-term compensatory measures for poorer households should preferably focus on income transfers to reduce the loss in real income due to higher commodity prices. Optimal interventions thus steer away from subsidies. Direct income transfers should be preferred to measures such as food vouchers. Short-term measures to help the weakest groups could also be complemented by more structural measures to reduce the energy demand from these households, e.g. support for investments in better insulation and more energy-efficient appliances.

Anyhow, substantial reforms in subsidy systems will only be possible gradually. This holds in particular for food subsidies, as past experiences have shown that the social consequences can be quite far-reaching, with potential implications also on the political side. The protests and unrest in the South Mediterranean countries were triggered by high prices underline the point. In this sense policy makers will have to take not only the economic, but also the political consequences into account. Moreover, the institutional capabilities of government to improve targeting and let it go hand in hand with reduced market imperfections are an important factor determining success.

⁴ We see “distributional fairness” as the case where low-income households receive a higher percentage of subsidies in terms of their income than high-income households and where at the same time the low-income households consume the major share of the total amount of subsidies. If not, the subsidy system is regressive (implying that rich people have a bigger advantage than the needy).

5. Summary, policy issues and future research

This paper provides a comparative analysis of the impact of world food prices on consumer price inflation, food subsidies and fiscal balances in South Mediterranean economies for the period 2002-2011. To the best of our knowledge, no other studies in the scientific literature investigated this before empirically.

We first estimate econometrically, in a system of inflation equations, the pass-through of world food prices and allow for an asymmetry in reactions. It follows that the asymmetry holds, in that increasing world food prices push up consumer price inflation in the South Mediterranean economies quickly whereas falling world food prices hardly reduce this domestic inflation. We thereafter empirically test for the impact of world food prices on government food subsidies. A similar asymmetry in responses is found, in that increasing world food prices significantly push up government food subsidies while the effect of decreasing world price on government food subsidies is not statistically significant.

At the domestic markets there are thus nominal downward rigidities, probably due to inefficiencies in the food chain. Some costs are kept high, even in times when world food prices fall. Despite the fact that inflation goes up - and almost never down - in response to world food prices, food subsidies heavily impose on the government budget. Neither fell these subsidies in the global recession year 2009 when world food prices fell drastically. So the sword of rising world food prices cuts badly twice for these South Mediterranean economies. Firstly, on consumer price inflation, and therewith consumers' purchasing power, and secondly, on the public budget and therewith leaving less room for other needed public expenditures.

The value of food subsidies is substantial and even absorbed a worryingly large share of the current government expenditures of up to more than 10% in 2007-2008 and 2010-2011. This is very high in comparison to other regions in the world. South Mediterranean countries have a high potential to catch up with the developed economies. But in order to help achieve this, the fiscal burden of the subsidies needs to be reduced to create more fiscal space and possibly more room for additional spending on growth-enhancing measures. This is the main policy recommendation of this paper. There are several ways of pursuing this policy objective, mainly through improved targeting, which may or may not be achievable in view of the political regime shifts in some of the countries. More in-depth research in this field can help, to shed light on the composition and causes of these high subsidies.

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