

# ***A discusión***

## **ANTI-POVERTY TRANSFERS WITHOUT RIOTS IN TUNISIA\***

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# **ANTI-POVERTY TRANSFERS WITHOUT RIOTS IN TUNISIA**

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## **ABSTRACT**

In this paper, we draw some lessons from the Tunisian experience of social reforms and associated civil conflict. Our main interest is the riots that occurred after subsidy cuts and the attempts at substitution of price subsidies by direct cash transfers. We propose new welfare indicators apt to assess policy reforms in such situations. Using micro level data, we show that plausible policy decisions depend on parameters describing the balance between poverty and program exclusion risk. In the Tunisian case, only a much larger weight put on poverty relatively to exclusion could bring the decision maker to substitute the in force price subsidies with direct cash transfers.

***Keywords:*** Poverty; Social conflicts; North Africa, Tunisia, Targeting; Social transfers.

***JEL classification:*** D63; H53; I38.

## **1. Introduction**

One of the three key challenges identified by the World Bank in meeting the goals of the 10<sup>th</sup> Economic Development Plan is to strengthen the performance of social programs while maintaining budget balances (The World Bank, 2004). However, the implementation of this objective often meets difficulties in Less Developed Countries (LDCs) because social programs that are seen as more efficient by governments and international organizations raise severe risks for some of the poor. This situation has often led to social unrest. Then, progressive and efficient social policies may be the source of social and political conflicts, a serious concern for politically fragile states.

In Muslim states of Middle-East or North Africa, such fears combine with the threat of integrist Islamic terrorism to make unpopular reform especially sensitive. On the other hand, it has often been recognized that fighting terrorism cannot be done only by military means, but that some social justice should be provided so as to protect the poorest populations against distressing situations, and thereby avoid them to search refuges in extreme ideologies. In that sense, the design of social policies in this context is intimately related to the control of social and political violence.

In order to reach the dual political objectives of reforming policies while limiting civil conflict, one needs to avail of social welfare indicators accounting for the risk of violent conflict. These indicators should account for the fact that reducing vulnerability not only implies to reduce poverty but also to limit the policy-induced risk for the non-poor of falling in poverty and the risk for the poor to become still poorer.

Our leading case corresponds to subsidy cuts in developing countries, where they often yielded violent conflict. Indeed, protests against subsidy cuts are recurrent in LDCs as Bienen and Gersowitz (1986) show who list numerous violence episodes for the period 1976-

84. Other ‘price riots’ recently broke out at the end of the 1990s and in the beginning of the 2000s, in countries as diverse as: Indonesia in 1998 and 2005, Nigeria in 2003, Yemen and Mexico in 2005, Malaysia, India and Sudan in 2006, South Korea in 2007, Cameroun and Egypt in 2008<sup>1</sup>.

These violent outbursts have typical features. Almost always, the price hikes were large, discrete and well above the inflation rate. There was no evidence of an articulated agenda among rioters, or of leadership organizing the riots. The cause of the riots is rather to be searched in the perception by the population that the government are being reneging on past commitment to low prices. Riots start in town as urban dwellers cannot retreat from markets, whereas peasants can switch to growing food.

It is not our ambition in this paper to offer definitive solutions to such a complex economic, social and political issue as the question of subsidy cuts is. We shall limit ourselves to reflecting on the Tunisian case and proposing new policy-monitoring indicators incorporating potential poverty risks affecting the poor during economic reforms.

In Section 2, we discuss the anti-poverty policies and social issues in Tunisia. In Section 3, we propose an analytical framework. Section 4 presents our estimation results. Finally, Section 5 concludes.

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<sup>1</sup> See for references on this violent incidents: Al Jazeera, July 22, 2005; International Herald Tribune, March 20, 2005; People’s Daily, September 30, 2005; BBC News, June 26, 2003, February 29, 2008 and March 12, 2008; Berita Informasi, October 13, 2006; Reuters, July 9, 2006; The Hindu, January 8, 2006; New York Times, February 20, 2007 and February 1, 2007.

## **2. Anti-Poverty Policies and Social Issues in Tunisia**

### **2.1. Poverty and social policies in Tunisia**

The periods we deal with are primarily the 1980s till 1990 that is the year of the micro level data we use in our estimation. However, we also discuss the present situation in Tunisia<sup>2</sup>.

The successive governments put the social constraint in the centre of their priorities, and implemented vigorous social policies. In the 1980s, poverty was already lower in Tunisia than in the other countries of the region. Many formal social protection mechanisms were already present at that time. Public expenditure on health and education was on the increase. Infrastructures were improving and expanding. The growing role of the state generated more government jobs. In particular, the poor who were able to work were assisted through public work and micro-credit for self-employment. Insurance against old age was provided through expanded pension schemes. Also private remittances from abroad, which amounted to over four percent of GDP, helped alleviate household hardships. Last, but not least, food subsidies on basic necessities and cash assistance helped those who could not afford basic needs.

In the 1990s, the growth in the country revenues was on the decline. This curtailed the ability of the state to help the poor, while demographic growth created more needs. The mean real GDP growth rate was 5.8 percent in 1976-85, and fell to 3.0 percent in 1986-90, and 3.9 percent in 1991-95, before to rise again to 5.2 percent in 1996-98. Unemployment started to rise along with the vulnerability of the poor, although poverty was dropping. Despite of this,

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<sup>2</sup> We used a variety of sources for the statistics given in this paper. Some important ones are: Republic of Tunisia (1996), République Tunisienne (1996), Razmara (1998), Tzannatos (2000), The World Bank (1995, 1996, 2000, 2004),.

real wages seem to have remained unchanged between 1983 and 1993. In 1995, the unemployment rate was about 15 percent (11 percent in urban areas); although it is widely believed that the actual numbers much exceed these statistics.

## **2.2. The social sectors**

The current Tunisian social conditions are more favourable than in other countries of the region in most sectors: life expectancy (70 years for female and 68 years for males); birth control (the birth rate fell from 45.1 per mil in 1966 to 17.9 per mil in 1998); education (alphabetisation rate of 55 percent for females and 79 percent for males); female status (abolition of polygamy and repudiation); wage policy (triennial agreement about wage rises between unions and firms) and basic needs (access to water, electricity and housing).

The Tunisia family planning association was founded in 1968. It promoted a diminution of the fertility of Tunisian women. In particular, family benefits were limited to the first three children. The total fertility rate dropped from 6.4 children per woman in 1970 down to 2.8 children per woman in 1996.

In Tunisia, basic education is provided free of charge. Enrolment rates are almost identical for girls and boys. However, if secondary enrolment is as high as 78 percent in Tunis, it only reaches 19 percent in rural governorates. The public education budget was stable over the 1990s at 6 percent of GDP in 1990 and 6.5 percent in 1995.

Public works help providing employment to the poor. These programs create short-term jobs for unskilled workers. Participants are primarily from agriculture (66 percent) and construction (28 percent). During 1987-91, the programs employed on average 7500 workers per year, two-third were in rural areas.

On the whole in 1990, the government spent about 20 percent of its budget on social transfers including subsidies, spending on education, public health, social insurance, regional development, employment and training schemes, program for youth, social housing schemes and direct assistance to the poor. In 1995 after a big reform, the social sector expenditure still amounted to 10.5 percent of public budget. The main expenditure posts were: education (6.5 percent) and public pensions (2.6 percent) followed by health (2.2 percent) and food subsidies (1.7 percent). Finally, social assistance including cash and in kind transfers amounted to 1 percent of GDP and public works only to 0.4 percent.

### **2.3. The food subsidies**

The Tunisian consumption of basic food stuffs has been subsidized by the Caisse Générale de Compensation since the 1970s. The principal policy against poverty in Tunisia for many decades has been the Tunisian Universal Food Subsidies Program (TUFSP). The consumer food subsidies aimed at stabilizing prices of basic food staples, protect the purchasing power of the poor, redistribute income to the poor and improve their nutritional status. They are implemented through multiple public interventions along the marketing chain, from importers through refiners, up to distributors.

The subsidies have an important nutritional impact as in 1990 about sixty percent of caloric intake and half of protein consumption came from subsidized food, although the poor often remained under recommended intake levels.

However, this program is extremely costly and very inefficient. In 1984 the subsidies cost 4.1 percent of GDP (3.3 percent in 1981) and 10 percent of government expenditure.

Furthermore, the poor received in total much less from the program than the better off households. To reduce the subsidies cost and still protect the poor, a more stringent selection

of subsidised products was put in place to discourage the non-poor to participate in the benefits. After the reform, the program cost was reduced in 1990 to 2.9 percent of GDP, and in 1993 to 1.9 percent. It is still large.

One issue is still that much of the subsidy money goes to the non-poor. The 1993 Tunisia absolute incidence of food subsidies by increasing quintiles of per capita consumption is: 21% for the poorest quintile, then 20%, 21%, 20% respectively for the second, third and fourth quintiles and 18% for the richest quintile (Razmara, 1998).

#### **2.4. The cash transfers**

An alternative to price subsidies are the direct cash transfers to the poor. The most important cash transfer program in Tunisia is the “*Programme des Familles Nécessiteuses*”, administered by the Ministry of Social Affairs. The program transfers cash to the elderly and the handicapped.

It started in 1986 with 65,000 families (85% of the target population). In 1994, it reached 107,000 families (72%). In 1990 about 100,000 needy families received TD 56 per family per quarter, which was equivalent to TD 34 per capita per year. In 1990, this program reached about 500,000 people. This is to be compared to the price subsidy scheme, which affects the whole population.

The program administration is complex, which causes inefficiencies. Because of the difficulties in observing individual incomes, cash transfers in Tunisia are characterised by a large leakage of the benefits to the non-poor. Moreover, many poor are not reached by the program. The eligibility criteria are very general and entitlement to benefits is not always fully defined. Eligibility lists are rarely updated. Even when the lists are updated coverage is not always extended over time. Thus, the transient poor and the new poor are not detected



through the present screening process. The undercoverage (the proportion of the poor not reached) of this scheme is blatant, with at least 40,000 families on waiting lists. Geographical coverage also seems inadequate. Finally, financial constraints have prevented sufficient transfers to lift the needy families above their subsistence threshold. Finally, it would be useful to extend the transfers to those facing a risk of falling into poverty.

Meanwhile, 23 percent of the covered families receive support from various other programs, while about 4 percent were covered by the social insurance system and should therefore not have been eligible for the *Programme des Familles Nécessiteuses*. In particular, they are several in-kind transfer programs, which are publicly administered: food aid to children conditionally on attendance to schools; nutritional programs for mothers and children; financial aid to elderly and handicapped.

One can improve targeting of cash transfers by anchoring them on observable characteristics correlated with living standards. This approach is called 'proxy-means testing'. The transfers based on proxy-means tests are calculated using predictions of household living standards. Using household living standard survey data, one first regresses the living standard variable on household characteristics easy to observe. The predicted living standards for out-of-sample households are a linear score of their observable characteristics, weighed by the estimated coefficients obtained from the regression.

## **2.5. The first reform attempt**

At the end of December 1983, the government, facing the financial unsustainability of the subsidy program, suddenly raised the prices of cereal products twofold. This rise, the first one in fifteen years, covered: bread, semolina, pasta and couscous. The announcement was

made to the public only one day before the price hikes. Detailed information on the reform is available in The World Bank (1996).

The population reacted with violence in the South, notably the South West, one of the poorest regions, mostly covered by deserts. Riots started in Douz, Kebili, El Hamma, and followed north to Gafsa, Kasserine, Sfax and Tunis. They were much concentrated in the poorest neighbourhoods.

By reducing the number of recipients, targeting could diminish the political support for taxation and redistribution (Donder and Hindricks, 1998, Pritchett, 2005). Indeed, some non-poor households in Tunisia may lose from modernizing public assistance to the poor. The large leakage of the assistance systems may cause negative political incentives among the beneficiaries from the leaked funds. However, in Tunisia most of the protesters were poor and disinherited. Many were young and even young teenagers. The occupation categories most participating in these riots were the seasonal workers, the peasants, the shopkeepers and the unemployed. Students sided with the poor, and schools and universities went on strike. In the whole country, poor rural and urban neighbourhoods were affected. The latter suggests that on the whole the protest can be interpreted as a genuine revolt of the poor.

The government responded by announcing compensations through wage rises and benefit hikes of TD 1.5 per month per person. However, only formally employed people could benefit from these compensatory measures, and therefore the bulk of the poor were excluded. Even if the trade unions were appeased, the students and the poor erupted in mass violence, causing about eighty casualties. Finally, President Bourghiba called off the subsidy cuts after one week, taking the defence of the poor. This was the first public recognition of a specific political role of the poor in Tunisia.

The violent response of the poor to the cancelation of subsidies should not have come as a surprise. Indeed, all the poor clearly benefit from price subsidies. On the opposite, cash

transfers alleviate poverty, but also exclude many poor and many households just above the poverty line. The poverty risk generated by the subsidy cuts was correctly understood by the poor and near poor. However, the perception of targeting risk by poor households may hamper the development of efficient anti-poverty cash transfers.

Tunisia is not an isolated case. For example, similar events took place in Egypt during the 1970s (Ahmed and Bouis, 2002, Ahmed, Bouis, Gutner and Löfgren, 2001, Gutner, 2002). In 1973, world wheat prices were multiplied by more than four, raising the cost of Egypt's wheat imports. The government expenditure on food subsidies had to rise in parallel up to 14 percent of total government expenditure. In January 1977, after negotiating with the International Monetary Fund in 1976, the government announced price hikes for some subsidized products (bread, flour, sugar, rice, tea, butane gas, gasoline and cigarettes). The subsidy cuts prompted violent riots. Rioters saw the cuts as government reneging on promises of 'greater prosperity for everyone' and that subsidies would not be affected by reforms. Riots erupted in Cairo and Alexandria, and then spread to other places in the Nile Valley. Violence stopped only when the government rescinded the subsidy cuts after a few days. Later on, the subsidies were even extended as a response to the rioters' demand for social equity.

Besides, as mentioned in the introduction, many 'price riots' are still taking place all over the world.

## **2.6. The second reform attempt**

Let us return to the Tunisian subsidies reform to show how exclusion and targeting concerns, not just poverty reduction, are crucial for policy designs. The reform package was designed under the Tunisian Structural Adjustment Program in 1988, and implemented in

1991. The reform of the subsidy program was carried out in such a way to develop 'self-targeting' by emphasizing subsidies on basic foodstuff (Alderman and Lindert, 1998). The reform, moving away from direct cash transfers, avoided the exclusion of the poor or the unemployed from the program, while it improved the targeting performance towards the poor.

The decision not to pursue direct cash transfers may have been influenced by the difficult administration of a composite program of subsidies and cash transfers. Managing eligibility lists can be expensive to maintain. Political and social interference may degrade the integrity of these lists (Park et al., 2002). However, decentralizing administrative tasks could enhance transfer efficiency as in Bangladesh (Galasso and Ravallion, 2005).

As Lindert (2000) explains, the Tunisian reform was a practical attempt to improve the cost efficiency and targeting of a universal safety net program. She signals that subsidies before the reform already contributed five times more to the purchasing power of the poor than to that of the rich. Conventional targeting approaches rely on means-testing or other individual assessment to screen eligible households. Improvement of self-targeting subsidies in Tunisia was based on low quality products so as to discourage higher income groups from participating. Before the reform, 8 percent of food subsidies reached the poor in 1985, then 17 percent in 1990, and 21 percent after the reform in 1993 (Alderman and Lindert, 1998).

By mid 1980s the subsidy program represented 4 percent of GDP and the costs were rising by over 8 percent per annum in real terms. After the reform, the cost of subsidies was reduced to about 2 percent of GDP and to less than 6 percent of government expenditure. So, partial success was achieved.

Policy makers in Tunisia have learned how to prepare the price hikes months in advance. Communication about price subsidies and the reasons of policy changes much improved over time. In 1989, an 'awareness campaign' preceded the price hikes. The heavy financial burden that the subsidies represent for the country was discussed in Tunisian

newspapers, all closely controlled by the government. Even the President mentioned the issue in public speeches. Price hike announcements took place several months in advance. A similar effort of public explanation of the benefits of direct transfers would still be useful.

Sri Lanka in the 1950s and the 1960s is an example where the subsidy cuts went well (Bienen and Gersowitz, 1986), in part because public opinion was prepared for reform. Specific communication strategies were used for introducing the reform. The reasons for the subsidy cuts were explained to the population. Small farmers were mobilized in favor of the program. There was discipline inside the government. External donors were quick to respond. Only a few prices were raised and the minimum wage was increased too.

In Tunisia, compensating measures were announced simultaneously to price hikes: allowances for beneficiaries of direct assistance programs, increasing direct aid of school cafeterias, raises in minimum wages. It was understood it was necessary to provide a convincing and public rationale for reforms and to organize pilot experiments in local contexts. In particular, the savings obtained were emphasized while the poor remaining protected.

After the 1984 riots all price hikes have been gradual and moderate. Also, the prices of different staple goods were raised at different times. The government implemented the price hikes during the summer, when the students were absent from school, and not likely to demonstrate.

## **2.7. The current situation**

Additional social progress have been made recently in Tunisia, even if strengthening the performance of social programs while maintaining budget balances is still a challenge

(The World Bank, 2004). Life expectancy has reached 72 years; poverty has dropped from 8 percent of the population in 1995 to 4 percent in 2000.

However, the social and political situation is becoming volatile again. In April 2000, the first popular protest since 1984 broke out when taxi and truck drivers laid over for three days in Tunis against new driving licences opening increased opportunities to policemen to intimidate drivers (Smith, 2000). Then, the drivers' strike was followed by student demonstrations, which were supported by young unemployed workers and by other sections of the population. The demonstrations extended to the suburbs of the big towns and many small towns<sup>3</sup>.

The unrest is associated with tricky circumstances for families. Because of the recent price rises for gas, electricity, water and transports, many households have increasing difficulties to make ends meet and face debts. Unemployment is on the increase, 15 percent officially, while probably much more in reality. This potentially explosive context is reinforced by the loss in credibility and legitimacy of the Tunisian State (Hibou, 1999a, b). Ministries and administrations are seen as controlled by different clans. Privatisations and State criminalization hamper the traditional bargaining mechanisms, the conditions of the Tunisians' submission.

Moreover, public freedom of expression is scarce in Tunisia. Many Tunisians are in jail for minor political acts of opposition, such as internet navigation (Labidi, 2006). This leaves violent demonstrations as the only channel for protest.

What about poverty alleviation policies in this situation? New financial resources must be found in order to placate the growing demands of the population. In these conditions, subsidies look again like too expensive. How to improve policy efficiency and save funds, while still protecting the poor? Policy makers must take heed of the trade-off between

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<sup>3</sup> Zarzis, Gabes, El Hamma, Chenini, Medenine, Jerba, Ben Gardane, Kebili, Douz, Medhila, Moulares, Gafsa, Jebeniana, Sfax, Kasserine and Beja.

reducing budgetary costs and protecting the poor, while preserving political stability. For this they need statistical indicators.

In the next section, we move from these policy considerations to the precise definition of indicators with which policies and social situations can be assessed. We start with the definition of the poverty measures and how they are calculated given a specific policy.

### 3. An Analytical Framework

#### 3.1. Post-policy poverty Assessment

Our poverty estimators are based on the popular FGT poverty measures (Foster et al., 1984):  $P_\alpha(z, y) = \int_0^z \left( \frac{z-y}{z} \right)^\alpha f(y) dy$ , where  $z$  is a pre-specified poverty line,  $f(\cdot)$  is the c.d.f. of household income  $y$  (or household living standard) and  $\alpha$  is a poverty aversion parameter. The objective function can be weighed by equivalent-scales in each household and the income function can be replaced by income per-adult-equivalent to deal with poverty at the individual level rather than the household level. However, for expositional simplicity, we forget for the moment that households may include several members. One could extend our approach to other poverty measures.

Let us first consider the policy of direct cash transfers. Given a transfer budget, one must choose transfers that optimally allocate this budget across households. The optimal transfer allocation is the solution to post-transfer poverty minimization subject to a fixed transfer budget, and using only non-negative transfers. We obtain  $t^i$ , the non-negative transfer

to household  $i$ , which depends on  $y^i$  is pre-transfer income,  $B$  is the budget to allocate and  $z$  the poverty line. Meanwhile, we do not consider how the fixed budget  $B$  is funded.

In practice, living standards are imperfectly observed for most households. What proxy-means tests try to do is to assess household living standards and identify the poor. In the previous optimisation program, the incomes  $y_i$  must be replaced by their predictions,  $p\_y_i = X_i \beta$ , obtained from regressing  $y_i$  (or a transformation of it) on a set of explanatory variables  $X_i$  easy to observe. These regressions employed for the proxy-means tests are carried out using data from a living standard household survey.  $\beta$  is the vector of estimated coefficients obtained from the regression. The corresponding true value in the population is denoted  $\beta_0$ . The poor are therefore identified by the inequality  $X_i \beta < z$ , where  $z$  is the poverty line.

Once the predictions  $X_i \beta$  are calculated, they can be introduced in the previous optimisation program in place of the  $y_i$ . Then, the transfers  $t_i^*$  for each household  $i$  can be calculated as the solution to this optimisation problem. Finally, the post-transfer poverty measures, based on the  $y_i + t_i^*$  can be estimated in order to assess post-policy poverty.

Let us now consider the subsidies program. The equivalent gain of the food subsidy program is calculated in a form similar to a transfer vector:  $Y_e(p^r, p^s, Y) = Y + \Gamma$ , where  $Y$  is the income vector for observed households,  $Y_e(\cdot)$  is the equivalent-income function vector for observed households,  $p^r$  is the reference price vector composed of the prices obtained without food subsidies,  $p^s$  is the price vector under food subsidies, and  $\Gamma$  is the vector of the estimated equivalent-transfers under food subsidies. The equivalent-income function, and therefore  $\Gamma$ , is obtained by estimating a demand system using household survey data.

The poverty measure under price subsidies is calculated by converting the incomes and the poverty line into their equivalent values based on the reference price vector  $p^r$  instead of the observed price vector  $p^s$ .



Finally, administrative costs of a transfer program, typically a few percent of the global budget, should be taken into account.

### 3.2. Introducing targeting risk

We are interested in post-program poverty shocks which have been seen associated to riots. The post-program poverty reduction is  $P_{\alpha}(z, Y) - P_{\alpha}(z, Y + \hat{T})$ , where  $\hat{T}$  is the vector of the estimated household transfers.

Imperfect targeting can be described similarly to the two usual types of statistical errors. The *Type I error (undercoverage)* is that of not implementing transfers for some of the poor. The *Type II error* corresponds to transfers awarded to some ineligible non-poor people. In this typical vocabulary, akin to what is used in statistical theory, the null hypothesis would correspond to poverty for an individual, and would condition the decision to provide him with cash transfer. The undercoverage statistics provides a simple way of describing the risk for a poor household not to be reached by the policy. The undercoverage rate (UR) is

$$UR1 = ((1/N) \sum_{i=1}^N I_{[X_i \beta_0 > z]} I_{[y_i < z]} ) / P_0,$$

where  $P_0 \equiv \frac{1}{N} \sum_{i=1}^N I_{[y^i < z]}$ . That is: UR1 is, among households who are poor, the proportion of households *not* identified as poor by using their predicted income deduced from their observable characteristics. The definition of UR1 must be adjusted when the transfer budget is not large enough to serve all the households identified as poor. In that case, the transfers  $t(X_i) > 0$  correspond to a subset of the observations with  $X\beta < z$ , and

$$UR2 = ( (1/N) \sum_{i=1}^N I_{[t(X_i) = 0]} I_{[y_i < z]} ] ) / P_0.$$

That is: UR2 is, among households who are poor, the proportion of households who do not receive any transfer. In these cases, UR2 are superior or equal to UR1 since there may be poor households who are correctly identified as poor but do not receive any transfer.

The *leakage* of the transfer policy is the sum of the transfers given to those whose pre-transfer income is above the poverty line and the transfers received by pre-transfer poor while unnecessary as the post-transfer incomes are above the poverty line. So, the leakage includes the wasted transfer budget due to too high post-transfer living standards for some poor households. The *leakage ratio* is the ratio of the leakage by the transfer budget<sup>4</sup>. The leakage ratio has been estimated by Grosh and Baker (1995) and Cornia and Stewart (1995)<sup>5</sup>.

One issue is: should one minimize poverty or undercoverage? A simple answer to this question is that rather than excluding one of these legitimate concerns, it would be better to combine them in a composite indicator that would reflect the trade-off between the two types of welfare risks. This is what we do in this paper by using a C.E.S. function for the aggregation of indicators. We now define our new composite risk measure (CR):

$$CR = ( a P_0^b + (1 - a) UR^b )^{1/b},$$

where  $a$  is a positive weight representing the relative importance for the policy-maker of reducing poverty and undercoverage respectively.  $\sigma = 1/(1 - b)$  is the elasticity of substitution of  $P_0$  and  $UR$  in the objective  $CR$ . For example, for  $b = 0.5$ , we have  $\sigma = 2$ .

The C.E.S. aggregation can be seen as mixing two considerations<sup>6</sup>. First, parameter  $a$  describes the ‘relative importance or weight’ of the two welfare indicators. Second, parameter  $b$  describes risk aversion and substitution features. If one considers a decision maker

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<sup>4</sup> Other indicators are possible. Creedy (1996) and Bibi and Duclos (2007) distinguish vertical inefficiency. Coady, Grosh and Hoddinott (2004), Coady and Skoufias (2004), Lindert et al. (2005) and Skoufias and Coady (2004) use the Distribution Characteristic Indicator, which shows the change in social welfare marginal benefit achieved by transferring a standardized budget to the program, and the Coady-Grosh-Hoddinott index, which allows the comparison of the actual performance to the outcome from neutral targeting. Many inequality, concentration and progressivity indices could also be used.

<sup>5</sup> Grosh and Baker (1995) and Cornia and Stewart (1995) omit the second component of the leakage cost.

<sup>6</sup> Note that the aggregation corresponds to constant returns to scales. Indeed, there is little motivation for introducing non-constant returns, as is obvious in the case where  $UR$  is zero. In that case, non-constant returns would just produce a meaningless change in the level of the head-count index.

alternating, depending on decision times for example, between concerns for poverty and for exclusion of the poor, then  $CR^b$  is akin to the expectation of a utility function  $u(x) = x^b$  with probability  $a$  and  $1-a$  of the two states. In that case, risk aversion situations would correspond to  $b < 1$ , which we assume. As above-mentioned with the definition of  $\sigma$ , values of parameter  $b$  different from 1 also express the imperfect substitutability between the two welfare indicators in the formula of CR. Thus, parameter  $b$  has a dual interpretation in terms of risk aversion or substitutability<sup>7</sup>.

All the welfare statistics we use can be decomposed into population totals, each of which can be consistently estimated by totals weighed by the sampling scheme of the survey. We now present our estimation results for Tunisia.

## 4. Estimation Results

### 4.1. The data

The data we use is taken from the 1990 Tunisian national consumption survey conducted by the INS (National Statistical Institute of Tunisia). Using this information we computed the value of total consumption for a sample of 7734 households.

Clearly, the definition of the living standards matters. Since equivalence scale specification is always debatable<sup>8</sup>, and we do not know what the appropriate scale is, we define our welfare indicator for each household member as the total consumption expenditure per capita. It has been found that it is important to account for spatial price differences across households for poverty measurement (Muller, 2002, 2008). We correct for spatial price differences and account for substitution effects caused by price subsidies by calculating the

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<sup>7</sup> Converting the criterion by using favourable outcomes such as  $1-P_0$  and  $1-UR$  yields the familiar interpretation of an utility function based on 'goods', and preserves the substitutability, risk aversion and weighing interpretation of parameters.

<sup>8</sup> Pollak and Wales (1979), Blundell and Lewbel (1991).

equivalent-transfer corresponding to the subsidies. The calculus of the equivalent-transfer is explained in Muller and Bibi (2008) and is derived from the estimation of a Quadratic Almost Ideal Demand system.

As mentioned above, proxy-means tests are based on predictions of household living standards, obtained from regressions on observed characteristics. The predictions are, as usual, calculated from ordinary least-squares estimates (OLS). The targeting scheme for cash transfers is estimated in two stages. We first estimate a demand system. From this estimation, we derive the per capita household equivalent-incomes, which are our living standard variables. Second, we regress the logarithms of the household living standards on observable correlates. From these estimates we derive the predictions of living standards from observed household characteristics. The calculus of the optimal transfers is done using the method of Bourguignon and Fields (1990, 1997) applied to the sample of equivalent-incomes. All these calculations are detailed in Muller and Bibi (2008).

The poverty line we use is equal to TD 250 under subsidies (The World Bank, 1995). It corresponds to 14.1 percent of poor people in Tunisia in 1990. This poverty line can be converted into an equivalent poverty line of TD 280 without in force subsidies.

#### **4.4. The estimation results**

We consider four alternative policies: the price subsidies and three cash transfer schemes based on proxy-means with three respective sets of observable correlates. Muller and Bibi (2008) discuss in details the correlates used for the living standard predictions. We group these correlates of living standards according to increasing observation difficulty by the administration and increasing ease of modification or concealing by households. Set I

includes the regional dummies, which corresponds to regional targeting<sup>9</sup>. Set II contains regional and demographic information on households, and characteristics of the household's dwelling. The variables in Set II are unlikely to be manipulated by households and can be easily observed. Set III adds information on the occupation and education of the household's head, which is easier to conceal by households than other observed characteristics. The performances of these policies are compared by using the post-policy equivalent-incomes.

Table 1 shows the estimation results for our different criteria<sup>10</sup>: (1) the levels of poverty measures for  $P_0$ ,  $P_1$  and  $P_2$ ; (2) two measures of targeting accuracy (leakage and undercoverage, (3) our new composite risk measure, for different values of parameters  $a$  ( $= 0.25, 0.5$  and  $0.75$ ), and  $b$  ( $= 0.5, 0.75, 1, \infty$ ). The limit case  $b = \infty$  corresponds to the minimum of the two welfare criteria.

Poverty levels reached by using any tried transfer method are much lower than those obtained with the price subsidies, for the same global budget. Moreover, the leakage statistics is always substantially larger with the subsidies where the only targeting device is the choice of the poor households to consume relatively more of the subsidized goods. Thus, direct cash transfers, according to these important social welfare indicators, appear are clearly preferable in terms of poverty.

In contrast, the undercoverage is null for subsidies that reach everybody. With the transfers they amount to slightly less than one quarter of the poor, down to 18 percent with the best method. One question is whether the undercoverage shortcoming of the transfers can be enough to change the policy decision in favor of the subsidies. The answer is given by the estimated levels of our composite risk indicators for different values of parameters  $a$  and  $b$ .

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<sup>9</sup>About regional targeting, see Kanbur (1987), Ravallion (1992), Datt and Ravallion (1993), Baker and Grosh (1994), Besley and Kanbur (1988), Bigman and Fofack (2000) and Bigman and Srinivasan (2002).

<sup>10</sup> The estimates of  $P_0$  and  $P_1$  have been dropped from Muller and Bibi (2008). Therefore, the estimates for  $P_0$  and  $P_1$  in the present paper are original, as well as our composite risk measure.

When the weights given to head-count index and undercoverage are the same ( $a = 0.5$ ), the subsidies much dominate the transfer programs, for all reasonable values of the substitutability parameter  $b$ . Of course, this trend is reinforced when putting more weight on undercoverage ( $a = 0.25$ ). However, when more weight is put on the number of the poor ( $a = 0.75$ ), perhaps a reasonable approach when dealing with poverty alleviation policies, direct transfers may be deemed preferable to subsidies, provided their targeting power is good enough, for example because a large number of living standard correlates has been used.

The results show how policy decisions depend on balancing weight parameters between poverty and program exclusion risk. In the Tunisian case, only a much larger weight put on poverty relatively to exclusion, and the good targeting performance of proxy-means transfers, could bring the decision maker to substitute the in force price subsidies with direct cash transfers, for fear of social unrest. We deem it unlikely in the absence of improvement of targeting methods.

## **5. Conclusion**

In this paper, we draw some lessons from the Tunisian experience of social reforms and associated civil conflict. Our main interest is the riots that occurred after subsidy cuts and the substitution of price subsidies by direct cash transfers. We propose new composite welfare indicators apt to assess policy reforms in such situations. The indicators account for the trade off between poverty alleviation and targeting efficiency. Finally, using micro level data we show that the plausible policy decision depend on parameters describing the balance between poverty and program exclusion risk. In the Tunisian case, only a much larger weight put on poverty relatively to exclusion could bring the decision maker to substitute the in force price

subsidies with direct cash transfers, for fear of social unrest. We deem it unlikely in the short term.

Our approach has been to propose new indicators of targeting risk combining social and political objectives. Such indicators would provide valuable information on the feasibility of the reform and of the likelihood of social reforms. Our composite risk indicator could for example be used to assess other policies as the ones discussed in Section 2 or the ones studied in Van de Walle (1998) for public services.

To make it practicable, the transfer scheme in operations in Tunisia would need to be much extended and improved. One avenue of improvement could be to use ‘focused transfers’ as in Muller and Bibi (2008), based on quantile regressions. This would allow the government to reduce the undercoverage of the scheme to a very low level. Then, the reform should be politically viable because it would not generate severe risks for the large majority of the poor. Some of the budget allocated to price subsidies could be affected to an improved cash transfer program, showing to the population how the new approach reduces poverty and limit post-program exclusion. Perhaps, the best program is to be searched as a sharing rule of the social budget between food subsidies and cash transfers.

Of course, replacing price subsidies with cash transfers would not only alleviate poverty, but may also improve market efficiency and thereby stimulate economic growth.

## Appendix 1: Estimation Results

**Table 1: Estimated Criteria**

	<i>Subsidies</i>	<i>Transfers I</i>	<i>Transfers II</i>	<i>Transfers III</i>
<b>Traditional indicators</b>				
P <sub>0</sub>	13.86 (0.75)	10.50 (0.67)	7.52 (0.47)	6.79 (0.40)
P <sub>1</sub>	3.44 (0.24)	2.24 (0.21)	1.37 (0.12)	1.22 (0.10)
P <sub>2</sub>	1.30 (0.11)	0.74 (0.10)	0.40 (0.05)	0.36 (0.04)
Leakage	90.05 (1.24)	80.74 (4.34)	73.57 (3.67)	72.39 (3.60)
UR	0.00 (0)	24.73 (2.88)	19.54 (1.58)	17.50 (1.37)
<b>Composite indicators</b>				
a = 0.5, b = 1	6.93	17.62	13.53	12.15
a = 0.5, b = 0.5	3.46	16.86	12.82	11.52
a = 0.5, b = 0.75	8.07	32.72	23,54	20,63
Min(P <sub>0</sub> , UC)	0,0	10,5	7,52	6,79
a = 0.25, b = 1	3,47	21,17	16,54	14,82
a = 0.25, b = 0.5	0,86	20,61	16,00	14,35
a = 0.25, b = 0.75	2,60	41,42	30,50	26,68
a = 0.75, b = 1	10,4	14,06	10,53	9,47
a = 0.75, b = 0.5	7,79	13,49	9,99	9,00
<b>a = 0.75, b = 0.75</b>	<b>15,65</b>	<b>24,83</b>	<b>17,30</b>	<b>15,21</b>

Sampling standard errors are in parentheses. There are 7734 observations.

The rows of P<sub>2</sub>, UR and Leakage are taken from Muller and Bibi (2008). The estimates of P<sub>0</sub>, P<sub>1</sub> and those of our composite risk measures are new.

Set I of independent variables includes only regional variables. Set II includes in addition to Set I, demographic and dwelling variables. Set III includes in addition to Set II, occupation and schooling level of household head.

Each of the measures presented in this table has been multiplied by 100 for easy interpretation.



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