



IMF Working Paper

Burkina Faso—Policies to Protect the Poor from the Impact of Food and Energy Price Increases

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Fiscal Affairs Department and African Department

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August 2011

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Abstract

This paper assesses the effectiveness of policies taken by the Burkinabè authorities to protect the poor from the adverse impact of a combined food and oil price shock in 2008. Estimates of the impact based on household survey data and a price pass-through model suggest that these policies were not well-targeted, benefiting the wealthier groups of the population rather than the poor. More effective policy measures, such as a conditional cash transfer system, which is already being implemented on a pilot basis in urban areas, are discussed as an alternative policy option.

JEL Classification Numbers: H20, H22, H23

Keywords: Burkina Faso, fuel price subsidies, food price shock, conditional cash transfer system

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¹ The authors are grateful to David Coady for his invaluable input and feedback. We also thank Kossi Assimaidou and Benedict Clements for very useful suggestions and comments. Responsibility for remaining errors and omissions lies with the authors.

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I. INTRODUCTION

In mid-2008, the Burkinabè authorities sought to protect the poor from the adverse impact of a combined food and oil price shock. Food and energy prices surged in early 2008—called “*la vie chère*” by the population—reflecting international price developments and other factors. In response, the government suspended taxes on a number of consumer products between March and September 2008, with a view to protecting the welfare of the most vulnerable groups. Energy prices were also contained, and some petroleum products subsidized.

This paper assesses the effectiveness of these policy measures and proposes alternative policy options. This analysis is based on a national household survey. Our incidence estimates ignore behavioral responses. As a result, they do not reflect the full distributional effects of fiscal policy, but rather aim to assess the impact of specific policies, assuming other factors as constant.

The short-term measures to offset the adverse impact of increasing food and petroleum prices on the population were not very well-targeted. The phasing out of the temporary food price measures in late 2008 was in line with the finding that almost 80 percent of the benefits of these measures accrued to households in the top 60 percent of the welfare distribution. The ongoing measures relating to fuel product prices are especially poorly targeted, with less than 16 percent of the benefits accruing to the 40 poorest percent of the population.

Since early 2009 the authorities started to implement more effective policies against food price increases. Realizing that food supply needs to be increased, the government developed policies to boost agricultural production. The authorities are also targeting poor groups directly, notably through their school feeding program. The introduction of a conditional cash transfer system in the two biggest cities is also a promising option for promoting the poor’s welfare and reducing poverty over time. This program is being implemented with the help of donors, and could, if successful, be extended to deliver social protection more effectively to the poor population.

This paper is organized as follows. Section II presents the data sources and methodology. Section III assesses the distributional impact of the tax suspensions to protect the population from food price increases, while Section IV undertakes a similar analysis of the current subsidies for petroleum products. Alternative short-term policy options are presented in Section V. Proposals for better-targeted long-term policy options, in particular cash transfer systems, are discussed in Section VI, while Section VII concludes.

II. DATA SOURCES AND METHODOLOGY

Estimating the incidence of price increases and mitigating measures requires an estimation of households' consumption of all affected goods across income groups. Our analysis is based on the Survey on Living Conditions of Households (EBCVM) conducted by the National Institute of Statistics and Demography from April to July 2003.

A change in a commodity's price generates a *direct* effect on the real income of all households that consume it directly. The product of a percent price change and the share of the corresponding good or service in total household expenditures can be used as an estimate of the change in real income due to that price change. For example, if the price of petrol increases by 20 percent and the share of petrol in total household expenditures is 5 percent then the price increase leads to a one percent decrease in the real income of the household. These real income effects across all the goods from which prices have changed are aggregated to get the total decrease in household real income. When a commodity is an intermediate good used to produce other final goods and services, as is the case with fuel products, a change in this commodity's price affects the production costs of all final goods and services that use it as an input, and in turn, the price of these final goods. This is usually referred as an *indirect* effect. Our measure of the indirect effect of fuel price changes reflects the welfare loss due to the increase in the prices of other goods and services consumed by households, induced by the higher costs of fuel inputs.²

Households' per capita consumption is used herein as a measure of welfare. Welfare quintiles are then computed to analyze the distribution of the real welfare effect. We estimate both the impact of price increases on specific food and fuel goods, as well as the impact of mitigating policies on real income (welfare). This is achieved by computing the product of a specific percent price change and the share of this item in total household expenditures. This impact is then averaged over all households in each quintile to obtain the average percentage decrease in household real income in each quintile. To estimate the indirect effects, we use an input-output table of year 2007 to simulate the pass-through of a price change in one sector onto other sectors, assuming that input proportions are fixed and that price changes in upstream sectors are fully passed on to consumers in the form of price changes in the downstream sectors. The poor are here understood as the two lowest consumption quintiles of the population, equaling 40 percent of households (Box 1).

Estimating the net welfare gain and distributional impact of the recent policy measures requires some assumptions on the price effects of mitigating measures. These price effects are estimated on the basis of the assumed pass-through of taxes on the final consumer price.

² The estimation of the indirect price effect on other goods and services assumes that all cost increases are pushed forward onto output prices. Since much of the cost increases come through trade and distribution margins, which are non-traded, this is probably a good approximation. A more detailed description of the model and its applications to other countries is presented in Coady and others (2006).

For this, we assume that the retail price of staples affected by tax suspensions will decrease by the same percent value as the percent change in the tax rates due to the measures, as reported in Table 2 (for staples) and Table 5 (for fuel products). The household's benefit accrued from the measures is estimated by multiplying the household's expenditure share on a specific good by the estimated price change of the good due to the mitigating measures. To compute the indirect benefits, we use the same input-output price-shifting model as described above. The net welfare loss in real income is calculated as the loss due to the price increase minus the benefit from the mitigating measure.

Box 1. Poverty in Burkina Faso

Landlocked Burkina Faso remains a very poor country, and any decisive reduction in poverty a challenge. In 2009, UNDP ranked Burkina Faso as 177 out of 182 countries in its Human Development Index. The authorities have made significant efforts in reducing poverty, with their Poverty and Reduction Strategy as an important vehicle. As a result, the proportion of households living in poverty has fallen from 46.4 percent in 2003 to 40.1 percent in 2006.¹

Poverty is spread unevenly across the country, and concentrated in rural areas. Almost 53 percent of the rural population is estimated to live under the poverty threshold. Women are particularly affected, as their access to land and productive resources is still very limited. Moreover, about 40 percent of the rural population is at risk of food insecurity, and 42 percent do not have access to drinking water. Electricity is also mostly limited to urban centers.

The poor are also particularly affected by the adverse impact of the shocks Burkina Faso is prone to. Agricultural production, the main source of income for the rural poor, remains dependent on weather patterns and hampered by very low agricultural productivity. Diversification is limited, with cotton being by far the most important cash crop. The sector, however, has proven very vulnerable to international price shocks. The urban poor, unable to carry out subsistence farming, are in turn adversely impacted by international food price shocks. Unstable weather patterns and severe flooding have also affected the poor disproportionately, as their housing is not very solid, and often built in undesirable locations.

¹ Source: Nouvé and others (2009).

In order to compute the aggregate net welfare loss from food price increases in the overall population—which includes consumers and producers of food products—we net the welfare gain from food price increases for domestic net producers of food products to the loss incurred by net consumers. We base this analysis on the answers related to the quantity of agriculture production and sales in the EBCVM.³

III. THE IMPACT OF FOOD PRICE INCREASES AND POLICY MEASURES TAKEN

Through the beginning of 2008, the prices of a number of core food items increased significantly (Table 1). By February 2008, the price of maize had increased by 43 percent (year-on-year), while the prices of millet increased by 18 percent, and of sorghum by 25 percent—the three crops being the most important staple foods for the population. This price increases mostly reflected two bad harvests in a row, caused by adverse weather. The high international price of rice, in combination with weak local supply, drove up the price for rice by 14 percent over the same period. The price for vegetable oil shot up by 43 percent, as a result of low cotton grain production, the core input for vegetable oil.

Table 1. Food Price Increases, March 2007–February 2008

Staple Product	Percent Increase
Rice	13.8
Millet	18.2
Sorghum	24.6
Maize	42.5
Meats	7.1
Flour	18.5
Vegetable oil	43.4
Overall CPI	7.1

Source: Burkinaabè authorities; and staff calculations.

In order to mitigate the impact of the food price increases, the government suspended customs duties and VAT on a number of important food products in March 2008. Most food items are already exempt from the VAT—in the West African Economic and Monetary Union (WAEMU), each member state can chose a number of product categories to be granted this exemption, in order to protect food consumption of the poorer segments of its society. In addition, in an attempt to keep prices down, the government of Burkina Faso put

³Appendix Table 1 presents a tabulation of household survey answers on the revenue module that relate to household sales of grain products produced. We use these data, in spite of having a large number of missing values which we account as zero values (no production/sale). Under this approach, some missing values that could simply reflect poor quality data could result on an underestimation of the impact of price changes on producers of grain products.

in place the following regulations (Table 2): *i*) suspensions of customs duties for rice, salt, powdered milk and other milk products, *ii*) VAT suspensions for wheat, noodles, vegetable oil and soap.

Table 2. Suspended Tax Rates
(In percent)

Staple Products		Tax Rate
Rice	Import tariff	10
Salt	Import tariff	5
Milk and milk products	Import tariff 1/	9
Pasta	VAT	18
Soap	VAT	18
Vegetable oil	VAT	18

Source: Burkinaabè authorities; and Fund staff calculations.
1/ Tax rate weighted by sales volume of specific milk products.

However, the measures could not contain the upward trend in prices. The price of rice continued to increase by almost 40 percent between March and September 2008. The prices for powdered milk, noodles, and soap are partially controlled by the authorities and hence not fully determined by market forces. As a result, the price of some of these products, for example soap, stayed flat between March and September 2008. None of the products, however, declined in price.

The revenue loss of these measures amounted to about CFAF 4 billion (0.1 percent of GDP). Lost revenue for customs reached CFAF 3.7 billion, while the VAT suspension cost was contained at CFAF 0.1 billion.

Distributional impact

Poor households are hit the most by the food price increases. Table 3 reports the average budget shares of a basket of staple products most affected by the price increases, across household's consumption quintiles.⁴ The poorest segment of the population consumes more food items relative to their budget, and is thus more affected by the food price shocks. By contrast, the pattern of household consumption across income groups is roughly neutral for products targeted by the tax suspension. Rice is an important food staple, accounting in average, for 3 ½ percent of all household's spending. The distribution by household groups reveals that it is more important a good for the higher-income groups of the population, with the top two richest groups having the highest budget shares on rice. Milk is also consumed

⁴ The shares reported in Table 3 reflect only consumption generated by purchases of these products (i.e., do not include consumption of products self-produced by each household or gifts). These shares are subsequently used to compute the welfare impact of a price increase.

more by the wealthier segments of the population. Yet, the poorer segments spend relatively more on soap and salt.

Table 3. Household Budget Share of Staple Products with Tax Suspensions

(In percent of total consumption)

Products	Consumption quintiles					All households
	Bottom	2	3	4	Top	
Staples most affected by price increases 1/	14.2	13.8	13.7	14.4	12.1	13.7
All products with tax suspensions	7.4	7.4	7.6	8.4	7.8	7.7
Rice	2.7	3.1	3.5	4.1	4.0	3.5
Vegetable oil	1.1	1.2	1.3	1.3	1.2	1.2
Salt	0.8	0.6	0.5	0.5	0.2	0.5
Milk	0.1	0.1	0.2	0.3	0.6	0.2
Flour from cereals	0.2	0.2	0.2	0.3	0.3	0.2
Soap	2.5	2.1	2.0	1.8	1.4	2.0

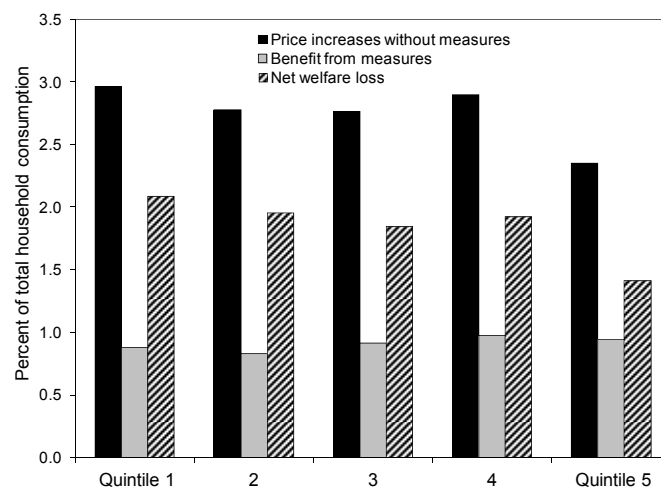
Source: Fund staff calculations based on EBCVM (2003).

Note 1/ Includes purchased rice, millet, sorghum, maize, meats, flour, and vegetable oil.

The mitigating measures taken in March 2008 had only a modest impact relative to the staples' price increases over the previous 12 months, and the net welfare loss was significantly more pronounced in the poorest households.⁵ The average net welfare impact of the price increases over the period March 2007 to February 2008 against the mitigating measures taken in March 2008 was equivalent to almost 2 percent of total household's consumption. Moreover, the net impact of the bottom quintile was around 50 percent higher than the net impact on the top quintile (Figure 1).

Further, the tax suspensions were not well targeted to poor households, with a clear bias of benefits towards the rich. Our estimates suggest that the poorest quintile of the population received less than 10 percent of the relief that the government's measures

Figure 1. Net Welfare Impact of Tax Suspensions



Source: Fund staff calculations based on EBCVM (2003).

⁵ See Appendix Tables 2 and 3 for a detail of the estimated impact of the price increases and tax suspension for each specific food product.

provide, while the richest 20 percent of households received one third of

the total benefit (Table 4). This reflects poor households' relatively small share in total consumption of the goods affected, so that, like with most universal subsidies, the benefits of the mitigating measures accrue disproportionately to higher-income households.

Table 4. Shares of Tax Measure's Benefits
(In percent)

Share of benefit	Consumption quintiles					Poor 1/	Non-Poor	All Households
	Bottom	2	3	4	Top			
All tax exempted products	9.5	13.5	18.1	24.0	34.9	19.3	80.7	100.0
Rice	7.3	12.1	17.4	24.8	38.4	16.2	83.8	100.0
Vegetable oil	8.6	13.9	19.4	24.3	33.8	18.7	81.3	100.0
Salt	17.7	19.1	20.0	27.3	16.0	31.7	68.3	100.0
Milk	1.7	4.9	10.4	17.2	65.7	5.7	94.3	100.0
Pasta	7.5	8.1	12.8	27.7	43.8	11.8	88.2	100.0
Soap	13.5	16.3	19.6	22.7	28.0	25.2	74.8	100.0

Source: Burkina Faso authorities; Fund staff calculations based on EBCVM (2003). 1/ Using poverty line defined by the National Institute of Statistics and Demographics of Burkina Faso, equal to 82,672 FCFA, 37.5 percent of households are classified as poor.

In detail, the richest households received disproportionately more benefits than the poorest from tax suspensions on rice, milk, pasta, and vegetable oil, while benefits from salt and soap were somewhat more neutrally distributed (Table 4). As with the other products, this benefit distribution reflects the direct consumption pattern of households in the different income groups. The two richest segments of the population receive over 60 percent of the benefits from the tax suspension for rice. By contrast, the poorest twenty percent of the households receive only 7 percent of the benefits. For milk, the pattern is even more pronounced, with the richest 20 percent of the population accruing 39 times more than the poorest 20 percent. For vegetable oil and soap, the rich also gain progressively more than the poor, with the top quintile accruing four and two times more of the benefits of the suspension than the bottom quintile, respectively. Households in the two bottom quintiles display a larger share of total salt consumption, and so, they accrue a more proportional benefit of the tax suspensions for salt.

IV. THE IMPACT OF HIGH ENERGY PRICES AND MITIGATING POLICY MEASURES

Between October 2007 and September 2008, the prices of some core energy products increased significantly in Burkina Faso, reflecting to a large degree international prices (Table 5). The largest price increase was for diesel, which increased by over 20 percent, while the price for gasoline increased by 10 percent. Lamp oil (kerosene), used by the poorer segments of the population to lighten their houses, increased by 8 percent. The prices of all of these energy products are regulated and set directly by the authorities. A committee meets

every month to review and set prices, in principle passing through international price developments to domestic retail prices.

Table 5. Energy Price Increases, October 2007–September 2008

Energy product	Percent increase
Lamp oil	7.7
LPG	0.0
Gasoline	10.4
Diesel	20.2
Electricity	0.0
Overall CPI	7.1

Source : Burkinabè authorities.

However, since mid-2007, the government has been cushioning the adverse impact of the international oil price shock on consumers by allowing less-than-full pass-through of increases in international prices. This policy is generating a significant fiscal cost, both in the form of explicit budgetary subsidies to the national oil company, as well as foregone revenue from custom tax takes that would have been higher if a market wholesale price had been used as a tax base. Table 6 reports the types of subsidies that are applied to each specific fuel product.

Table 6. Fuel Product Policy Measures

	Gasoline	Butane	Lamp oil	Diesel 1	Diesel 2
Explicit subsidy (to distributors)	No	Yes	No	No	No
Implicit subsidy (to oil parastatal)	Yes	Yes	Yes	Yes	Yes
Exemption excise petroleum tax	No	Yes	Yes	No	Yes
Exemption VAT	No	Yes	Yes	No	Yes
Total measure, percent of current price	10	240	81	22	75

Source: Burkinabè authorities; and Fund staff calculations.

The government explicitly subsidizes the price of butane gas, at a cost of 0.3 percent of GDP, with the subsidy being paid directly to the distributor (Table 7). Heavy fuel is also subsidized directly at a cost of 0.4 percent of GDP, in order to keep electricity prices down, as it is used for electricity generation. The estimated total cost of the price gap between government-regulated and formula-determined prices—part of which is currently implicit, as a loss of the national oil company—and lower customs revenue is estimated at 0.8 percent of GDP (Table 7). In sum, measures related to fuel products in 2008 generated an estimated cost of 1.6 percent of GDP. If foregone consumption taxes, notably the excise and VAT exemptions

(exempted before 2007), are taken into account, the total estimated fiscal cost of fuel-related measures in 2008 amounts to 2.9 percent of GDP.⁶

Table 7. Estimated Fiscal Cost of the Energy Policy Measures in 2008
(In percent of GDP)

	Gasoline	Butane	Lamp oil	Diesel 1	Diesel 2	Heavy fuel	Fuel	Total
Total fiscal cost	0.1	0.5	0.2	0.4	0.4	0.8	0.4	2.9
Controlled pass-through and direct measures	0.1	0.3	0.0	0.4	0.1	0.5	0.0	1.6
Direct subsidies	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.8
Loss for oil parastatal and foregone customs tax	0.1	0.0	0.0	0.4	0.1	0.1	0.0	0.8
Foregone consumption taxes 1/	0.0	0.2	0.2	0.0	0.3	0.3	0.4	1.3
Excise	0.0	0.1	0.1	0.0	0.2	0.2	0.2	0.7
VAT	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.6

Source: Burkinaabè authorities; and Fund staff calculations.

Notes: 1/ Excise tax equal to gasoline is assumed, no change in total projected sales volume is taken into account.

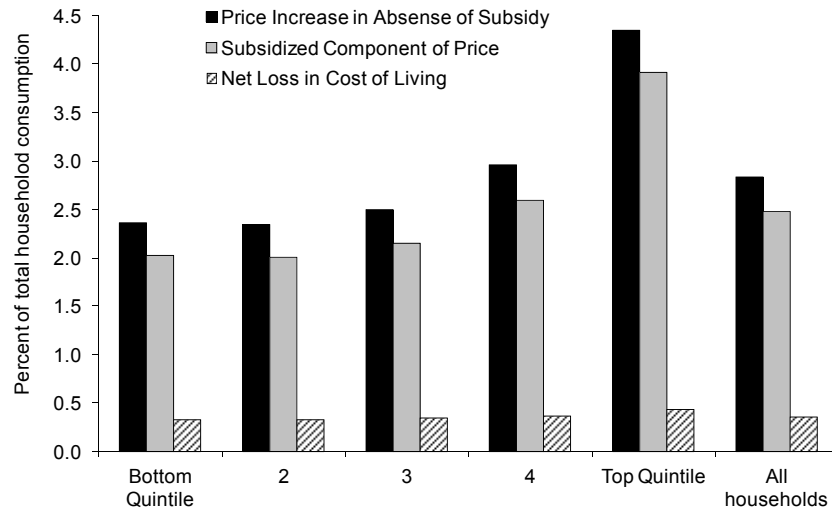
Distributional impact

Energy price increases affect consumers in both a direct and indirect way. Energy is an input for the production of many products, so that their consumer price is impacted by increases in energy prices. The direct effect of energy price increase on consumer welfare can, as for the staple products above, be estimated on the basis of household consumption of energy products. To do this, the energy expenditure share in household consumption is multiplied by the actual price increase. A 2007 input-output table is used with a price-shifting model to estimate the *indirect* price effects that the increase in fuel prices had on the prices of the output of other industries. Finally, the benefits from a price subsidy have similar direct and indirect effects.

The results show that fuel subsidies cushioned most the impact of the international fuel price increase. Our estimates suggest that in absence of the subsidy, the total (direct plus indirect) impact of passing through international fuel prices would have amounted to an average decrease of 2.8 percent of real per capita income, whereas the total impact of the subsidy was equivalent to a 2.5 percent of real per capita income.⁷ Moreover, the distribution of the net loss is roughly neutral across household's income level, as both the price impact and the benefits depend on the distribution of consumption (Figure 2).

⁶ This should be interpreted as an upper-end estimate, with foregone revenue for VAT and excises amounting to 1.3 percent of GDP.

⁷ See Appendix Tables 2 and 3 for the estimated price impact and subsidy benefit for each specific fuel product.

Figure 2. Net Welfare Impact of Fuel Subsidies

Source: Fund staff calculations based on EBCVM (2003).

Consequently, fuel subsidies benefit higher-income households by a very large margin. The distribution of the welfare gain across income groups of households shows that over 87 percent of it benefits the non-poor –approximately the top 60 percent of households in terms of total per capita consumption (Table 8). However, only around 13 percent of these benefits are accrued by the poor. The top 40 percent of households received more than 4½ times more than the bottom 40 percent. More specifically, our analysis shows that:

- The subsidy on butane gas and measures to lower the price of gasoline benefit the richer households significantly more. The poorest 40 percent of the population hardly gains at all from the butane subsidy, whereas the two top quintiles receive virtually all the benefit. Likewise, the poorest 40 percent of households receive only 6.3 percent of the gasoline subsidy.
- Subsidies for lamp oil (kerosene) yield higher welfare gains for the poor than subsidies for other products. The two bottom quintiles of households receive 38 percent of the benefits, while the top two quintiles accrue 38 percent of the total benefit. Moreover, the rural poor benefit the most from lower prices for lamp oil—with the bottom 20 percent of the rural population accruing 20 percent of the benefit (see Appendix Table 4).
- Benefits received through the indirect impact of fuel subsidies also disproportionately accrue to the richest households, with the top consumption quintile receiving as much as 50 percent of the benefits.

Table 8. Shares of Fuel Subsidy Benefits
(In percent)

	Consumption quintiles					Poor 1/	Non-Poor	All Households
	Bottom	2	3	4	Top			
Total Impact	6.3	9.2	12.9	19.2	52.3	12.9	87.1	100.0
Direct effect	7.4	9.5	12.1	17.9	53.0	14.2	85.8	100.0
Butane (LPG)	0.2	0.2	1.2	10.8	87.6	0.2	99.9	100.0
Lamp oil (kerosene)	17.2	20.5	23.5	22.4	16.4	32.1	67.9	100.0
Gasoline	1.5	4.8	9.1	20.8	63.8	4.7	95.3	100.0
Indirect effect	5.4	8.9	13.7	20.4	51.7	11.7	88.4	100.0

Source: Fund staff calculations based on EBCVM (2003). 1/ Using poverty line defined by the National Institute of Statistics and Demographics of Burkina Faso, equal to 82,672 FCFA, 37.5 percent of households are classified as poor.

V. COMBINED IMPACT OF FOOD AND ENERGY PRICES AND MITIGATING POLICY MEASURES

Overall, the impact of food and fuel subsidies was not sufficient to offset the higher cost of living due to price increases, and the benefits of these subsidies were rather accrued by the rich. Table 9 summarizes the estimated total impact of higher food and fuel prices, the total impact of mitigating measures, and the net impact on welfare across consumption quintiles. These results suggest that the net welfare loss incurred by the bottom quintile of households was equivalent to 2.4 percent of their total consumption, around one third larger than the loss suffered by the richest quintile (1.8 percent of total consumption). The driving forces were price increases in food, which were only marginally offset by the government's mitigation measures.

Table 9. Overall Net Welfare Impact of Food and Fuel Mitigating Measures
(In percent of total household consumption)

	Consumption quintiles					All Households
	Bottom	2	3	4	Top	
Total price increases in absence of measures	5.3	5.1	5.3	5.9	6.7	5.8
Total mitigation measures	2.9	2.8	3.1	3.6	4.9	3.5
Net welfare loss	2.4	2.3	2.2	2.3	1.8	2.3
Food						
Price increases in absence of measures	3.0	2.8	2.8	2.9	2.4	2.9
Tax offsetting measures	0.9	0.8	0.9	1.0	0.9	1.0
Net welfare loss	2.1	2.0	1.9	1.9	1.4	1.9
Fuel						
Full pass-through price increase	2.4	2.3	2.5	3.0	4.4	2.8
Subsidized component of price	2.0	2.0	2.2	2.6	3.9	2.5
Net welfare loss	0.3	0.3	0.4	0.4	0.4	0.4

Source: Fund staff calculations based on EBCVM (2003).

VI. SHORT-TERM POLICY RECOMMENDATIONS

In the short term, the poor could be more effectively protected against price increases by redirecting resources to better-targeted measures. Importantly, the government realized that the tax suspensions were not very effective in mitigating the effects of food and energy price increases on the poor, and phased them out. While a well-developed social safety net would be desirable in the medium term, some of the measures below could be considered as second-best solutions to address high food prices in the short run.

Shift resources from butane and gasoline subsidies to lamp oil subsidies. Subsidies for lamp oil are better targeted than those for butane and gasoline, as shown above. Therefore, shifting some of the resources spent on the butane subsidy to better-targeted measures would improve the impact of these resources. Possible options include: *i*) phasing out the butane and gasoline subsidies completely, including the tax preferences; *ii*) limiting the subsidy for butane to an excise tax exemption, and, in both cases, shifting the resources saved to subsidizing lamp oil.

If a shift of resources from butane to lamp oil subsidies were considered, two challenges would need to be addressed, however. First, one important purpose of the butane gas subsidy is to motivate consumers to shift from firewood and charcoal to butane. However, the household data suggest that butane is still too expensive for poorer households, and thus the subsidy is not likely to work in this regard. Alternatively, it could also mean that only relatively rich households can afford the stoves that are required to use butane. To the extent that reductions in the consumption of charcoal and firewood are needed for environmental protection, it is likely that more effective incentives will be necessary to induce a switch away from charcoal and firewood. Second, a significant reduction in the relative price of lamp oil will provide an incentive to use it for other purposes (e.g., mixing it with diesel for transport fuel). Therefore, the administration of the subsidy will be critical, and steps must be taken to ensure that lamp oil is not diverted from its current and intended use or at least that there are no shortages and that sufficient kerosene is available to meet demand for poor rural households.

Increase agricultural production and reallocate subsidies from fuel to food products consumed by the poor. Household data show that measures to contain price increases of millet, sorghum and maize would benefit the poor, as it is their core food staple. Rather than rice, the poor consume millet, sorghum and maize to prepare “To” the national dish, with the preference for the crop varying by region. According to survey data, the poorest twenty percent of the population spend 13 percent of their income on millet, also 13 percent on sorghum, and 5 percent on maize. By contrast, the richest twenty percent of the population only spend 3 percent of their income on millet, 3 percent on sorghum, and 2 percent on maize. Therefore, any measure to limit price hikes of these staple products, as experienced in 2008 (Table 1), would benefit the poor.

To increase food supply, the government has already been seeking to increase agricultural production through a variety of policy measures. The supplementary 2008 budget included agricultural input subsidies for rice, at a cost of 5 CFAF (0.1 percent of GDP), which managed to stimulate a bumper rice harvest. In June 2008, the authorities drew up an emergency plan to ensure food security in the face of the food price increases.⁸ The agricultural emergency plan provides a policy matrix with concrete proposals to raise agricultural productivity and increase agricultural production. The total cost of all of these measures is estimated at CFAF 75 billion, spread out over the years 2008 and 2009.

Target relatively poor groups directly. Some groups of poor households could be targeted directly, based on a set of indicators that signal their poverty level. Household data reveal that families with school-aged children are disproportionately poor and most poor lack access to health care. Thus, programs could target those groups directly, for example through the provision of school lunches⁹, fee waivers for health care for the poor, short term employment at minimum wage, and other forms of direct transfers to vulnerable groups.¹⁰ Additional programs should also be designed to cover poor households that do not have children, those that do not have access to health or school facilities, the handicapped, and the elderly.

The current school lunch program in Burkina Faso is successful in targeting the poor directly, and should be expanded. The country has experimented with school canteens since the early 1970s, when they were first introduced by the Catholic Relief Service. From 2005 on, the World Food Program (WFP), has assumed responsibility for all school nutrition programs, both canteens and take-home rations, on the donor side. Other operators, such as NGOs, and private organizations, also provide school lunches. The government, notably the Ministry of Primary Education, coordinates all these interventions. The program currently covers about two thirds of all primary schools in the country, and could be expanded.

⁸ This plan identifies the following key obstacles facing the agricultural sector: (i) a lack of clear property rights holding back investment in agricultural production; (ii) poor agricultural inputs such as low-quality seeds; (iii) a lack of proper irrigation schemes; (iv) a lack of access to agricultural machinery and technical know-how about more advanced farming techniques. To address these obstacles, the plan highlights the following policy measures as crucial: *Clarify property rights.* The government has adopted a comprehensive law to clarify land rights. A swift and rigorous enforcement of this law is an important measure to create the incentives to invest in farming. *Increase agricultural productivity.* Greater emphasis should be given to helping farmers apply more advanced farming techniques, including better irrigation techniques.

⁹ School feeding programs are typically pursuing three core policy objectives: (i) they can motivate parents to have their children attend school regularly; (ii) they can improve the nutritional status of school age children over time; and (iii) they can improve cognitive functions and academic performance of children, World Bank (2008).

¹⁰ Several types of subsidies can help poor households maintain a minimum standard of living, such as tuition related interventions, targeted bursaries, textbook-related interventions, school transport related interventions, etc. See Grosh and others (2008) for a discussion of principles and country experiences with different types of subsidy programs.

VII. LONGER-TERM POLICY OPTIONS

Prepare a medium-term policy package for the elimination of fuel subsidies. This would ensure that all increases in international prices are passed onto domestic fuel prices and allow redirecting the resulting budgetary savings to better targeted mitigating measures and higher priority public expenditures.

Introduce a Conditional Cash Transfer Program (CCTP). Such a program would be a more permanent way to protect the poor from welfare losses, including food and energy price increases. Its cost could be kept in the order of 1 percent of GDP, or lower. A simulation for Senegal¹¹ suggests that under a CCTP more than 60 percent of each dollar being spent would reach the poorest 20 percent of the population (see Appendix 1). By contrast, general subsidies such as the current butane subsidy are much more expensive, while reaching fewer of the very poor.

Conditional cash transfer programs have proven an effective and innovative tool to deliver social protection to the poor in Latin America, and are being gradually introduced around the world, including in some countries in Sub-Saharan Africa.¹² Typically, these programs provide money to poor families conditional upon investments in human capital, such as sending children to school or attending health centers. In some cases women are the primary recipient of cash transfers, as they tend to make household spending decisions that are more beneficial for the family's welfare, in particular for children. Prominent examples are Brazil's *Bolsa Familia*, Mexico's *Oportunidades*, Ecuador's *Bono de Desarrollo Humano*, and Colombia's *Familias en Acción* programs. A review of conditional cash transfer programs finds that the majority was very effective in reaching the poorest segments of the populations, with higher shares of the benefits accruing to the bottom quintiles of the welfare distribution.¹³

Having access to schools and health centers is an obvious precondition. While the possibility of receiving cash transfers may increase the likelihood of families to use services that are already available, families that live in areas in which supply of these services is inexistent, presumably poor rural areas, would be deprived from this assistance. If the government proceeded with a CCTP of full scale, it would also need to evaluate the access level to services required for eligibility of the transfers, and allocate resources to increase its supply in poor and rural areas.¹⁴ Enforcing eligibility conditions based on use of health services and/or attendance of school for households with school-aged children across the country,

¹¹ IMF (2008).

¹² Countries in Sub-Saharan Africa that have either a full program or a pilot CCT include: Kenya, Zambia, Malawi, Mozambique, South Africa, and Ethiopia (United Nations, 2009 and references therein). See Rawlings (2004) and World Bank (2009) for a review of experiences with CCTs in other regions.

¹³ Coady, Grosh, and Hoddinott (2004).

¹⁴ The Institute of Statistics reported that in 2003, only 35.3 percent of Burkina Faso had access to health services.

regardless of whether regions offer these services would be inadequate. Thus, these eligibility criteria could be applied only in regions where schools and health posts have proven to be available. Increasing the supply of schools cannot be achieved by the transfer itself, yet the transfers could potentially help to increase the demand for education by partially compensating households for the costs incurred by school fees.¹⁵

Key elements of successful conditional transfer programs are proper targeting and conditioning. Effective targeting ensures that transfers reach those most in need. A wide range of targeting methods has proven successful, which are often combined to get the most cost-effective results (e.g. geographic targeting, community targeting, self-selection targeting, proxy-means targeting). The University of Ouagadougou has already carried out a proxy-means targeting analysis to identify and select the poorest households in Burkina Faso.¹⁶ Conditioning is very important because it generates incentives for transfer recipients to invest in human capital, addressing this way the underlying causes of poverty. This enables them to graduate out of from the program at some point in the future.¹⁷

At a smaller scale, Burkina Faso has already been experimenting with cash transfer programs. As discussed above, the government phased the tax suspensions. Instead, it worked with donors to find more effective and efficient policy tools to protect the poor's welfare. In early 2009, the WFP, in collaboration with the government, launched a CCTP for the most vulnerable groups in urban areas. In July 2008, the government sent a formal request of the WFP to provide assistance to the populations most affected by high food prices, with a focus on urban households. The WFP, in collaboration with other donors, identified cash transfers and/or subsidies for the poorest groups as the most suitable policy response. Their program uses a targeting mechanism that is, in effect, a proxy-means approach. As such, it can be used in the future as the basis of a more comprehensive cash transfer system, and possibly be extended beyond the urban areas. This program targets the 20 poorest percent of the urban population living in destitute, very poor, and poor households in Ouagadougou and Bobo-Dioulasso. The very poor are receiving vouchers and ready-to-use foods, while the destitute and poor households are receiving ready-to-use foods only. These

¹⁵ The Institute of Statistics shows that 27.5 percent of students that were not in school in 2003 reported the reason to be the high cost of school fees. L'Institut National de la Statistique et de la Démographie (INSD), 2004, Analyse descriptive des résultats de l'Enquête burkinabè sur les conditions de vie des ménages (EBCVM).

¹⁶ Proxy-means targeting usually identifies poor households on the basis of a household welfare score. For this a set of observable criteria that characterizes poor households must be chosen (see Appendix 1 for a simulation of a proxy means-testing program).

¹⁷ The positive impact of enforcing conditions versus that of a simple cash transfer in Mexico and Ecuador for example has been documented by de Braw and Hoddinott 2008, and Schady and Araujo 2006, respectively.

different household groups are being identified through a number of household characteristics.¹⁸

To identify these households, the Burkinabè Red Cross carried out a major household registration operation. The Red Cross used as a basis the distribution system they had drawn up for their interventions to address food insecurity. In the first stage, volunteers went out to examine households in both Ouagadougou and Bobo-Dioulasso, and filled out a simple questionnaire, mainly describing housing features, in order to determine whether or not the household was at all eligible. In a second stage, potentially eligible households were approached by the volunteers to collect data on overall household characteristics, such as the number of people living in the household, number of children, the gender of the household head, whether the children went to school, as well as some characteristics relating to ownership of goods, such as sleeping mats, radio, bicycle, car. This registration comprised 140,000 households, was carried out in 4 weeks, and its cost, covered by a donor, was relatively low (Euro 90,000).

Following this methodology, 180,000 beneficiaries of vouchers were identified. This is roughly the total population estimated to live in very poor households in Ouagadougou and Bobo-Dioulasso. Beneficiary lists were cleared by the Red Cross, Ministry of Social Affairs, and the WFP for the final registration in the voucher program. Participants will receive CFAF 1.500 and monthly vouchers to buy a limited number of food items, consisting of locally produced cereals (maize, sorghum), salt, sugar, soap and cooking oil, which they can find in specific shops within a predefined time period. The number of vouchers per household is capped at 6. The vouchers will specify the name of the household head, family size, place of residence, and the selected shop. They will be issued in the name of the woman within each household. In addition, 76,000 ready-to-use-fortified food ratios were handed out for children between 6 and 24 months, as well as 74,000 nutrition items for pregnant and lactating mothers. The total cost of this program is USD17.5 million, or about CFAF 8 billion (0.2 percent of GDP) for one year. This comprises all operational costs, including distribution. The actual vouchers, cash transfers and food ratios cost USD 12.6 million.

There also other ongoing projects that are based on conditional, and also unconditional, cash transfers. In 2008, the World Bank started implementing a project to mitigate the direct and indirect adverse impact of the AIDS epidemic, by targeting infected and affected people with

¹⁸ Destitute households comprise usually one member only, who is either disabled or elderly. Very poor households are typically female-headed, renting a 8-10-square meter house without latrine. They live on a very low income from unskilled, irregular daily labor. Children who live in these households do not go to school, and health care is provided by traditional healers, with medicine bought on the street. Poor households are typically male-headed, owning a 10–30-square meter house with a latrine. At least two active adults provide a low and irregular income as daily workers. Access to health care is limited, and medicine is bought on the street. The household often own assets such as sleeping mats, a radio, and/or a bike.

HIV/AIDS, including AIDS orphans. The program is directed towards children under 15 years that have at least one biological parent through AIDS, and/or live in a household with a HIV-positive member. Beneficiaries are being identified through proxy-means testing, performed by local capacity. The project comprised 3250 households in 75 villages, which were examined on the basis of the last household survey. The University of Ouagadougou helped to carry out a proxy-means regression, estimating the households' eligibility on the basis of its consumption, characteristics and location, as well as assets. Thus, this project demonstrates local capacity to perform proxy-means regressions. Such capacity could be tapped into to develop a wider conditional cash transfer system. As a pilot, the project tests out several set-ups of transfers: a conditional cash transfer handed out to males, a conditional cash transfer handed out to females, an unconditional cash transfer handed out to males, and an unconditional cash transfer handed out to females. The conditions are related to investment in human capital. For children of school age, transfers are related to children's enrollment in a school, coupled with an attendance rate of over 90 percent. For smaller children, the condition is a regular visit of a local health center.

VIII. CONCLUSION

The government of Burkina Faso recognized that the tax suspensions on staple products examined above were not well-targeted and phased them out in late 2008. This policy measure is commendable, as it freed up resources for other better targeted measures to mitigate the repercussions of the international food price shock on the population. However, current fuel subsidies are costly, overall not well-targeted, and their dependency on volatile international prices poses a fiscal risk. The butane and gasoline subsidies should be reduced or eliminated in the short run, and some of the resources redirected towards better-targeted measures. It is crucial to follow through with the government's emergency plan to increase agricultural production. In particular, land property rights should be clarified, and agricultural productivity increased. The current school feeding program is successful in targeting the poor directly, but other segments of poor households need to be reached by other programs.

The authorities have, in collaboration with donors, started to introduce a conditional cash transfer system, concentrating on the urban areas. Such a scheme is likely to be more effective and cost-efficient than the current subsidies in addressing both cyclical and structural threats to the well-being of poor households. Burkina Faso launched a CCTP for destitute, very poor, and poor household in the urban areas. Other ongoing cash transfer programs have used a proxy-means targeting approach, and are currently testing several set-ups of transfers, both conditional unconditional, on a pilot basis. The government should evaluate these experiences, and use the insights to possibly develop a more comprehensive CCTP to cover all vulnerable groups of the population.

**Appendix Table 1. Sales of Household Production of Grains:
Tabulations of Household Survey Data**

	Millet and Sorghum	Rice	Maiz
Total number of observations	8,500	8,500	8,500
Producers	1,719	528	749
Positive	704	209	193
Zero	886	265	454
Missing	129	54	102
Non Producers	6,781	7,972	7,751
<i>Weighted Variables</i>			
Total number of households	1,777,035	1,777,035	1,777,035
Producers	395,176	127,370	173,608
Positive	159,420	47,352	47,728
Zero	206,304	66,381	102,432
Missing	29,453	13,637	23,448
Non producers	1,381,859	1,649,665	1,603,427

Source: Fund staff calculations based on EBCVM (2003).

Appendix Table 2. Distributional Impact of Food and Fuel Price Increases

(In percent of total consumption)

	Consumption quintiles					Non Poor	All households	
	Bottom	2	3	4	Top			
I. Net impact all food products	2.3	1.7	2.3	2.3	1.6	2.1	2.0	2.1
Gain producers:	0.9	1.3	0.6	0.8	0.8	0.7	1.1	0.9
Mill	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Maize	0.4	0.9	0.3	0.4	0.6	0.4	0.7	0.5
Rice	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2
Minus loss to consumers: all food products	3.2	3.0	2.9	3.1	2.4	2.8	3.1	3.0
Rice	0.4	0.4	0.5	0.6	0.5	0.5	0.4	0.5
Mill	0.6	0.4	0.5	0.4	0.3	0.4	0.5	0.5
Sorgho	0.9	0.8	0.5	0.5	0.2	0.4	0.9	0.6
Maize	0.7	0.7	0.7	0.8	0.6	0.7	0.7	0.7
Meats	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2
Flour	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Vegetable Oil	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.5
II. Fuel total impact 1\	2.4	2.3	2.5	3.0	4.4	2.4	3.1	2.8
Direct effect fuel	1.3	1.2	1.1	1.3	2.1	1.2	1.5	1.4
LPG	0.0	0.0	0.0	0.3	1.3	0.0	0.4	0.3
Kerosene	1.3	1.1	0.9	0.8	0.4	1.1	0.8	0.9
Gasoline	0.0	0.1	0.1	0.3	0.4	0.1	0.3	0.2
Indirect effect	1.0	1.2	1.4	1.7	2.2	1.2	1.6	1.5
All food and fuel products (I+II)	5.5	5.4	5.4	6.1	6.8	5.2	6.2	5.8

Source: Burkinabè authorities; and Fund staff calculations. 1\ Fuel impact assumes a full pass-through of international oil prices.

Appendix Table 3. Distributional Impact of Policy Measures
(In percent of total expenditure)

	Consumption quintiles					Poor	Non-Poor	All Households
	Bottom Quintile	2	3	4	Top Quintile			
I. Net Impact all tax exempted products	0.9	0.8	0.9	1.0	0.9	0.9	0.9	1.0
Rice	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Gain consumers	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3
Loss producers	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0
Vegetable Oil	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Salt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milk	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Pasta	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Soap	0.5	0.4	0.4	0.3	0.3	0.3	0.4	0.4
II. Fuel Direct plus Indirect	2.0	2.0	2.2	2.6	3.9	2.2	1.9	2.5
Direct Effects Fuel	1.2	1.0	1.0	1.2	2.0	0.9	1.1	1.3
LPG	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.3
Kerosene	1.1	0.9	0.8	0.7	0.4	0.7	1.0	0.8
Gasoline	0.0	0.1	0.1	0.3	0.4	0.1	0.1	0.2
Indirect Effect	0.9	1.0	1.2	1.4	1.9	1.2	0.9	1.2
All fuel plus exempted products (I+II)	3.0	3.0	3.2	3.7	4.9	3.0	2.9	3.5

Source: Burkinaabè authorities; and Fund staff calculations.

Appendix Table 4. Estimated Share of Food and Fuel Subsidies Benefits by Urban and Rural Regions
(In percent)

	Consumption quintiles					Poor	Non-poor	All HHs
	Bottom	2	3	4	Top			
URBAN								
All fuel plus exempted products	1.5	3.9	7.6	18.2	68.9	2.2	97.8	100.0
Fuel Ind plus Direct	1.2	3.1	6.0	16.2	73.6	1.8	98.2	100.0
All Direct fuel	1.4	3.3	5.6	16.1	73.7	1.7	98.3	100.0
LPG	0.2	0.1	1.3	10.4	88.0	0.2	99.8	100.0
Kerosene	7.8	15.3	21.3	30.2	25.4	19.0	81.0	100.0
Gasoline	0.2	2.3	4.7	18.6	74.3	1.7	98.3	100.0
Indirect Effect	0.8	2.9	6.5	16.4	73.5	1.9	41.9	100.0
All tax exempted products	2.6	6.9	13.1	25.3	52.1	7.5	92.5	100.0
Rice	1.6	6.9	13.7	27.2	50.6	5.9	94.1	100.0
Vegetable Oil	1.9	6.7	12.1	24.1	55.2	6.8	93.2	100.0
Salt	6.5	10.6	15.6	26.6	40.7	13.6	86.4	100.0
Milk	0.4	1.8	2.7	15.4	79.7	2.7	97.3	100.0
Pasta	6.8	6.4	13.9	24.4	48.6	15.3	84.7	100.0
Soap	3.6	7.8	14.4	25.1	49.1	8.8	91.2	100.0
RURAL								
All fuel plus exempted products	12.4	16.2	20.4	22.4	28.6	15.4	84.6	100.0
Fuel Ind plus Direct	11.5	15.3	19.9	22.2	31.0	13.1	86.9	100.0
All Direct fuel	15.1	17.7	20.6	20.4	26.3	11.3	88.7	100.0
LPG	-	0.9	0.3	13.7	85.1	-	100.0	100.0
Kerosene	20.0	22.0	24.1	20.1	13.8	36.0	64.0	100.0
Gasoline	4.3	10.1	18.1	25.3	42.2	10.9	89.1	100.0
Indirect Effect	9.0	13.7	19.4	23.5	34.4	10.9	22.9	100.0
All tax exempted products	14.8	18.5	21.9	23.0	21.9	28.6	71.4	100.0
Rice	12.4	16.7	20.7	22.7	27.4	25.5	74.6	100.0
Vegetable Oil	12.6	18.1	23.6	24.5	21.2	27.4	72.6	100.0
Salt	19.7	20.6	20.8	27.4	11.5	35.0	65.0	100.0
Milk	3.4	8.8	20.0	19.5	48.3	18.1	81.9	100.0
Pasta	9.6	13.0	10.0	36.8	30.7	27.6	72.4	100.0
Soap	19.5	21.5	22.8	21.2	15.1	35.3	64.7	100.0

Source: Burkinaabè authorities; and Fund staff calculations

Appendix 1. A Conditional Cash Transfer Program Simulation for Senegal

A CCPT for Senegal, a country with some similar characteristics of Burkina Faso, was simulated and allows to draw some lessons. The analysis shows that a CCPT would be much more cost-effective than the current subsidies and tax suspensions Senegal put in place to protect the poor from the food and energy price shocks.¹⁹ The beneficiary shares show that for every dollar spent, 50 cents reach the poorest 20 percent of the population, when the bottom 30 percent of the population is targeted. The program targeting the poorest 10 percent of the population is even more cost effective, with 62 cents reaching people in the poorest quintile of the population. By contrast, for every dollar spent on the excise tax exemption for lamp oil, only 22 percent reaches the poorest 20 percent of the population, and for the butane subsidy, only 6 cents reach that group. Lessons from the Latin American experience come close to these findings, with as much as 70 percent of benefits of CCPT programs of Brazil's *Bolsa Familia*, Chile's *Subsidio Unitario Familiar*, and Mexico's *Oportunidades* being estimated to have reached the poorest quintile of households (Grosh and others, 2008).

As a basis for a CCPT, a targeting mechanism is simulated, based on a proxy-means approach. This links eligibility and transfer size to some elements correlated with individual household income. The number of indicators regressed against per capita consumption might complicate the CCPT's implementation, but the exercise helps to identify a few potential observable characteristics, which can be then be used to rank actual households, based on estimates of their income level. Moreover, the underlying analysis could also serve as input for other forms of targeting, such as geographical or categorical targeting. The regression results are presented in the Appendix Table 5.

Two alternatives that are easier to administer but almost equally effective were also examined. Two simpler specifications are based on a number of core characteristics that are most likely to be an indicator of household consumption per capita. Household scores could then more easily be derived by using only 16 of the geographic and housing characteristics, or 21 of the geographic, housing, and family descriptors.

The results show that a CCTP would be very well targeted. Two options were examined—one that targets the poorest 30 percent of households, and one that targets only the poorest 10 percent, (but presumably with a higher benefit). In the first scenario, aimed at the poorest 30 percent of households, 75 percent of the bottom income quintile, and 46 percent of the next quintile would be eligible. The participation rates fall for the higher income groups,

¹⁹ Senegal has similar direct and indirect energy subsidies in place as Burkina Faso, notably a direct subsidy for butane gas, and an excise tax exemption for lamp oil. Moreover, the country suspended taxes and customs duties on rice, wheat, powdered milk, and bread.

especially for the top 40 percent of households, which indicates that the approach is quite effective at limiting the coverage of higher income groups. The second scenario, which aims to target the poorest 10 percent of the population, would cover 31 percent of the bottom quintile, and 13 percent of the second-lowest income group. In this scenario, the participation would fall even more in the higher income households.

Appendix Table 5. Proxy Means Household Indicators
(Dependent variable = Log per capita consumption)

	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
	Spec I		Spec II		Spec III	
Location						
Region Diourbel	-0.17	-8.79	-0.06	-3.56	-0.10	-5.48
Region Fatick	-0.06	-2.93	-0.02	-1.17	-0.05	-2.67
Region Kaolack	0.03	1.72	0.08	4.18	0.02	1.36
Region Kolda	0.13	6.35	0.16	8.41	0.09	4.88
Region Louga	-0.26	-12.85	-0.20	-10.90	-0.23	-12.80
Region Matam	0.20	9.70	0.24	13.07	0.22	12.19
Region Saint-lou	0.18	8.92	0.22	12.39	0.21	12.47
Region Tamba	0.07	3.25	0.09	4.60	0.04	2.17
Region Thies	0.01	0.28	0.05	2.81	0.03	1.77
Location: Urban	0.23	18.27	0.12	9.61	0.12	10.18
Housing						
House roof of concrete, tiles, or cement	0.17	13.00	0.18	15.27	0.12	10.73
House walls of cement or brick	0.04	2.16	0.08	5.34	0.07	5.02
Piped water	0.12	8.63	0.13	10.06	0.09	7.31
Toilet sewer or septic	0.18	13.06	0.17	13.86	0.13	10.94
Cooking with gas	0.29	20.68	0.17	13.32	0.12	10.02
Electricity	0.22	15.83	0.27	21.12	0.14	10.31
Household and household head						
Number of people in household			-0.03	-29.27	-0.04	-36.71
Age of household head			0.00	-4.23	0.00	-4.88
Number of children			-0.01	-4.30	-0.01	-2.04
Household head works in agriculture			-0.08	-5.89	-0.08	-6.21
Household head professional training			0.08	18.62	0.05	11.27
Ownership						
Ownership of house					-0.06	-4.69
Ownership of land					0.01	7.18
Ownership of a car					0.26	11.80
Ownership of a radio					0.17	14.71
Ownership of a mattress					0.14	7.90
Ownership of a refrigerator					0.17	12.59
Ownership of a motorcycle					0.12	6.93
Ownership of a television					0.11	8.93
Ownership of a telephone					0.15	10.22
Ownership of a computer					0.12	4.71
Constant	11.69	645.07	12.00	479.68	11.93	400.90
Adj. R-squared	0.38		0.49		0.54	
No. Observations	13567		13567		13566	

Source: Senegalese authorities; and staff calculations.

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