

## IV. Elevated Food Prices and Vulnerable Households: Fiscal Policy Options

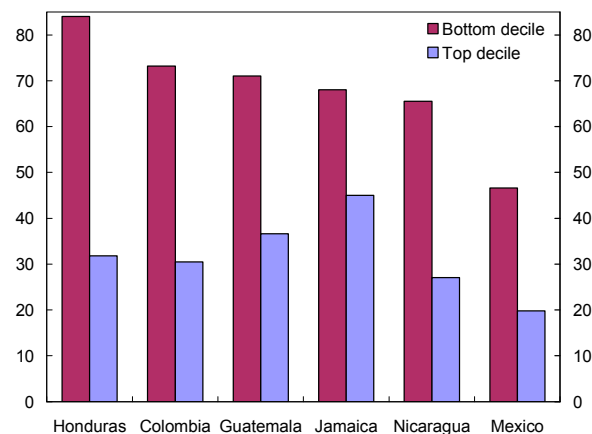
### Elevated Food Prices Trigger Policy Debate

The sharp run-up in food prices between 2006 and mid-2008 has set off a debate about how to deal with the adverse effects on low-income households, which typically devote a larger share of their budget to food. In fact, IDB and World Bank estimates suggest that the recent surge in food prices may have erased the gains in poverty reduction of the last decade in many countries (Box 4.1).

Policymakers across the region have adopted a variety of measures to try to mitigate the impact of rising food prices on the poor (Box 4.2). These steps have ranged from administrative measures (e.g., price controls, export quotas) to tax and expenditure measures (e.g., lowering indirect tax rates, expanding social safety nets). These actions entail varying degrees of fiscal and efficiency costs and effectiveness in reaching those households most exposed to food price hikes.

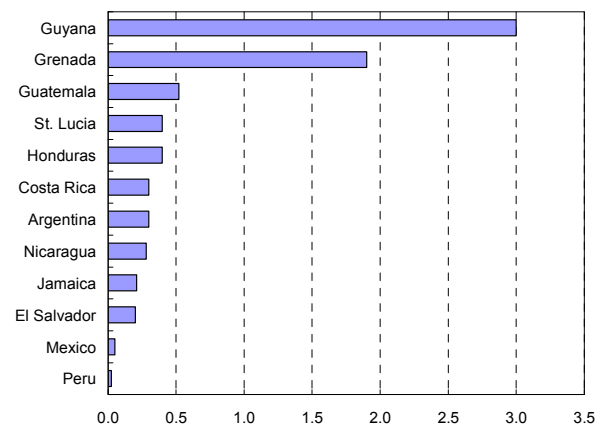
In most countries, the fiscal cost of the response to higher food prices has been limited so far. Guyana and Grenada are expected to devote fiscal costs of 2–3 percent of GDP in 2008, while for most other countries, the additional cost is projected at 0.2 percent of GDP. Compared with other regions, LAC countries have relied more on reducing taxes and tariffs, while food subsidies have been less prevalent.<sup>12</sup>

**Food Consumption by Decile**  
(In percent of total consumption)



Source: Robles and others (2008).

**Fiscal Cost of Response to Food Price Shock**  
(In percent of GDP)<sup>1/</sup>



Sources: National authorities; and IMF staff estimates.  
1/ Projected cost for 2008, including subsidies, tax cuts, transfers, and other measures.

Note: This chapter was prepared by Francisco Arias-Vazquez, Ana Corbacho, and Priyadarshani Joshi.

<sup>12</sup> In contrast, the fiscal cost of fuel subsidies is expected to average 1.8 percent of GDP for the LAC region. See IMF (2008a) for further details.

**Box 4.1. Impact of Rising Food Prices on Poverty**

According to the IDB, the LAC region will face a significant increase in poverty if measures to compensate for the impact of rising food prices are not implemented. Estimates suggest that, without a policy response, more than 26 million people could fall into extreme poverty should food prices remain high (IDB, 2008). Central American and Caribbean countries, which import large quantities of food, would be at the greatest risk of deepening poverty. The estimates are calculated under an extreme scenario, to illustrate the serious consequences that rising food prices can have on poverty levels in the absence of effective policies.<sup>1</sup>

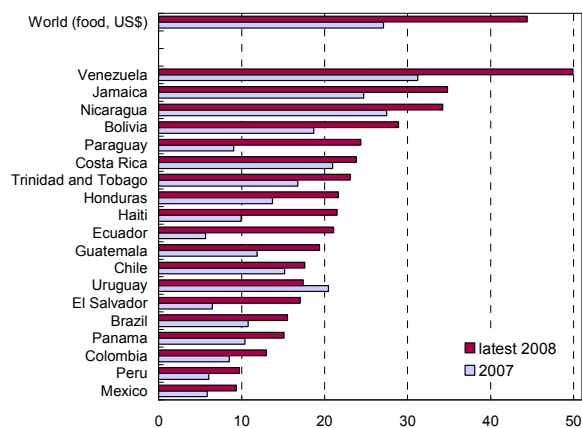
Several studies from the World Bank confirm the adverse impact of food price hikes on poverty. World Bank (2008a) constructed a poor person’s price index for 12 countries in the LAC region, suggesting that in 2007 the effective inflation rate faced by poor households exceeded the national rate in most countries, by a margin of up to 3 percentage points. Dessus, Herrera, and de Hoyos (2008) simulate the first-round impact of a food inflation shock for a sample of 72 developing countries. In their central scenario, they find that for the most affected countries a 20 percent increase in prices would raise poverty rates by 4 percentage points on average. Their estimates focus exclusively on the urban sector and abstract from the positive impact that rising food prices may have on agricultural income of food producers. Using household survey data, Ivanic and Martin (2008) estimate the impact of price increases in several agricultural staples for nine developing countries (including Bolivia, Nicaragua, and Peru in LAC), taking into account income effects for food producers and unskilled labor. They find that a 10 percent price increase would raise the poverty rate by 0.4 percentage point on average.

In this chapter, we extend previous analysis by assessing the costs and benefits of alternative fiscal policies that can be used to mitigate the welfare effect of rising food prices. Using household survey data for Mexico and Nicaragua, we compute welfare losses due to rising domestic food prices by taking into consideration households’ food consumption and production patterns, their urban versus rural location, their position in the welfare distribution, and their access to social safety nets and government’s mitigating measures.

Note: This box was prepared by Ana Corbacho.

<sup>1</sup> Researchers assumed a 30 percent price increase in corn, rice, wheat, soybeans, sugar, and beef; full pass-through of international price increases to consumers; and no changes in consumption and production habits in response to the price signals.

**Food Inflation in Latin America**  
(In percent; end-of-period)



Sources: National authorities; IMF WEO; and Haver Analytics.

Against this background, the chapter addresses two questions: (1) how large is the effect of rising food prices on household welfare and its distribution?<sup>13</sup> and (2) how cost-effective are different fiscal policies to buffer the adverse social effects of food inflation?

Drawing on household survey data for Mexico and Nicaragua, the results show that the recent rise in domestic food prices would reduce real consumption of the poorest households significantly. Of course, the effects vary widely across the region. While annual food inflation

<sup>13</sup> Our measure of welfare corresponds to household consumption per capita.

## Box 4.2. Policy Responses to Ease Effects of Higher Food Prices

Countries have adopted a range of measures to ease the impact of higher food prices, including the following:

- **Tax cuts.** Many countries (Belize, Bolivia, Brazil, Ecuador, Mexico, Peru, and most CARICOM and Central American countries) have lowered import tariffs on major food staples. Brazil, Dominica, Guyana, and St. Vincent and the Grenadines cut or eliminated VAT rates on selected food items, while Panama reduced income taxes for the low-income bracket.
- **Price subsidies.** The Dominican Republic, Ecuador, Guyana, and Jamaica introduced or extended food price subsidies. In Panama, the government has been importing and selling rice, wheat, vegetable oil, and canned fish in limited quantities at cost, and in Nicaragua, the government has been using state-owned commercialization centers to distribute subsidized food.
- **Social safety nets.** Interventions have ranged from direct food distribution (Grenada, Guatemala, and Peru) to the scaling-up of targeted income transfers (Barbados, Belize, Brazil, Chile, Costa Rica, El Salvador, Mexico, Jamaica, Trinidad and Tobago, and Panama), food security (Argentina and Guatemala), school feeding (Haiti and Nicaragua), and food-for-work programs (Brazil).
- **Price controls.** Mexico reached a voluntary agreement with private producers to cap the price of tortillas after protests in early 2007. Guatemala has also announced a few voluntary price agreements. Ecuador has been regulating the price of milk, and Bolivia replaced a ban on vegetable oil exports with a price ceiling.
- **Trade restrictions.** Argentina has imposed temporary restrictions on exports of beef, cereals, and dairy products. Several countries have imposed minor export restrictions on selected items, such as rice (Bolivia, Brazil, Ecuador, Honduras, and Suriname), while others eased import restrictions (Guyana, Nicaragua, and Panama).
- **Steps to encourage agricultural production.** Many governments have provided inputs (such as seeds and fertilizers), extended subsidized credit, and enhanced crop insurance (Bolivia, Brazil, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, and Panama). In Mexico, a new public-private initiative (FONAMU) will improve corn and bean producers' access to financing.
- **Other.** The Bahamas, Belize, Dominica, El Salvador, Guyana, Panama, and St. Kitts and Nevis have raised wages or pensions. Honduras has increased its strategic grain reserve, and Venezuela has stepped up its ALBA-related assistance and pledged US\$100 million to a food security fund.

Note: This box was prepared by Eva Jenkner.

reached around 10 percent in Mexico and Peru, it surpassed 30 percent in Nicaragua and Venezuela. The Caribbean countries also experienced significant increases in food prices.<sup>14</sup>

The analysis suggests that urban households at the bottom of the distribution would be the most affected. Absent any policy response, the rise in

food prices between end-2006 and mid-2008 would imply a reduction of real consumption for these urban households of 16 percent in Nicaragua and 3 percent in Mexico. The rural poor have been relatively more protected as they typically produce food, helping to cushion the impact of food price hikes.

Expanding targeted transfers stands out as the most cost-effective policy to ease this burden.

<sup>14</sup> See Box 2.5 in Chapter 2 for a description of inflation trends in the Caribbean.

**Mexico and Nicaragua: Key Characteristics**

(In percent, unless otherwise indicated)

	Mexico	Nicaragua
Headline inflation (Dec. '06 - Apr. '08)	5.5	24.4
Food inflation (Dec. '06 - Apr. '08)	8.8	32.9
Food share in CPI	22.7	41.8
Poverty 1/	20.7	48.3
Extreme Poverty 1/	13.8	17.2
GDP per capita in 2007 (US\$)	8,478.7	945.5
Total households in sample	20,326	6,732
of which: percent rural	26.5	49.1

Sources: WEO; national authorities; and IMF staff estimates.

1/ Percent of individuals below the poverty line. Latest estimates based on national definitions. For Mexico, poverty corresponds to abilities concept; extreme poverty to food concept.

Moreover, it is possible to compensate the extreme poor for much of their loss in real consumption at a relatively low fiscal cost. Other measures, such as price subsidies or controls, are more difficult to target effectively and may entail distortions that generate long-term costs. For example, subsidies distort price signals and may weaken a supply response, exerting upward pressure on prices over the medium term. However, an important trade-off arises in terms of coverage of vulnerable households. While subsidies or import tariff reductions ensure almost universal coverage of low-income families, the coverage of transfer programs is more limited.

The remainder of the chapter first analyzes which households would be most affected by rising food prices. It then assesses the cost-effectiveness of different fiscal policy instruments that could be used to protect the most vulnerable. The final section concludes.

**Food Price Inflation Can Have Strong Welfare Effects**

This study relies on household survey data because the effects of food prices can vary widely across households, which spend different shares of their budget on food and consume different kinds of food. While other studies focus primarily on food consumption, we also consider food production. It is important to estimate net food consumption for each household because some,

especially in the rural sector, produce food and are able to buffer the impact of higher food prices.

We selected two countries—Mexico and Nicaragua—that differ in many respects to provide a useful spectrum to assess the effectiveness of fiscal policies.<sup>15</sup> We simulate the effect of domestic food price increases between the end of 2006 and April 2008 (about 9 percent in Mexico and 30 percent in Nicaragua) on real household consumption.

We focus on the short-term impact of higher food prices. In the estimations, we assume that consumption and production patterns remain unchanged. However, over time, households are likely to engage in substitution to buffer real consumption losses. We also abstract from indirect effects that food price increases may have on wages and employment and do not factor in any policy response in the baseline scenarios. Therefore, the short-run impact should be interpreted as an upper bound on overall real consumption losses. The methodology is explained in Appendix 4.1 and in Arias-Vazquez, Corbacho, and Joshi (2008).

As expected, the share of consumption allocated to food without considering food production (“gross food share”) declines with the level of welfare: households at the bottom of the distribution consume more food out of their budget than do the rich. Gross food shares are higher in Nicaragua—the poorer of the two countries—than in Mexico across the entire distribution. Similarly, gross food shares are higher in the rural than the urban sector in both countries, as rural populations tend to be poorer.

However, a different pattern emerges when looking at the share of consumption devoted to food taking into account food production (“net food share”). As before, low-income households in the urban sector are more exposed to food

<sup>15</sup> For Mexico, the database is Encuesta Nacional de Ingreso Gasto de los Hogares (ENIGH) 2006 and for Nicaragua, Ecuesta de Medición de Niveles de Vida (EMNV) 2005.

price hikes than wealthier households. However, rural households at the bottom and the top of the distribution are more protected because of their higher food production levels. In Nicaragua, households in the middle of the distribution turn out to be more vulnerable.

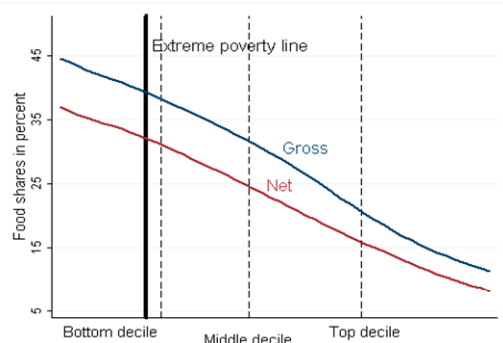
Even taking into account gains accruing to food producers, we find that food price hikes have a significant impact on welfare levels of low-income households. Based on net food shares, the run-up in food prices since 2006 would imply a decline of nearly 16 percent in real consumption of urban households in the bottom decile in Nicaragua. This compares with a decline of about 8 percent for households in the top decile. As expected, the estimates of consumption losses in the rural sector are sizable, but less than half those in the urban sector. In Mexico, overall consumption losses appear less severe because of the lower inflation in food prices as well as the smaller share of the budget spent on food. Real consumption losses are the largest for low-income households, at around 3 percent for the urban sector and 2 percent for the rural sector.

### Fiscal Policy Can Help Ease the Burden on the Poor

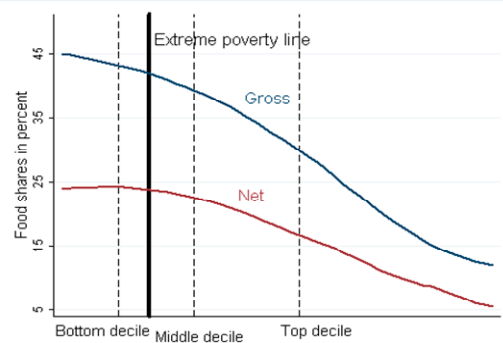
The key challenge has been to implement well-targeted policies that can reach the most vulnerable households at a reasonable fiscal cost. A common feature in both countries is the relatively high income inequality: household consumption in the two bottom deciles amounts to around 7 percent of national income. Then, given the degree of income inequality, large consumption losses of the most vulnerable households do not represent sizable shares in terms of aggregate income. Indeed, fully compensating for the effects of higher food prices on the extreme poor would require unsubstantial fiscal resources, amounting to 0.8 percent of national income in Nicaragua and 0.1 percent of national income in Mexico.

### Food Shares by Decile (In percent of total consumption)

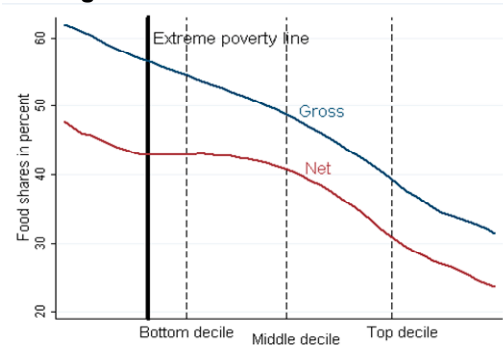
**Mexico: Urban Sector**



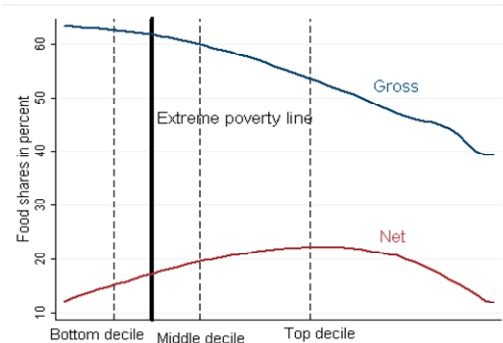
**Mexico: Rural Sector**



**Nicaragua: Urban Sector**



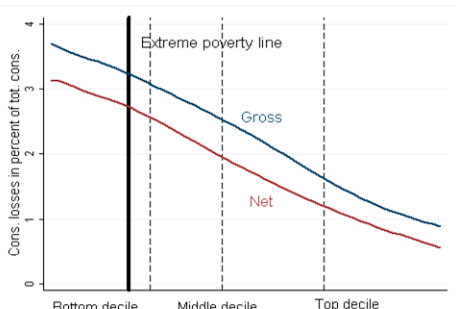
**Nicaragua: Rural Sector**



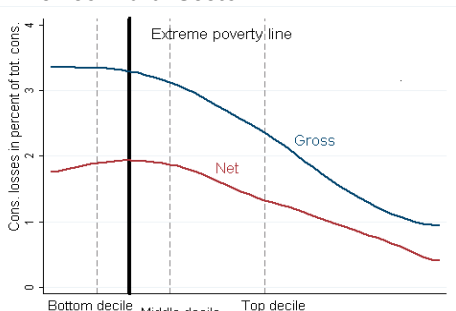
Source: IMF staff estimates based on ENIGH 2006 and ENMV 2005.

**Real Consumption Losses by Decile**  
(In percent of total consumption)

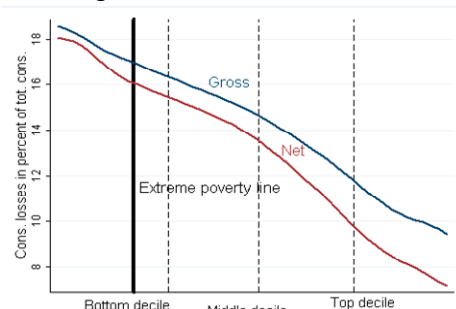
**Mexico: Urban Sector**



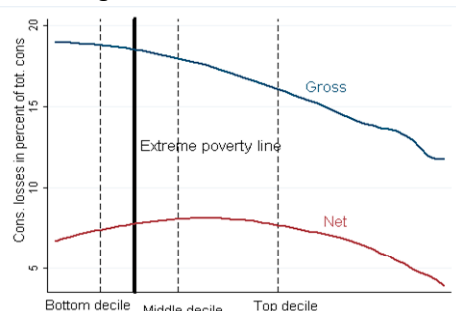
**Mexico: Rural Sector**



**Nicaragua: Urban Sector**



**Nicaragua: Rural Sector**



Source: IMF staff estimates based on ENIGH 2006 and ENMV 2005.

To look at the issue of targeting, we used the information in the household surveys on access to a variety of social government programs. This allows us to simulate the distributional impact of alternative fiscal policies. The scenarios are designed to make the cost of the different policies comparable in each country. In Mexico, the cost is small, around 0.1 percent of national income. In Nicaragua, the cost is higher, at around 1 percent of national income, in line with the more sizable consumption losses.<sup>16</sup>

We consider three main fiscal instruments:

(1) *Transfers to households.* We analyze an increase in transfers to participant households to compensate for their consumption losses.<sup>17</sup> In Mexico, we analyze an increase in the conditional cash transfer program *Progresa/Oportunidades*, which was the actual policy implemented by the authorities.<sup>18</sup> In Nicaragua, there is no conditional cash transfer program. We analyze instead an increase in the school feeding program, which was one of the responses to the food price shock.

(2) *Price subsidies.* We estimate the welfare impact of introducing price subsidies on five food items, with one scenario using the five food products that have the largest weight in the national consumption basket; and another using the top five in the consumption basket of the urban poor.<sup>19</sup> The latter scenario aims to better target subsidies to the consumption basket of the most vulnerable households.

<sup>16</sup> This corresponds to the cost of compensating consumption losses abstracting from other efficiency aspects. For transfers, the main efficiency costs relate to administrative setups; for subsidies, the standard deadweight loss; for tariff reductions, the elasticity of imports. For tariff reductions, there is also an efficiency gain, given that tariffs distort trade patterns.

<sup>17</sup> The compensation is set at 40 percent of consumption losses to keep the cost comparable across scenarios.

<sup>18</sup> *Oportunidades* transfers are automatically increased by inflation of the basic goods basket, and transfers were increased by an additional amount in May 2008.

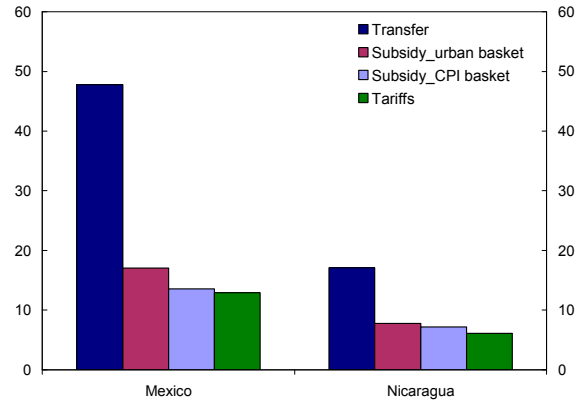
<sup>19</sup> The level of price subsidies was set to reduce inflation rates in these items by 30 percent.

(3) *Reductions in import tariffs.* We simulate the impact of eliminating import tariffs for key staple foods consumed by poor households. Relevant domestic prices are reduced to reflect these lower import costs, assuming a pass-through from import prices to domestic prices based on country-specific estimations (Box 4.3).

The simulations show that transfers to households are the most cost-effective instrument to reach vulnerable households. In Mexico, the conditional cash transfer program is significantly better targeted than tariffs or subsidies. Over 50 percent of program benefits would accrue to households in the bottom two deciles, compared with less than 20 percent under the other instruments. In Nicaragua, the school feeding program is also better targeted, but the difference is not as striking as in the case of Mexico. About 20 percent of program benefits would accrue to poor households, compared with under 10 percent for tariffs and subsidies. Within the price subsidy scenarios, selecting food items more relevant for the urban poor increases benefits for the most vulnerable households in a cost-effective manner.

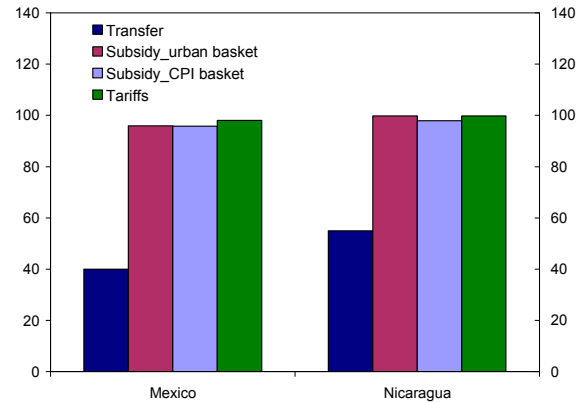
The drawback is the more limited coverage of transfer programs. In Mexico, the household survey indicates that *Oportunidades* reaches 40 percent of households in the bottom two deciles.<sup>20</sup> In Nicaragua, around 55 percent of households in the bottom two deciles receive benefits from the school feeding program in Nicaragua.<sup>21</sup> Instead, subsidies or tariff reductions potentially benefit all families that consume the key staple foods selected. This greater coverage of poor households of course extends the benefits to rich households as well.

**Share of Benefits for Bottom Two Deciles**  
(In percent of total program benefits)



Source: IMF staff estimates based on ENIGH 2006 and EMNV 2005.

**Household Coverage in Bottom Two Deciles**  
(In percent of total households in bottom two deciles)



Source: IMF staff estimates based on ENIGH 2006 and EMNV 2005.

<sup>20</sup> Administrative records show a broader coverage—around 70 percent.

<sup>21</sup> This corresponds to the coverage of all households in the bottom two deciles, including those without children or with children not enrolled in elementary school. If we include only households with children enrolled in school, the coverage is close to 80 percent.

### Box 4.3. Can Import Tariff Reductions Help Reduce Food Prices in the Region?

**Countries have considered selective reductions in import tariffs on agricultural commodities as a step to help lower domestic food prices.** In Nicaragua, the authorities have reduced or temporarily suspended tariffs on key staples since late 2007, when the country was hit by several natural disasters. In Mexico, the NAFTA agreement had already removed most barriers to free trade with the United States, and Mexico decided to eliminate its remaining transitional restrictions—on certain agricultural items—in 2007, a year in advance of its NAFTA commitment.

**However, reducing tariffs may have only a partial impact on domestic prices.** Effects of tariff cuts would be subject to the same partial “pass-through” that occurs when world commodity prices fluctuate. Also, while a reduction in import tariffs might help lower domestic prices, the effects could well be dwarfed when world commodity prices rise sharply. To quantify the extent of pass-through from world commodity prices to domestic prices, we estimated a vector error correction model. For some food staples, such as corn in Mexico, pass-through is almost complete, although this process takes well over two years. For powdered milk, pass-through to prices of domestic dairy products is significantly lower and takes much more time. In Nicaragua, pass-through for all products in the sample is also relatively low, yet the process is generally faster than in Mexico.

#### Mexico: Pass-Through Effects from Commodity Prices

(In percent, unless otherwise noted)

	Tariff rate 1/		Pass-through 2/	Half-life (In quarters)
	2007	Simulation		
Corn	18.2	0.0	0.9	8.1
Powdered milk	20.0	0.0	0.3	17.4

Sources: TRAINS database; and national authorities.

1/ Over-quota tariff rate under NAFTA prior to its elimination in 2007.

2/ Impact of 1 percent reduction in commodity prices on domestic prices of similar food items, estimated with a Vector Error Correction Model. Period corresponds to 1998Q1-2007Q4.

#### Nicaragua: Pass-Through Effects from Commodity Prices

(In percent, unless otherwise noted)

	Tariff rate 1/		Pass-through 2/	Half-life (In quarters)
	2007	Simulation		
Corn	11.6	0.0	0.5	2.5
Rice	61.2	0.0	0.6	5.6
Wheat flour	10.0	0.0	0.5	15.8
Beans	30.0	0.0	0.5	5.6
Vegetable oil	5.0	0.0	0.4	5.8

Sources: TRAINS database; and national authorities.

1/ These do not apply to CAFTA or other preferential agreements.

2/ Impact of 1 percent reduction in commodity prices on domestic prices of similar food items, estimated with a Vector Error Correction Model. Period corresponds to 1998Q1-2007Q4.

**Several factors can account for this incomplete and delayed pass-through.** Commodities are only one input in the production structure of firms selling food at the retail level. Changes in the input cost of commodities can then be absorbed by several margins that are country- and sector-specific. The low pass-through may also signal important domestic market imperfections, including weak transportation and distribution infrastructure that isolates communities from international trade; insufficient competition among domestic suppliers; and policies that restrict imports. All these factors may be operating together and reinforcing each other. While addressing some of these problems may take time, countries in the region that retain severe restrictions on agricultural imports could reconsider those policies. For such countries especially, it is possible that major liberalization of certain imports would significantly reduce domestic food prices, even if pass-through is only partial.

Note: This box was prepared by Ana Corbacho and Volodymyr Tulin.

## Conclusions

Based on this analysis of recent household surveys for Mexico and Nicaragua, the increase in food prices since 2006 would lead to a substantial reduction in real consumption levels absent a policy response. The most vulnerable would be

low-income households in urban areas, as well as net food consumers in rural areas. However, protecting the extreme poor would not require sizable fiscal resources, and the key challenge is to implement well-targeted policies that also do not introduce distortions.



The best option is to develop an effective social safety net. The simulations for Mexico highlight the considerable payoff to having a well-targeted conditional cash transfer program to deliver vital relief to vulnerable households. At the same time, by conditioning income support on school attendance and health visits, conditional cash transfers provide incentives to invest in human capital, reducing not only current but also future poverty.

However, the design and implementation of conditional cash transfers take time. In countries where these programs are not in place, other short-term instruments are needed. As shown in the scenarios for Nicaragua, expanding coverage of other targeted measures, such as school feeding programs, can also be a cost-effective way to compensate vulnerable households.

Still, a difficult trade-off arises because transfer programs are able to reach far fewer families. In contrast, subsidies or tariff reductions ensure almost full coverage of households in the bottom deciles. In the future, a priority should be to increase coverage of social safety nets, particularly in the urban sector.

In this context, price subsidies may provide a way to reach many households in the short run, but they are poorly targeted, result in overconsumption, and may be difficult to reverse. They also present implementation and enforcement challenges. More fundamentally, domestic food producers stand to lose at a time when increased investment is critical to promote a supply response in agriculture. Finally, subsidies do not help in alleviating future poverty. They are better considered as a temporary relief measure and reassessed as social safety nets are expanded.

Import tariff reductions may be more benign, particularly if part of a broader trade reform to enhance economic efficiency. However, given that the pass-through of import costs to domestic prices can take a relatively long time, the effects of import tariff reductions on social welfare may

materialize over the medium run. In countries where there are severe limitations on agricultural imports, such as quotas or tariff rate quotas, eliminating these has the potential to bring more significant reductions in domestic food prices.

## Appendix 4.1

This chapter focuses on the short-run impact of higher food prices. In the estimations, we assume that consumption and production patterns remain unchanged. Demand elasticities for staple foods consumed by poor households are believed to be small, because the poor typically consume the least expensive qualities and types of food, leaving little scope for substitution. In addition, when food prices for a broad range of goods move together, there are fewer opportunities for substitution. Also, poor households have generally less access to credit, land, and infrastructure, facing obstacles to expanding their own food production. Still, over time, households are likely to engage in substitution to buffer real consumption losses due to higher food prices. We also abstract from other indirect effects on wages or employment and do not factor in any policy response in the baseline simulations. Therefore, the short-run impact should be interpreted as an upper bound on overall real consumption losses.

Based on a simple model that recognizes the dual role of households as consumers and producers of food,<sup>22</sup> a first-order approximation of real consumption losses due to a percent change in food prices is given by

$$\Delta \ln C^b \approx \sum_i p_i (y_i^b - q_i^b) / c^b \Delta \ln p_i,$$

where  $y_i^b$  is the production and  $q_i^b$  the consumption, of food item  $i$  by household  $b$ , and  $c^b$  is total household consumption.

Then, households will stand to lose from changes in food prices in proportion to the value of their net budget shares allocated to food (that

<sup>22</sup> For further details, see Deaton (1997).

is, the difference between the value of food production and consumption as a percent of their total consumption). Based on household survey data for Mexico and Nicaragua, we calculated household net budget shares for various food items. Then, we multiplied proportional price increases by the corresponding household net budget shares and aggregated these effects across consumption items.<sup>23</sup> Finally, to examine the distributional impact of food price hikes, we averaged real consumption losses across different welfare groups. In line with the literature, welfare groups are defined according to deciles of household consumption per capita.<sup>24</sup> We trimmed the sample for outliers by dropping households at the top and bottom 1 percent of the distribution. Results are based on the underlying surveys after adjusting for sample weighting, so that they are representative of the whole population.

Results on the mean value of food shares and real consumption losses by welfare groups are calculated with a nonparametric approach that

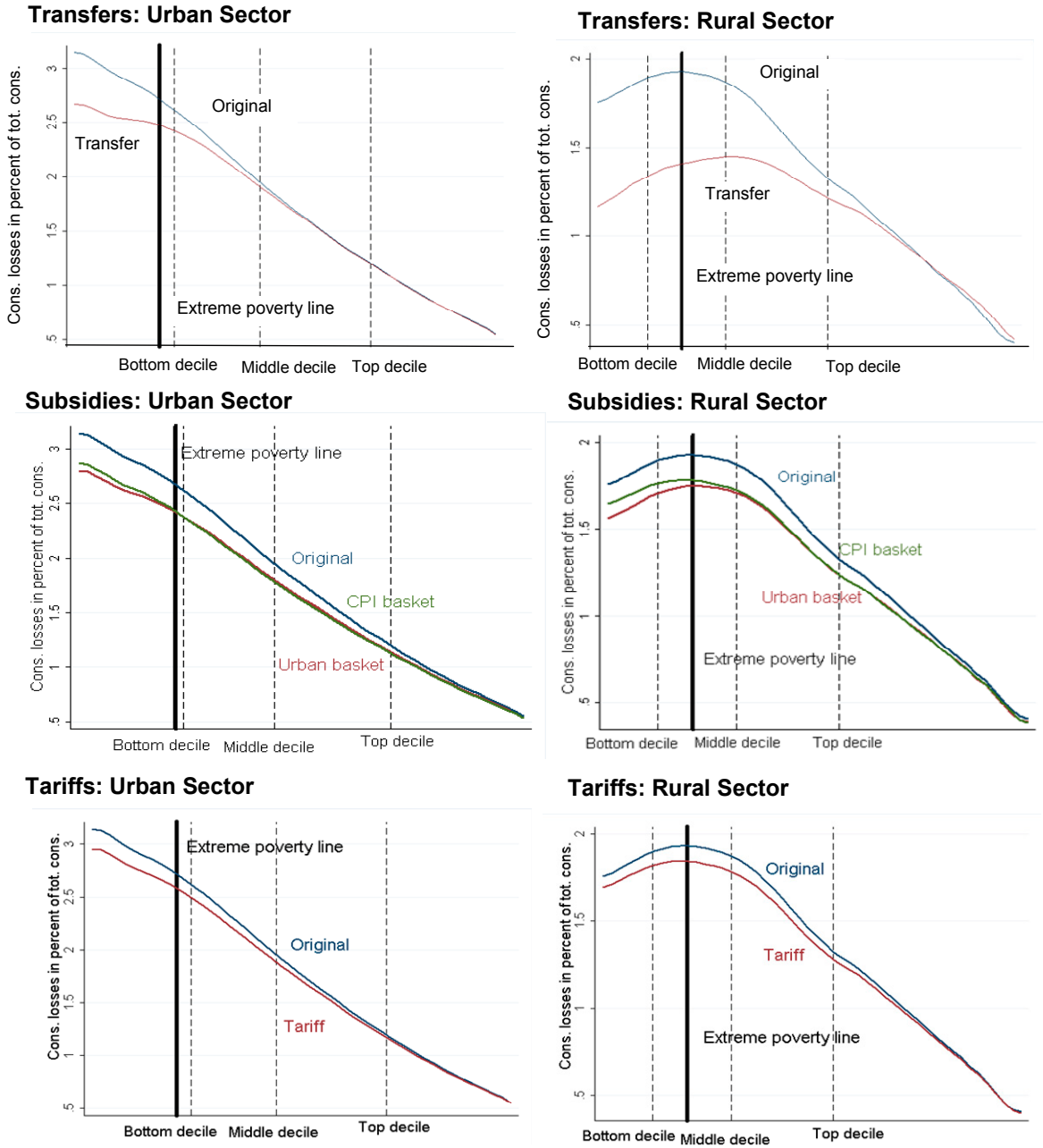
allows for the possibility of nonlinear relationships. We used local polynomial regressions that trace a nonlinear relationship between a  $y$  variable (food shares/real consumption losses) and an  $x$  variable (the log of household consumption per capita), without specifying in advance the functional form of this relationship. A data-driven technique determines the shape of the relationship. Similar to parametric regression, a weighted sum of the  $y$  observations is used to obtain the mean values. Instead of using equal weights as in ordinary least squares, or weights proportional to the inverse of variance as in weighted least squares, a different rationale determines the choice of weights in nonparametric regression. When estimating the expected value of  $y$  at a particular level of  $x_0$ , the data points closer to  $x_0$  receive more weight than those more remote from  $x_0$ . We used the kernel function to assign these weights, and determined the size of the bandwidth around each level of  $x_0$  optimally to minimize bias in the regression.

---

<sup>23</sup> We considered 15 categories of food items and match these with price changes based on national consumer price indices.

<sup>24</sup> See for instance Deaton and Zaidi (2003).

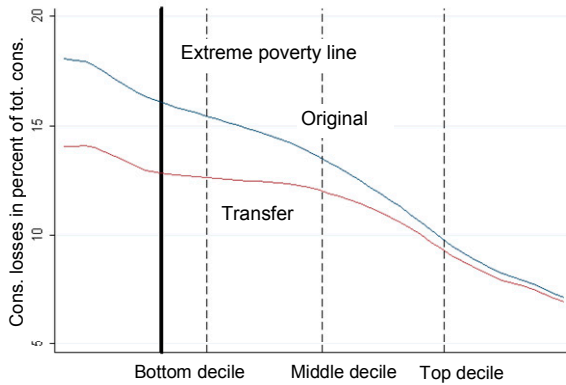
**Mexico: Real Consumption Losses Under Fiscal Policy Scenarios**  
*(In percent of total consumption)*



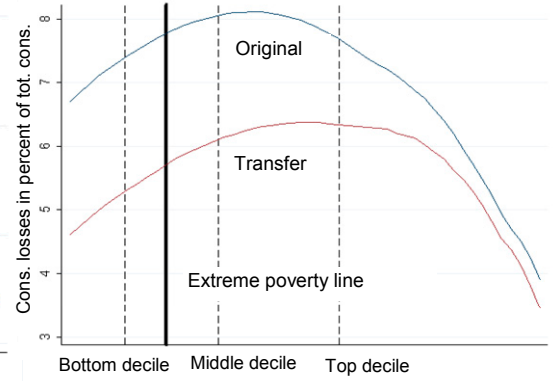
Source: IMF staff estimates based on ENIGH 2006.

## Nicaragua: Real Consumption Losses Under Fiscal Policy Scenarios (In percent of total consumption)

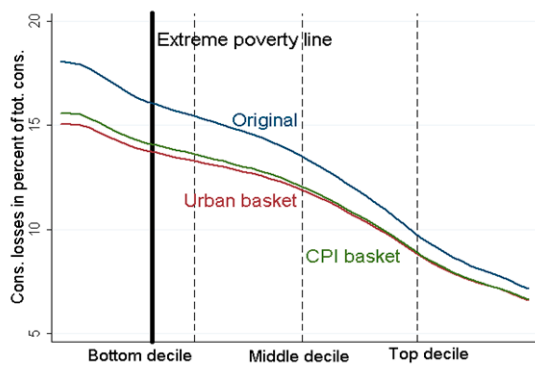
**Transfers: Urban Sector**



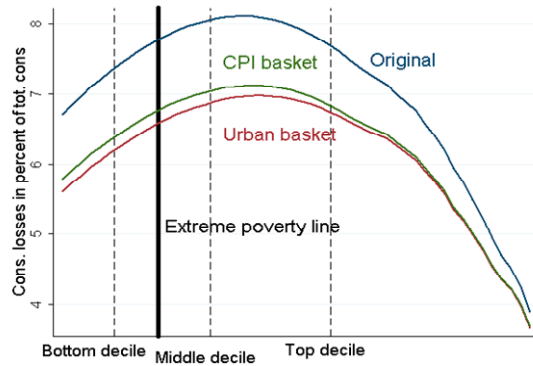
**Transfers: Rural Sector**



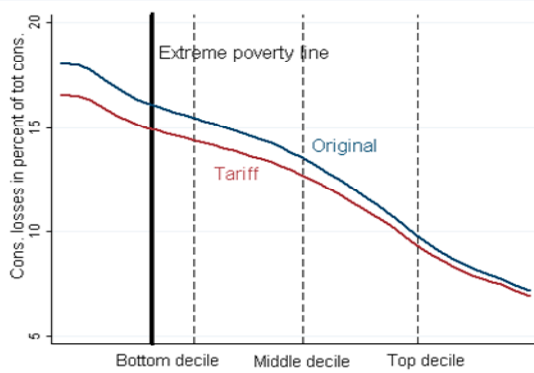
**Subsidies: Urban Sector**



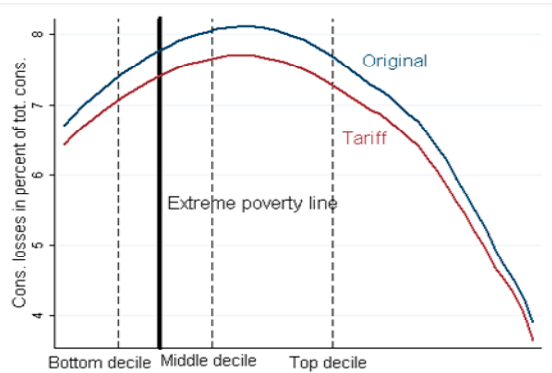
**Subsidies: Rural Sector**



**Tariffs: Urban Sector**



**Tariffs: Rural Sector**



Source: IMF staff estimates based on ENMV 2005.