

Poverty Impacts of the Volume-Based Special Safeguard Mechanism

Maros Ivanic and Will Martin

The World Bank

1818 H Street NW

Washington, DC, USA

5 February 2014

Abstract

The proximate cause of the collapse of the Doha Agenda negotiations in 2008 was disagreement over the volume-based Special Safeguard Mechanism (SSM). This measure is more cumbersome to use than the price-based safeguard and hence seems likely to be used mainly when price-based safeguard cannot be used, particularly when import prices have not declined and imports are rising because of an adverse shock to domestic output. While many simulations of the SSM on domestic prices are available, there appear to be none examining its impacts on the welfare of poor households. Whether such a safeguard will increase or reduce poverty can only be determined empirically—if there are enough small, poor farmers who are net sellers of the commodity when the duty is imposed, then it may reduce poverty. If most small, poor farmers are net buyers of dutiable products, then poverty will likely rise. Empirical analysis for thirty-one countries finds that poverty is generally increased following the imposition of this safeguard. The adverse poverty impact of the duty is larger when the quantity safeguard is likely to be triggered, because declines in farm output reduce the benefit to poor producing households from higher prices.

Key words: Special safeguard mechanism, SSM, quantity safeguard, World Trade Organization, agricultural yield, poverty

Poverty Impacts of the Volume-Based Special Safeguard Mechanism

The logic of the proposed volume-based special safeguard mechanism (SSM) in the Doha Agenda negotiations (WTO 2008) seems quite simple. When imports increase from baseline levels, a duty can be invoked to protect domestic producers against the threat posed by these imports. Such a measure seems appealing from the viewpoint of producers, who might find difficulty competing with imports which have, for some reason, suddenly become more competitive than domestic production. As designed, this policy might seem potentially very important for poverty reduction because most of the poor in developing countries live in rural areas, and obtain the majority of their income from farming (World Bank 2008). If all poor farmers in developing countries were net sellers of food—as are almost all commercial producers in the industrial countries—then a measure that raised the price of competing imports would likely help to reduce poverty amongst this group, as well as to address competitive challenges posed by increases in imports.

However, it is important to remember farm structures in developing countries are very different from those in the industrial countries. Many farmers in poor countries remain subsistence-oriented, and many poor farmers are actually net buyers of food. Sometimes this reflects the very limited resources available to these producers, other times a desire to diversify their output mix in order to reduce their vulnerability to shocks affecting any one activity. Low-income producers are particularly likely to be net buyers in years when the country faces increased competition from imports, perhaps because of unfavorable seasonal conditions. Low-income non-farm households are likely to be very vulnerable to increases in the prices of staple foods, since many spend up to three-quarters of their incomes on staple foods. When many poor farm households are also vulnerable to higher food prices, the risk that higher food prices will raise overall poverty rates, and hence imperil the food security of the poor, seems particularly strong. Whether this is the case is an important question when evaluating the potential impact of such a measure.

Since the proposed measures provide a right, but not an obligation, to impose a duty, a key decision for WTO members with the right to use an SSM would be when to impose such a duty. Two approaches might seem attractive: (i) to impose such a duty in line with the WTO rules that permit its use, or (ii) to impose such a duty when it seems likely that this would help reduce poverty and vulnerability, particularly among small farmers. The first decision rule is

relatively simple, since it requires only information on import levels in the current year relative to imports in a three-year moving-average baseline period. The second may be much more complex because it requires much more difficult-to-obtain information on whether individual households are net buyers or net sellers of the products in question. An important question is therefore how frequently the proposed WTO rules would permit the introduction of measures that are consistent with the goals of reducing poverty and vulnerability. If they frequently do, then WTO rules could perhaps be used to provide simple rules of thumb for triggering the volume-based SSM. If they are not, then developing alternative rules of thumb is likely to be important if adverse outcomes are to be avoided.

While many studies (e.g. Montemayor 2007; Grant and Meilke 2009; Hertel, Martin and Leister 2010) examine the implications of the SSM proposals for aggregate variables such as market prices and farm incomes, almost no analysis is available at the household level needed to assess the implications of the SSM for its intended objectives of improving food security, livelihood security and rural development. For an excellent overview of related issues of the implementation of SSM policies and a review of many quantitative and qualitative studies on the subject see Grant and Meilke (2011).

This paper uses data at the household level to assess the implications of the volume-based SSM for household welfare, and particularly for the number of people who fall below the internationally standard poverty line of \$1.25 per day (Ravallion, Chen and Sangraula 2009), and hence face increased risks to their food and livelihood security. In the following sections of this paper, we consider the methodology used to assess the frequency of when the volume-based safeguard might be applied, and how its effects might be assessed. After a short discussion of the data available for the analysis, we present poverty estimates of our simulations for a set of individual developing countries as well as for the world as a whole and conclude.

Methodology

The proposed SSM involves both a price-based and a quantity-based measure. The price-based measure is much simpler to use, since it can be invoked whenever the price of a shipment falls below a trigger level based on a moving average of import prices from all sources (Hertel, Martin and Leister 2011). As noted by Martin and Anderson (2011) and Anderson, Ivanic and Martin (2013), such price-based measures are likely to be attractive for individual developing

countries—and have been widely used in the industrial countries in the past. They can stabilize domestic prices in individual, small countries relative to the situation without such intervention, although the incentive created for false invoicing created by the shipment basis for pricing creates risks both of corruption and for the effectiveness of the measure in restraining imports, as well as of discrimination against exporters with lower unit values, who are typically from poorer countries. However, widespread use of such measures leads to a collective action problem that may require a collective policy response—by substantially increasing the volatility of world prices, these interventions are collectively ineffective in stabilizing domestic prices (Martin and Anderson, 2011). The best that they can do is to redistribute volatility between countries. The implications of the application of quantity- and price-based SSMs on the volatility of world market prices was quantified for the wheat market by Grant and Meilke (2009, page 11) who estimate a 16-percent increase in the standard deviation of the world price as a result of the application of SSM rates (subject to existing bound tariffs). Such a large increase in price volatility makes it more difficult for countries to refrain from using such measures—a problem akin to the collective action problem when members of a crowd stand to get a better view at a sporting event.

We begin our analysis by considering the sources of increases in imports relevant to the quantity-based SSM. Given that the price-based safeguard can be applied quickly when the price of a particular shipment is fifteen percent or more below a three-year moving average price, and the volume-based safeguard requires the authorities to wait until cumulative exports during the year exceed a three-year moving average of imports, it seems likely that the quantity-based safeguard will generally be used only when the price of imports has not fallen substantially. It appears that this type of situation is frequent. The South Centre (2010, p2) concludes that, in over 85 percent of import surges,¹ the import price did not fall more than 15 percent below the preceding three-year moving average.

Since the focus of the volume-based safeguard is on situations where the price of imports does not decline we need to ask carefully why imports might rise when import prices are not declining. For most agricultural commodities, this is likely to be the case because of weather-induced shocks to output which—in the case of crops—manifest themselves through changes in yields (Roberts and Schlenker 2010). We considered following Roberts and Schlenker in using

¹ Where an import surge is defined as imports exceeding 110 percent of the preceding three-year moving average.

the deviations of yields from trends, but finally decided to use a three year average of past yields as our benchmark against which to compare current yields. To the extent that changes in imports reflect changes in the volume of output, use of this average-yield measure as the base should better reflect the deviations in imports from their three-year moving average that trigger the volume-based SSM than would deviations from a linear trend. We compared the deviations from the three-year moving average with those from a linear trend and found those from the three-year moving average to be smaller (Table 1).

Our analysis considers the impacts of yield shocks and subsequent application of SSM measures in a sample of low and middle-income countries (for the list of countries see Table 2) many of which are, or may become, importers of key commodities, particularly maize, rice and wheat. For all countries included in our sample, we have collected detailed data from household surveys on the sources of income and patterns of expenditure—with special emphasis on the consumption of staple foods whose price is enormously important for the poor, and on income from production of these goods—for a large sample of households. These data are used to capture the impacts of production and price shocks on the real incomes of households.

The first step in the analysis is to estimate the distribution of unfavorable shocks to agricultural output—such as might arise from a drought—and evaluate their implications for the national economy and household welfare. We use historical data on shocks in yields, available from the FAO, to estimate the distribution of shocks in productivity relative to a three-year average. We then implement shocks in a CGE model (GTAP) as negative productivity shocks and, through a Monte Carlo exercise, calculate the resulting distribution of prices, household incomes and poverty rates.

Although the quantity-based SSM duty cannot be imposed until imports have exceeded a trigger level, we assume that key market participants know the broad order of magnitude of the output decline—and hence the size of the duty to be imposed—at, or before, the time of the harvest. Given intertemporal arbitrage possibilities, the expectation that a duty will be imposed later in the season can be expected to raise the price of the commodity throughout the marketing season. Otherwise, market participants could make profits by buying early in the season and selling later. Given the time sequence, output in the marketing season in which the duty is imposed is unable to respond to the higher prices resulting from the duty. We assume that the duty is removed at the end of the marketing year affected by the adverse shock. The fact that the

proposed measure may be imposed beyond the marketing season affected by the adverse shock means that our estimate of the effect of the measure is a lower-bound measure of its impact.

At the household level, we assume, for simplicity and transparency, that output of each crop in all producing households falls by the same proportion. The effect of these shocks on poor farm households will be to reduce their incomes directly, through reductions in the value of agricultural output at any given price. Another potential effect—calculated in the CGE model—arises from changes in prices following the output change: this may mean a reduction in the saleable surplus of farm households, or an increase in the share of net expenditure on food, making households more likely to be adversely affected by increases in the prices of these foods. We follow Deaton (1989) in assessing the impact of a price change using only the net buyer or net seller status of the household in a particular commodity. We considered allowing for welfare impacts resulting from food-price-induced changes in wages (see Ivanic and Martin 2008) but the evidence (see, for example, Ravallion 1990) suggests that most of this effect may take several years to emerge in poor countries. The income effect of a yield change was measured very simply using the change in producers' output volumes valued at domestic prices. We also ignore the depressing effect of the greater frequency of use of safeguard on average world prices because sustained changes in world prices appear to have small impacts on poverty (Ivanic and Martin 2014).

The second stage in the analysis is to take into account the effects of introducing the duties permitted under the quantity-based SSM. When negative output shocks cause imports to exceed one of the SSM thresholds, we change the duty in line with SSM proposal (WTO 2008).² When the country in question is a net importer, introduction of the duty is assumed to raise import prices by the same percentage. Where farmers were, and remain, net sellers of food, the increase in prices will help compensate for any losses resulting from the decline in their output. However, for farmers who were—or who have become after the adverse output shock—net buyers, the increase in prices resulting from the duty will have an adverse impact on real incomes.

² When imports are between 110 and 115 percent of the trigger, a duty of no more than 25 percent, or 25 percent of the bound rate is imposed. For imports between 115 and 135 percent, a duty of 40 percent, or 40 percent of bound rate, is imposed. For imports over 135 percent of the trigger, a duty of 50 percent, or 50 percent of bound rate, is imposed.

An important consequence of imposing SSM duties is their potential to raise tariff revenue, which could be used to ameliorate the negative impacts of higher prices on the poor. There is no guarantee that an additional duty such as the SSM will raise additional revenues because it will reduce the volume of imports on which existing tariffs are levied. The higher are the existing duties and the more elastic the import demand, the greater the probability that total trade tax revenues will be reduced. We allow for the possibility of either higher or lower revenues in the analysis.

There are several plausible mechanisms by which changes in total duty revenues may be redistributed to consumers. One option would be for the government to absorb the changes, not passing them on to consumers—or at least to poor consumers at all. At the other extreme, the government might subsidize the consumption of the affected commodity while maintaining the higher sales prices for farmers or, alternatively, the subsidy could be transferred directly to the farmers in order to offset their productivity losses. However, because such mechanisms are likely to be costly to implement and because we are unsure what measure would be adopted we consider a simplified uniform reduction in consumption tax which would make the imposition of SSM duties fiscally neutral—hence we use the CGE model to calculate and impose such a uniform change in consumption tax (possibly a subsidy) that would assure that all proceeds from SSM duties would be redistributed. We consider this mechanism in our calculations in order to assess the potential of the changed duty revenues in affecting the poverty impacts of the SSM duties.

In our assessment of the implications of the SSM proposal for poverty, we consider the differences in the distributions of national and global poverty headcounts as a result of the imposed SSM duties with any tax reductions for the same distribution of productivity changes. By judging the difference between average global poverty outcomes with or without the SSM policy and its significance we are then able to put forward a qualified statement with regard to the suitability of the SSM rules for poverty reduction.

Data

We obtained the historical distribution of yields of maize, rice and wheat yields from the FAO's FAOSTAT database which contains information on crop yields for 211 countries and regions for

the period of 1961–2009. Out of this database, we collected yield information for the set of countries included in our sample, which is described below.

From the WTO's Integrated Database we obtained tariff-line-level information on bound and applied rates for member countries. Using the reported unit values of cereal imports from the combined FAO database, we expressed the existing specific and *ad valorem* duties in their *ad valorem* equivalents for further use in this work.

We finally used a set of thirty-one household surveys representing globally distributed low- and middle-income countries (Table 2) collected between 2002 and 2010. All of the surveys contain household-level information on production and consumption of the four crops considered in this study (maize, rice, soybeans wheat) as well as total household expenditures which allow us to assess the impact of changes in productivity and prices for these commodities on household welfare.

Methodology

Stochastic model of yields

Our analysis of the distribution of yields for our sample of thirty-one countries shows that the median standard deviation of the value relative to the average of previous three years is lowest for rice (12.8 percent) and highest for soybeans (19 percent). Of course, many countries in our sample experience much greater volatility, especially in the case of wheat where a quarter of the countries experience volatility greater than 25 percent.

Knowing the distribution of individual yields is, however, not enough to fully understand their distribution in relation to one another because in addition to a high level of volatility, crop yields in our sample also show a large level of correlation across regions and commodities in response to common shocks such as those resulting from weather. In order to simulate their distribution faithfully, it is therefore necessary to decompose changes to crop yields into a set of underlying, independently distributed shocks and a matrix of relationships among individual crops and regions. We do so by estimating the variance-covariance matrix of crop yields (C) across regions and crops. Using the Cholesky decomposition (U) into $C = UU^T$ allows us to create a matrix of randomly distributed yield shocks with the same joint distribution as UI where I is a diagonal matrix of independently and standard-normally distributed shocks in any particular time period.

Domestic output shocks are only indirectly related to whether a SSM will be triggered because the change in imports resulting from the shock depends on a number of other factors. In order to translate the changes in domestic productivity into changes in imports and, from there, tariffs and domestic prices, we use the GTAP model into which we feed the set of simulated productivity changes. The imperfect substitution between imported and domestic goods in this model reduces the magnitude of the import shocks relative to those expected in a model with perfect substitutes, making our estimates conservative estimates of the measured impacts of the measure.

Macro model

Our initial part of the analysis is facilitated by the use of a global CGE model (GTAP) described by Hertel (1997). This model allows us to simulate the implications of changes in agricultural yields (productivity) for numerous variables of importance such as domestic prices and wage rates. To facilitate the analysis, we run the Monte Carlo simulations, with the 57 available commodities aggregated into six—maize, wheat, rice, soybeans, other food and the rest. The focus on food items in our selection of commodities reflects the fact that food is the most important commodity while we maintain our focus on the four agricultural crops where the SSM is most likely to be invoked (maize, wheat, rice and soybeans). We also aggregate the available 129 countries and regions into 32, 30 of which correspond best to our sample of 31 developing countries (in seven cases, we had to use an aggregate region as a representation of a country in our sample) and two more to represent the rest of developing countries and all developed countries.

In each of our simulations, we assume a short-run closure where the allocation of land, labor and natural resources to each commodity are fixed. The reason for this assumption is that it is likely that the size of the SSM response is known at the time when agricultural inputs have already been fixed and little can be done in terms of adjusting output. Once a crop has experienced a poor harvest, the level of the import surge is determined simultaneously with the corresponding tariff change.

Within the GTAP framework we simulate changes in tariffs as being endogenously determined based on the actual change in imports resulting from the changes in domestic productivity and tariffs. Tariff changes are modeled in a three-tiered structure reflecting the nature of the SSM proposal. Hence, using GEMPACK's complementary slackness feature, we

allow for tariffs to be increased within the allowed limit for each level of import surge (110, 115 or 135 percent) Specifically, the determination of the appropriate SSM duty—which depends on which band of the import surge has been reached—is achieved using the new feature of the GEMPACK software (used to run the GTAP model) which allows for enforcing complementary slackness conditions directly in the model. Using this feature, we are able to model in each instance the highest possible duty allowed under each level of import increase. No duty is imposed before imports reach 110 percent of the previous three years’ average. Once this increase in imports is reached, the duty is increased to the highest possible level allowed under the rules while ensuring that the surge remains at or above 110 percent to assure that the required surge is observed. If the surge exceeds the first band at the highest allowed duties, duties are allowed to be raised to the second band’s maximum, while maintaining the level of surge at the second band of 115. Finally, we allow for the third-band duties when the import surge reaches 135 percent of the historical average.

Micro model

For each run of our Monte Carlo simulation, we collect all of the relevant outputs of the macro model and use them as inputs in our micro model. Specifically, we apply the obtained productivity change, domestic price changes and wage changes to the households in our survey sample and calculate national changes in poverty rates following the approach of Ivanic, Martin and Zaman (2011) with the addition of second-order impacts for household consumption. This method can be simply described as follows: in the first step, we calculate the implications of price and wage changes for household welfare as a compensating variation measure. In the next step, we evaluate the number of households whose new welfare level places them below the poverty line and use the available household weights to calculate an updated poverty rate.

Global extrapolation

We extrapolate these national poverty changes of thirty-one developing countries into global poverty changes, expressed in numbers of people in millions. We do so by using our sample of thirty-one countries with their respective population weights—because our sample is fairly representative of the world regions with the largest numbers of people in poverty (South Asia and Sub-Saharan Africa), we are able to extrapolate global poverty estimates with relatively small standard error.

Results

Our analysis of the Monte-Carlo-simulated distribution of productivity changes suggests that quantity-based SSM measures are likely to be triggered quite often. As shown in Table 3, in about a third of the cases we observe that at least one SSM duty has been triggered. The probability of triggering an SSM response appears to be lowest for wheat (21 percent) and in excess of 40 percent for the rest of the commodities, reflecting the relative yield volatility levels among these crops. With regard to the average size of the SSM tariff response, we observe that the largest response, following a 35-percent increase in imports, is the most frequently-imposed. In other words, when imports rise above the minimum trigger level, they most often rise sufficiently to trigger the highest duty, as shown in Table 3. For each run, we calculate price and income changes resulting from the simulated yield changes in three distinct scenarios—one implementing SSM responses without redistribution of the resulting tariff revenue changes to the poor, another one implementing SSM responses with a general consumption tax change redistributing tariff gains, and, finally, one with no SSM duties to serve as our baseline simulation.

The country-level poverty results of our Monte Carlo simulation are shown in Table 4 for net poverty changes and in Table 5 for gross poverty increases where by “gross increases” we mean changes in poverty when counting only those households that have fallen into poverty while ignoring those who might have escaped poverty as a result of a simulation. In the first column of each table, we show the mean and standard deviations for the productivity shocks with SSM duties. The following column shows the same for a simulation involving the same SSM measures with the addition of tariff revenue redistribution. Finally, in the third column we show the results for the baseline simulation of no policy responses despite any changes in imports due to the changes in yields.

As shown by Table 4, SSM tariff responses to import surges generally increase the average poverty implications of the underlying productivity volatility. Only in a few cases (Cambodia, China, Cote d’Ivoire, Timor Leste and Yemen) do we observe a reduction in poverty as a result of SSM measures. The second considered scenario involving redistribution of any tariff proceeds from the SSM measures appears to be of little importance for national poverty changes. Moving our attention to Table 5, we can see, however, that even in those countries where the SSM tariffs reduce poverty on average, there are large groups of population who move

down through the poverty line into poverty. Hence, the aggregate benefit of the SSMs in these cases is still associated with the declining welfare of numerous households.

The global poverty results of the three Monte Carlo simulations are shown in Table 6. Focusing on the first column which shows the average changes in global poverty, we can see that the introduction of SSM measures results in an increase in average global poverty by 0.3 percent over the base scenario. With about 4.2 billion people living in the sampled region of low- and middle-income countries, this translates into an increase in poverty by about 14 million people. The introduction of a uniform subsidy used to redistribute any tariff revenue gains to the consumers appears to make little difference in the outcome of the SSM scenario. This relatively low importance of tariff redistribution is, among others, the result of the relatively small set of four considered crops included in our analysis whose global imports represent less than half a percent of global private consumption. Hence, redistribution of even substantial tariffs on those four crops is likely to represent an only insignificant change in overall cost of consumption.

Our global results suggest that the application of quantity-based SSMs is likely to raise global poverty. However, from the results we have presented so far, it is unclear how much of this increase in poverty headcount is due to the increases in prices as a direct consequence of SSM tariffs and how much is due to the fact that SSM duties are applied at times when crops have failed which reduces the net selling position of those farmers whose crops have failed (Figure 1). In order to understand this issue better, we run a hypothetical simulation in which we apply the same macroeconomic yield shocks with the appropriate tariffs exactly as the first scenario but assume that the productivity of household farms has not changed. We report the poverty implications of this scenario in Table 6 which shows that the decline in net-selling position alone is responsible for over 3 million of the total number of people thrown into poverty due to the application of SSMs.

Conclusions

In this work we considered the implications of the proposed quantity-based special safeguard mechanism (SSM), which would allow developing countries to impose safeguard duties when their imports of agricultural commodities rise above defined threshold levels even if import prices are not falling. Identifying domestic yield variations as the most likely causes of these

import surges, we analyze the likely impact of these policy responses on poverty in the imposing countries.

In our analysis, we first considered the impact of historical yield shocks on imports and prices in the affected developing countries. In response to this shock, the level of SSM duty allowed under the current proposals is invoked in countries which are, or have become, importers and the consequences for household incomes assessed.

The results from our analysis suggest that use of the volume-based duty raises poverty in most countries because of the importance of food in the expenditure patterns of the poor, and the tendency for low income producers to be net buyers of food. The adverse impact of the duty on poverty is worse than it would be in a normal year because—following the adverse yield shock—because producers have less output on which to benefit from higher prices and fewer producers are net sellers of food. Typical poor producers who are or become net buyers of food are doubly disadvantaged in the situation—first by the adverse yield shock that directly reduces their incomes and secondly by the increase in prices that increases the cost of their food purchases. While the imposition of SSM duties may raise the trade tax revenues of importing countries, we find that, even if these proceeds were given back to consumers in the form of a lower consumption tax, the impact of such a redistribution would not be sufficient to prevent poverty increases.

To assess the implications of automatic use of the SSM for the overall number of people in poverty and the variability of this number, we use the historically observed variations and covariations between the yields of several crops (maize, rice, soybeans and wheat) in a representative sample of thirty-one developing countries, and perform a Monte Carlo simulation of the poverty impacts of the SSM policy which mimics the observed patterns of yield volatility.

Our analysis suggests that yield volatility of output for the main cereals (maize, rice and wheat) is sufficient for SSM tariffs to be triggered quite often—between 44 percent of the time in the case rice to 21 percent in the case of wheat. Our short-run analysis shows that imposition of a quantity-based SSM is likely to raise poverty in countries imposing it by placing additional burdens on consumers, including farmers who are net buyers because their crop yields have declined. On average, we estimate the burden of the SSM measure to translate into additional 14 million people pulled into poverty; even in those countries that experience a net poverty reduction we observe significant number of households moving into poverty. Therefore, it seems

clear that a very substantial degree of caution is needed when considering imposition of a volume-based safeguard following a surge in imports if it is not to have an effect that is quite contrary to its intended objective of increasing food and livelihood security.

Table 1: Relative standard deviations of crop yields (median values, range of 25th and 75th percentile in parentheses, sample of thirty-one countries)

Commodity	Relative to three-year average	Relative to trend
maize	0.187 (0.113–0.236)	0.234 (0.149–0.321)
rice	0.128 (0.078–0.213)	0.175 (0.11–0.24)
soybeans	0.19 (0.098–0.213)	0.243 (0.155–0.38)
wheat	0.171 (0.12–0.286)	0.232 (0.141–0.349)

Table 2: Household surveys used in the study

Country name	Year	Survey name	Number of households
Albania	2005	Living Standards Measurement Survey	3664
Armenia	2004	Integrated Survey of Living Standards	6815
Bangladesh	2005	Household Income-Expenditure Survey	10080
Belize	2009	Household Income and Expenditure Survey	1948
Cambodia	2003	Household Socio-economic Survey	14984
China	2002	Chinese Household Income Project	5783
Ecuador	2006	Encuesta Condiciones de vida – Quinta Ronda	13581
Guatemala	2006	Encuesta Nacional de Condiciones de Vida	13686
India	2005	India Human Development Survey (IHDS)	41554
Indonesia	2007	Indonesia Family Life Survey	12999
Ivory Coast	2002	Enquete Niveau de Vie des Menages	10798
Malawi	2004	Second Integrated Household Survey	11280
Moldova	2009	Cercetarea Bugetelor de Familie	5532
Mongolia	2002	Household Income and Expenditure Survey	3308
Nepal	2002	Nepal Living Standards Survey II	5071
Nicaragua	2005	Encuesta Nacional de Hogares sore Medicion de Nivel de Vida	6619
Niger	2007	Enquete National sur Le Budget et la Consommation des Menages	4000
Nigeria	2003	Nigeria Living Standards Survey	19121
Pakistan	2005	Pakistan Social and Living Standards Measurement Survey	15453
Panama	2003	Encuesta de Niveles de Vida	6362
Peru	2007	Encuesta Nacional de Hogares	22201
Rwanda	2005	Integrated Household Living Conditions Survey	6900
Sierra Leone	2011	Sierra Leone Integrated Household Survey	6737
Sri Lanka	2007	Household Income and Expenditure Survey	4633
Tajikistan	2007	Living Standards Measurement Survey	4644
Tanzania	2008	National Panel Survey	3264
Timor-Leste	2007	Poverty Assessment Project	4477
Uganda	2005	Socio-Economic Survey	7425
Vietnam	2010	Household Living Standard Survey	9399
Yemen	2006	Household Budget Survey	13136
Zambia	2010	Living Conditions Monitoring Survey	19398

Table 3: Relative frequency of triggered SSM responses, percent

Commodity	No response	Minimum response	Medium response	Highest response
Average	0.626	0.135	0.059	0.180
Maize	0.566	0.102	0.077	0.255
Rice	0.560	0.190	0.068	0.182
Soybeans	0.586	0.195	0.050	0.169
Wheat	0.790	0.053	0.042	0.115

Table 4: Changes in poverty rates by country as a result of two SSM simulations (average change with the corresponding standard deviation in parentheses)

Country name	SSM response	SSM response with redistribution	No response
Albania	0.1% (0.1%)	0.1% (0.1%)	0% (0%)
Armenia	0.3% (0.5%)	0.1% (0.3%)	0% (0.1%)
Bangladesh	2.6% (6.8%)	2.6% (6.8%)	0.8% (4.1%)
Belize	0.1% (0.8%)	0.1% (0.8%)	-0.1% (0.7%)
Cambodia	-1.3% (2.2%)	-1.5% (2.3%)	-0.2% (1.3%)
China	-1.2% (3%)	-1.3% (3%)	-1.2% (3%)
Cote d'Ivoire	0.9% (4%)	0.9% (4.1%)	0.9% (3.7%)
Ecuador	0.5% (0.9%)	0.4% (0.8%)	0.2% (0.4%)
Guatemala	1.3% (3.1%)	1.2% (3%)	0.6% (2.2%)
India	1% (2.5%)	1% (2.5%)	0.4% (1.9%)
Indonesia	0.5% (0.8%)	0.5% (0.8%)	0.3% (0.5%)
Malawi	0.5% (6.5%)	0.5% (6.5%)	0.2% (6.3%)
Moldova	1.2% (3.7%)	1.2% (3.7%)	0.6% (2.3%)
Mongolia	1.2% (2.1%)	1.2% (2.1%)	0.1% (0.8%)
Nepal	1.6% (4%)	1.6% (3.9%)	0.5% (2.7%)
Nicaragua	0.4% (0.8%)	0.4% (0.8%)	0.1% (0.4%)
Niger	1% (1.4%)	0.9% (1.3%)	0.5% (0.9%)
Nigeria	-1.2% (4.6%)	-1% (4.8%)	-1.5% (3.5%)
Pakistan	1% (2.6%)	1% (2.6%)	0.2% (1.2%)
Panama	0% (0.3%)	0% (0.3%)	-0% (0.2%)
Peru	0.3% (0.4%)	0.3% (0.4%)	-0% (0.2%)
Rwanda	0.5% (1.5%)	0.6% (1.6%)	0.4% (1.4%)
Sierra Leone	0.5% (4.3%)	0.6% (4.3%)	0% (3.7%)
Sri Lanka	0.7% (1.5%)	0.7% (1.5%)	0.2% (0.8%)
Tajikistan	0.3% (1.3%)	0.3% (1.3%)	0.3% (1.3%)
Tanzania	2.4% (3.6%)	2.4% (3.6%)	2.3% (3.6%)
Timor-Leste	5.6% (17.4%)	6% (17.6%)	6.1% (17.5%)
Uganda	0.2% (0.8%)	0.2% (0.8%)	0.1% (0.7%)
Vietnam	0.4% (1.4%)	0.4% (1.3%)	0.3% (1.5%)
Yemen	0.7% (2.8%)	0.7% (2.6%)	0.9% (2.8%)
Zambia	-0.2% (1.7%)	-0.2% (1.6%)	-0.6% (0.8%)

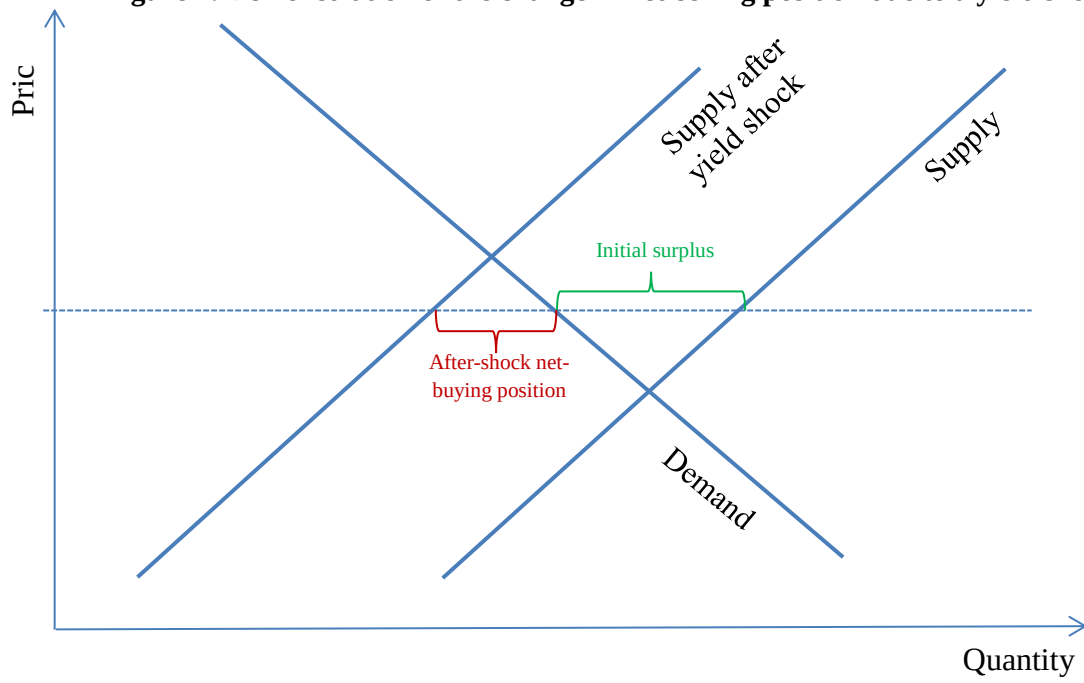
Table 5: Gross increases in poverty rates by country as a result of two SSM simulations (average change with the corresponding standard deviation in parentheses)

Country name	SSM response	SSM response with redistribution	No response
Albania	0.1% (0.1%)	0.1% (0.1%)	0% (0%)
Armenia	0.4% (0.5%)	0.2% (0.3%)	0.1% (0.1%)
Bangladesh	6% (7%)	6.1% (7.1%)	3.4% (3.2%)
Belize	0.5% (0.6%)	0.5% (0.6%)	0.3% (0.4%)
Cambodia	1.4% (1.1%)	1.3% (0.9%)	1% (0.9%)
China	0.7% (0.7%)	0.7% (0.7%)	0.7% (0.7%)
Cote d'Ivoire	2.1% (3.2%)	2.2% (3.3%)	1.9% (2.9%)
Ecuador	0.7% (0.9%)	0.6% (0.8%)	0.4% (0.4%)
Guatemala	2% (2.7%)	1.9% (2.6%)	1.2% (1.7%)
India	2.1% (2.1%)	2.1% (2.1%)	1.4% (1.5%)
Indonesia	1.2% (1.2%)	1.2% (1.2%)	0.7% (0.5%)
Malawi	2.9% (4.1%)	2.9% (4.1%)	2.7% (3.8%)
Moldova	1.2% (3.7%)	1.2% (3.6%)	0.7% (2.3%)
Mongolia	1.5% (1.9%)	1.5% (1.9%)	0.4% (0.5%)
Nepal	2.7% (3.2%)	2.8% (3.2%)	1.5% (1.9%)
Nicaragua	0.7% (0.7%)	0.7% (0.7%)	0.4% (0.3%)
Niger	1.5% (1.4%)	1.4% (1.3%)	1% (0.8%)
Nigeria	1.7% (1.2%)	1.8% (1.3%)	1.1% (0.6%)
Pakistan	1.4% (2.3%)	1.4% (2.3%)	0.6% (0.9%)
Panama	0.1% (0.2%)	0.1% (0.2%)	0.1% (0.1%)
Peru	0.4% (0.3%)	0.4% (0.3%)	0.1% (0.1%)
Rwanda	1.3% (1.4%)	1.4% (1.5%)	1.1% (1.3%)
Sierra Leone	2.1% (2.8%)	2.2% (2.9%)	1.7% (2.1%)
Sri Lanka	1% (1.4%)	1% (1.4%)	0.4% (0.6%)
Tajikistan	0.6% (1.2%)	0.6% (1.2%)	0.6% (1.2%)
Tanzania	3.6% (3.7%)	3.6% (3.7%)	3.6% (3.7%)
Timor-Leste	10.1% (13.8%)	10.3% (14%)	10.4% (13.8%)
Uganda	0.8% (0.8%)	0.8% (0.8%)	0.7% (0.6%)
Vietnam	1.2% (1%)	1.2% (1%)	1.2% (1.1%)
Yemen	1.3% (2.4%)	1.3% (2.3%)	1.4% (2.5%)
Zambia	1.4% (1.1%)	1.3% (1.1%)	0.7% (0.7%)

Table 6: Estimates of global poverty changes as a result of three SSM simulations (average changes)

Simulation	Change in poverty (%)	Change in poverty (millions)	Gross increase in poverty (%)	Gross increase in poverty (millions)
No response	-0.21	-8.9	1.11	46.7
SSM response	0.13	5.4	1.6	67.1
SSM response with redistribution	0.12	5.2	1.6	67.1
SSM response with no yield shock for households	0.06	2.3	1.77	74.2

Figure 1: Demonstration of the change in net-selling position due to a yield shock



References

- Anderson, Kym; Maros Ivanic and Will Martin. (2013) "Food Price Spikes, Price Insulation and Poverty," NBER Chapters, in: The Economics of Food Price Volatility National Bureau of Economic Research, Inc.
- Deaton, A., (1989) Rice prices and income distribution in Thailand: A nonparametric analysis. *Economic Journal* 99(Conference):1–37.
- Dimaranan, Betina V., Editor (2006). *Global Trade, Assistance, and Production: The GTAP 6 Data Base*, Center for Global Trade Analysis, Purdue University.
- Grant, J., and K. Meilke. (2009) 'Triggers, Remedies, and Tariff Cuts: Assessing the Impact of a Special Safeguard Mechanism for Developing Countries.' *Estey Center Journal for International Law and Trade Policy* 10(1):223–46.
- Grant, J. and K. D. Meilke. (2011) "The Special Safeguard Mechanism: Previous Studies and Present Outlook". In W. Martin and A. Mattoo, eds. *The Doha Development Agenda*, Center for Economic Policy Research and the World Bank, London and Washington DC.
- Hertel, T. (1997), *Global Trade Analysis: Modeling and Applications*, Cambridge University Press, Cambridge.
- Hertel, T., Martin, W. and Leister, A. (2010), 'Potential implications of a Special Safeguard Mechanism in the World Trade Organization: the case of wheat' *World Bank Economic Review* 24(2):330–59
- Ivanic, M., and Martin, W. (2008). 'Implications of higher global food prices for poverty in low-income countries'. *Agricultural Economics* 39(s1):405-16.
- Ivanic, M., Martin, W. and Zaman, H. (2011), 'Estimating the short-run poverty impacts of the 2010–11 surge in food prices', Policy Research Working Paper 5633, World Bank.
- Ivanic, M. and Martin, W. (2014), Short and long run impacts of food price changes on poverty, Mimeo, World Bank.
- Martin, W. and Anderson K. (2011). Export restrictions and price insulation during commodity price booms, Policy Research Working Paper 5645, World Bank. Forthcoming in *American Journal of Agricultural Economics*.
- Montemayor, R. 2007. 'Implications of proposed modalities for the Special Safeguard Mechanism A simulation exercise.' Issue Paper 10. International Center for Trade and Sustainable Development, Geneva.

- Ravallion, M. (1990). 'Rural welfare effects of food price changes under induced wage rate responses: theory and evidence for Bangladesh' *Oxford Economic Papers* 42(3):574-85.
- Ravallion, M., Chen, S. and Sangraula, P. (2009), 'Dollar a day revisited.' *World Bank Economic Review* 23(2):163-84.
- Roberts, M. and Schlenker, W. (2010), 'Identifying supply and demand elasticities of agricultural commodities: implications for the US ethanol mandate' NBER Working Paper 15921, National Bureau of Economic Research, Cambridge, MA.
- South Centre (2009), 'The Volume Based SSM: analysis of the conditionalities in the December 2008 WTO Agriculture Chair's Texts.' South Centre, Geneva, SC/TDP/AN/AG/9
- World Bank (2008), *Agriculture for Development 2008*, World Development Report.
- WTO (2008), Revised draft modalities for agriculture, World Trade Organization, Geneva. 6 December, TN/AG/W/4/Rev.4