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# Could the proposed WTO Special Safeguard Mechanism protect farmers from low international prices? ☆

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ABSTRACT

This paper offers an empirical analysis of the proposal by some developing countries for an agricultural Special Safeguard Mechanism (SSM) in the World Trade Organization. It draws on political economy and market theory to demonstrate that the loss-averting domestic producer benefits that proponents believe the SSM would offer agricultural-importing developing countries may be illusory, insofar as agricultural-exporting countries also seek to avert producer losses. By way of illustration, the paper then uses time series data to analyze past government responses to fluctuations in the world's rice markets. The results suggest that the proposed SSM would deliver at most only a small fraction of the loss-averting benefits that have been advertised by the proponents of the SSM. Since the analysis applies to upward as well as downward spikes in international prices, it underscores the importance of strengthening multilateral disciplines on both import and export trade interventions to reduce beggar-thy-neighbor unilateral trade policy responses to food price fluctuations.



## Introduction

Upward price spikes in international food markets during 2008, 2010 and 2012 were a major concern for poor food consumers, and many governments responded by at least partially insulating their domestic food market from the international price rises. Those responses triggered heated debates and stimulated much analysis to determine the loss-averting effectiveness of those interventions at national borders. Meanwhile, the opposite market situation – slumps in prices – has been a focus in the Doha Round of multilateral trade negotiations at the World Trade Organization (WTO). An agricultural Special Safeguard Mechanism (SSM) is being proposed by some developing country members of WTO that would allow them to raise their applied tariffs on specified farm products when either their import price falls or the volume of imports surges beyond threshold levels (WTO, 2008). This proposed SSM is one of the most contentious issues in the agricultural negotiations of the WTO, and was the issue that triggered the suspension of Doha Round negotiations in 2008. The purpose of this paper, like the recent global analyzes of responses to upward price spikes, is to examine the prospective loss-averting effectiveness of an SSM.

Criticisms of the SSM proposal include the following: it would be available to a large number of WTO members, it would require no commitments to further liberalization, it may allow import tariffs to increase above their bound rates for many products, and there would be no requirement to use an injury test nor to compensate adversely affected trading partners (Blustein, 2009; Wolfe, 2009; WTO, 2010; Grant and Meilke, 2011). Others have made the point that the developing countries that are net exporters of affected farm products would be harmed by an SSM (De Gorter et al., 2009; Finger, 2010).

Our purpose here is not to rehearse these valid criticisms. Nor is it to replicate for another product the innovative analyzes by Grant and Meilke (2006) and Hertel et al. (2010) of the possible effects of wheat import restrictions that the SSM might trigger. Rather, it is to demonstrate that the offsetting benefits that proponents believe the SSM would offer agricultural-importing developing countries may be illusory.

The illusion stems from not acknowledging that, historically, the behavioral responses to international price slumps by governments of agricultural-importing countries have been not dissimilar to those of agricultural-exporting countries. When this fact is taken

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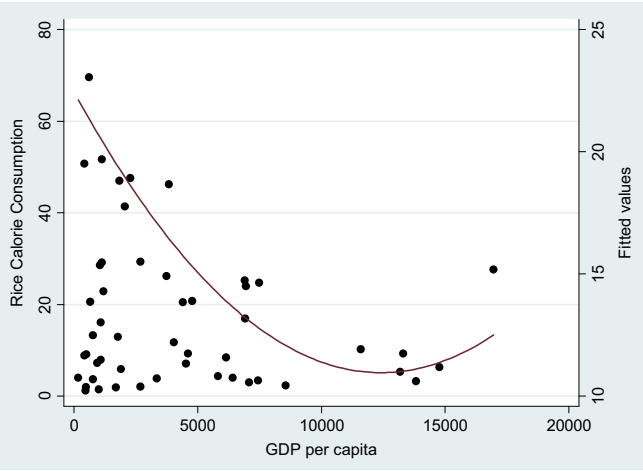


**Fig. 1.** Rice as a share of total calorie consumption and GDP per capita, 2009[a] (percent and current US$). [a]The sample includes all members of the WTO's G33 plus five other important rice-trading developing countries, namely Bangladesh, Iran, Malaysia, Thailand and Vietnam. The right-side upturn in the curve is due to the inclusion of the most affluent of the G33 members, namely Korea. *Source*: Authors' compilation based on data in FAO (2012).

into account, the loss-averting domestic producer benefits of the SSM are reduced and potentially eliminated. Moreover, each international price slump is exacerbated by those responses, making it more difficult for those countries trying to cope without altering their trade restrictions, and so raising the probability that they eventually will join the insulating group of countries and thus deepen and prolong the crisis.

After outlining the SSM proposal, the next section of the paper summarizes the political economy theory of loss aversion as it applies to agricultural trade policy. The following section provides the basic economic theory of the partial equilibrium effects of loss-averting trade policy responses by the governments of both agricultural-importing and agricultural-exporting countries. To see the extent to which governments in the past have altered trade restrictions in response to import price slumps, time series data are analyzed for rice, which is one of the world's most important foods, especially for low-income countries (see Fig. 1).[1] The results reveal that both of the unacknowledged facts mentioned in the previous paragraph are indeed important in the case of rice, which suggests the proposed SSM would deliver at most only a small fraction of the purported loss-averting benefits. In the light of these findings, the penultimate section points to far more efficient and equitable ways than an SSM for dealing with potential losses from market volatility for vulnerable groups. The final section concludes.

## The proposed Special Safeguard Mechanism (SSM)

The proposal of the SSM was included in Doha Development Agenda in 2004 as a response to the concern in some developing countries that sudden increases of cheap imports can adversely affect their farmers. The WTO provides member countries with a number of legal measures to manage import surges and rapid price declines. For example, a Special Safeguard to deal with price depressions and import surges is currently available to those WTO members that undertook tariffication following the signing of the Uruguay Round Agreement of Agriculture (AoA), as a reward for their commitment to liberalize through tariff reductions. However, many developing countries bound their tariffs outside the AoA tariffication process, and so they are not eligible to use the WTO's existing Special Safeguard to deal with agricultural import surges and price slumps. Hence their proposal for an SSM.

There are two types of safeguards for developing countries in the current proposal of the SSM, namely the price-based SSM and volume-based SSM (WTO, 2005). With regard to the price-based SSM, if the c.i.f. import price of a shipment falls below 85% of the average monthly price of imports from all sources in the preceding three-year period (the trigger price), an additional duty can be applied to remove up to 85% of the shortfall. With regard to the volume-based SSM, if the import volume in a year exceeds the preceding three-year average by more than one-tenth, the current rate can be raised depending on the size of the import surge: a one-quarter addition if there is a 110–115% import surge; a two-fifths addition for an import surge of 115–135%, and a 50% rise if the import surge exceeds 135%.

## Why countries seek to insulate against international market volatility

Why do countries act unilaterally to insulate their domestic market from price fluctuations in international markets for farm products? To address that question, it is possible to draw on and adapt recent political economy theory of loss aversion developed by Freund and Özden (2008), who in turn built on the pioneering work of Grossman and Helpman (1994). Assuming only trade measures are available to policy makers, they show how the preference for policies that insulate domestic prices from year-to-year changes around a desired level that differs from world prices can be specified in a welfare function. Corden (1997, pp. 72–76) suggests that such a pattern of intermittent border interventions implies a conservative social welfare function.

An objective function that represents this type of preference, and is closely related to one developed by Freund and Özden (2008), has been suggested by Jean et al. (2010). The latter model predicts that the lower the international price for a farm product in any year relative to its long-run trend value, the higher will be the rate of distortion of the domestic price that year, ceteris paribus. More than that, the key coefficient in their model is one minus the coefficient of price insulation in the international-to-domestic price transmission equation estimated by Tyers and Anderson (1992). It suggests that such policy makers will adjust their rates of distortion to domestic food prices to partially offset deviations of international prices from their trend value.

Even in the absence of generic national social safety nets, governments may be able to directly assist farmers when international prices slump (or assist consumers when prices spike upwards) at lower economic cost and more effectively with domestic measures rather than via altering their restrictions on trade. But if trade measures are considered by policy makers to be the only (fiscally or politically) feasible instrument available to them, this would mean that when international prices fall below trend, (a) agricultural import restrictions will rise (or import subsidies reduced) in importing countries, and (b) export restrictions will be eased (or export subsidies introduced or raised) in countries that are net exporters of food – and conversely when international food prices rise above trend.

It follows from this loss aversion theory that one should expect rates of producer assistance (and consumer taxation) from such trade measures to be correlated negatively with a product's international price, and more so during periods of extreme international price spikes. In so far as a country has a larger array of feasible domestic policy instruments at its disposal the more advanced its economy, the correlations should be less significant for

[1] Rice in 2009 provided 19% of the calories consumed by the world (the same as wheat), and 28% (compared with wheat's 15%) of the calories consumed in low-income food-deficit countries. Developing countries account for all but one-sixth of the world's rice consumption and production (FAO, 2012).

high-income than for developing countries.[2] And they should be more significant during downward price spikes than during upward price spikes for a basic food staple given that, in all but low-income countries, expenditure on staples by consumers is low (see Fig. 1 for rice) and the ratio of net buyers to net sellers of staple food is high, so the free-rider problem is greater for those lobbying for a lower domestic price (net buyers) than it is for those lobbying for a higher price (net sellers).

## Why the proposed SSM may be ineffective

To see why raising import restrictions of the sort an SSM would allow in response to a temporary shock to international markets may be ineffective in protecting producers from the shock if exporting countries also seek to insulate their producers from that price slump, consider Fig. 2. It depicts the international market of a farm product which involves, in a normal year, an excess supply curve ($ES_o$) for the world's exporting countries and an excess demand curve for the world's importing countries ($ED_o$). In the absence of any trade costs such as for transport, equilibrium would be at $E_o$ with $Q_o$ units traded at international price $P_o$.

Suppose there is a bumper harvest in a key exporting country which shifts the excess supply curve rightwards to ES′. If there were no policy responses, the equilibrium would shift from $E_o$ to E′ and the international price and quantity traded across national borders would change from $P_o$ and $Q_o$ to $P'$ and $Q'$. In the presence of an SSM, the lower price could prompt governments of importing developing countries to raise their import tariff. If the aggregate impact was to shift the excess demand curve from $ED_0$ to $ED_1$ then the equilibrium would shift from $E'$ to $E_M$ and the international price and quantity traded would shrink from $P'$ and $Q'$ to $P_1$ and $Q_M$. The average domestic price in the SSM-triggering countries would be $P_M$, however, with the gap between $P_M$ and $P_1$ being the extra import tariff applied.

According to loss aversion theory, however, that is unlikely to be the only the response, because governments of some of the exporting countries may choose to try to assist their producers from the exogenous shock. In principle they could do so by reducing their export tax or raising their export subsidy on this product. That would move the excess supply curve further to the right, say to $ES_1$. In the absence of any SSM-triggered responses, that would move the equilibrium to $E_X$ and the international price and quantity traded would change from $P'$ and $Q'$ to $P_2$ and $Q_X$. The domestic price in those reactive exporting countries would average $P_X$, with the gap between $P_X$ and $P_2$ being the extra export subsidy applied (or cut in the export tax).[3]

If the exogenous shock to the global market triggered responses from *both* groups of countries, the net effect would be to exacerbate the international price slump but to weaken each group's attempt to prevent the domestic price from falling as much as the initial slump in the international price (from $P_o$ to $P'$). If, as in the case illustrated in Fig. 1, the extent of the leftward shift in the excess demand curve equaled the rightward shift in the excess supply curve, the new equilibrium would be at $E''$ and the new international price would by $P''$. In that case the quantity traded would be $Q'$ and the domestic price would be $P'$ in both groups of responding countries, the same as if neither group had altered their border measures (with $P'P''$ being the average change in the border intervention in each group).

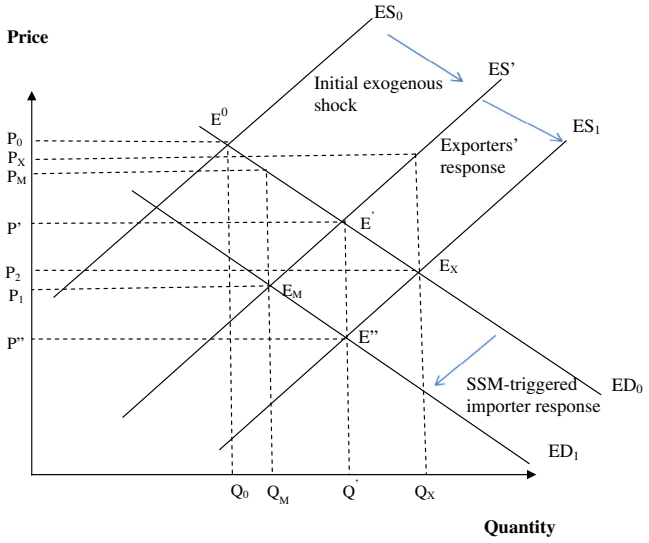


**Fig. 2.** Effects of import barrier increases and export barrier reductions in the international market for an agricultural product following an exogenous shock. *Source*: Authors' depiction.

Note that the terms of trade would be better for importing countries and worse for exporting countries as a result of these responses, so it is not surprising that exporting countries are so strongly opposed to the SSM. Aggregate global welfare would be the same as when neither country group so alters their border interventions, but there would be a transfer from exporting to importing countries' treasuries, via their altered trade taxes (or possibly subsidies), equal to area $P'E'E''P''$ in Fig. 2. An equal and opposite transfer occurs in the case of insulating responses to an upward price spike. This suggests another testable hypothesis: the negative correlation between rates of producer assistance (and consumer taxation) and a product's international price should be more significant for importing countries than for exporters in the case of price slumps (and the opposite when prices spike upwards).

What this simple analysis demonstrates is that if the food-exporting countries are as responsive in wanting to protect their producers from a price slump as the food-importing developing countries, the net effect on domestic prices of an SSM could be zero. The extent to which the loss-averting benefits to producers in importing countries are shrunk thus depends on the extent to which exporting countries have an export restriction they can lower or have the fiscal and legal capability to introduce an export subsidy when the international price slumps.

## Hypotheses, data and estimation strategy

Loss aversion theory and the above analysis suggest a number of hypotheses that could be tested against historical data for a staple food such as rice. Specifically, one should expect a country's rate of producer assistance (and consumer taxation) from trade policy intervention to be correlated as follows:

- negatively with a product's international price,
- more during periods of extreme international price spikes than in other periods,

[2] Even so, high-income countries that converted their quantitative import restrictions to tariffs following the GATT's Uruguay Round could (and often did) adopt specific rather than ad valorem tariffs which automatically provide a degree of insulation when international prices fluctuate. Many also were allowed to introduce 'tariff rate quotas' which were subject to a lower tariff than 'out-of-quota' imports. Where the later was prohibitively high and the former was lower enough to ensure the quota was filled each period, the policy was similar in effect to a normal import quota and thus ensured little or no transmission of international price changes to the domestic market.

[3] Of course a response by just one small country would not affect the international market. But if enough small countries – both exporters and importers – face the same political economy forces and react in the above way, their combined impact on the international market could be significant even if no large country so acted.

**Table 1**
Summary of rice descriptive statistics, sample of 36 rice-market countries, 1961–2009. *Source*: Authors' compilation from sources cited in text.

| Variable | Mean | Standard deviation | Minimum | Maximum | No. of observations |
|---|---|---|---|---|---|
| NAC | 1.29 | .94 | .06 | 9.18 | 1499 |
| International price of rice (Thai price 5%, current US$/MT) | 262 | 114 | 112 | 650 | 1720 |
| GDP per capita (constant year 2000 US$) | 4766 | 7832 | 72 | 40,656 | 1629 |
| Arable land per capita (hectares) | .32 | .46 | .03 | 3.50 | 1673 |
| Exchange rate (nominal rate in national currencies per US$) | 4191 | 64,741 | .01 | 1,507,226 | 1591 |

- more for developing countries than for high-income countries,
- more during downward price spikes than during upward price spikes, and
- more for importing countries than for exporting countries.

To test those hypotheses, we make use of annual national nominal rates of assistance (NRA)[4] to rice producers and international prices of rice. These variables are included in a World Bank database for 82 countries annually from 1961 to 2009 (Anderson and Nelgen, 2012a). For present purposes, we calculate a Nominal Assistance Coefficient (NAC) from these NRAs, where NAC = 1 + (NRA/100). The international prices of rice are taken from the World Bank (2012a). The control variables of annual exchange rates and real GDP per capita are also from Anderson and Nelgen (2012a). We also use arable land per capita data from the World Development Indicators (World Bank, 2012b). Our sample, which includes all countries with more than ten years of observations, consists of 36 countries that together account for all but one-tenth of the world's rice market.[5] Table 1 reports summary statistics for these variables. The world trade shares of the various rice economies change over time but their status as net exporters or net importers is fairly constant (Table 2).

Given that our interest is to assess the association between percentage change in the international price and the percentage change in NAC, the variables of interest are first-differenced.[6]

Specifically, we address the following empirical questions: How much do countries change their NAC in response to price spikes? How much asymmetry in policy behavior is there between high income countries and developing countries, during periods of extreme price spikes and other periods, between importing and exporting countries, and during periods of downward versus upward price spikes? In order to address these questions, we employ both panel estimation and a time series specification of the same model with national time series data.

The panel-data estimation method is employed to examine how international price slumps induce national governments to change their NAC, using the following reduced form model with panel-fixed effects:

$$\Delta\log(\mathrm{NAC}_{i,t}) = a_i + b\Delta\log(\mathrm{international\_price}_{i,t}) + c\Delta\log(X_{i,t}) + e_{i,t} \quad (1)$$

where $\Delta\log(\mathrm{NAC}_{i,t})$ is the change in log of NAC; $\Delta\log(\mathrm{international\_price}_{i,t})$ is the change in log of international price of rice; $\Delta\log(X_{i,t})$ includes control variables; and $e_{i,t}$ is the error term. Subscripts $i$ and $t$ refer to $i$ th country in time period $t$. The control variables are the exchange rate, arable land per capita, and GDP per capita.[7]

We use the Chow test to compare the estimated coefficients of high-income and developing countries, importing and exporting countries, during periods of extreme spikes and other periods, and during downward versus upward price spike periods. We also estimate Eq. (1) using the pooled OLS estimation method as a robustness check.

Then we re-estimate our basic model with time series specifications to examine the policy behavior of selected rice importing and exporting countries by relaxing the assumption of the panel data analysis that countries share common slope coefficients. Indonesia and Sri Lanka are chosen to represent large and small Asian importing countries, and Nigeria to represent African importing countries. The chosen rice exporting countries are Thailand, India and Pakistan. The model with annual time series data for individual countries takes the form:

$$\Delta\log(\mathrm{NAC}_t) = a + b\Delta\log(\mathrm{international\_price}_t) + c\Delta\log(X_t) + e_t \quad (2)$$

where the variables are defined as in Eq. (1) for each country $i$.

## Panel-data results for full sample

Table 3 presents the estimates for the fixed-effects log-change regressions using the full sample of 36 countries and all years. The variable of key interest is international price. As hypothesized, there is a significant negative association between changes in NAC and changes in the international price (columns 1–2). The size of the estimated coefficients implies that a 1% decrease in international price of rice increases the nominal rate of assistance by around 4%.

Estimates in columns (3) and (4) of Table 3 confirm the robustness of our results. Despite the inclusion of additional explanatory variables in the model, the estimated relationship between the international price and NAC continues to be significantly negative. The validity of the results is also confirmed by the pooled OLS estimates provided in column (5). The test results for serial correlation reported in Table 3 show that our fixed-effects log-change regressions do not suffer from serial correlation.

Despite the fact that the government of each country acts virtually independently in their policy behavior, their policy actions (together with those of other countries) could affect the international price. Table 4 shows how much the international

[4] The NRA is the percentage by which gross returns to producers of a product have been raised above the price of a like product at the country's border (Anderson et al., 2008). Even though the consumer tax equivalent (CTE) is also a relevant variable in analysing changes in trade interventions, particularly during the periods of upward price spikes, the high correlation between NRAs and CTEs for rice reflect the fact that most interventions are at the border, which justifies our exclusive focus (for reasons of brevity) on NRAs in the following analysis.

[5] Australia, Bangladesh, Brazil, China, Colombia, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, France, Ghana, Greece, India, Indonesia, Italy, Japan, Korea, Madagascar, Malaysia, Mexico, Mozambique, Nicaragua, Nigeria, Pakistan, Philippines, Portugal, Senegal, Spain, Sri Lanka, Tanzania, Thailand, Turkey, Uganda, United States, Vietnam, and Zambia.

[6] The first difference of a variable is referred to as a variable integrated of order zero; its use avoids spurious estimates resulting from non-stationary variables. The standard unit root tests conducted for key variables in this analysis confirm that the first differences are $I(0)$.

[7] It could be argued that the international price is not independent of the change in a country's rice NAC. However, most of the 36 countries in our sample are too small for their policy actions to influence the international price of rice (see Table 2). So even though collectively their policy actions altered that international price, their individual actions did not contribute substantially to the price spike. Support for this supposition is provided in a recent study by Jensen and Anderson (2014). Using the GTAP global economy-wide model, that new study estimates that 30% of the 2006–08 rise in the international price of rice is due to changes in national NACs, but only three countries contributed more than two percentage points to that rise (India 9.1%, Pakistan 7.5% and Thailand 5.6%).

**Table 2**
Net exports of main rice-trading countries as a share of world rice trade, 1970 to 2009. *Source*: Authors' calculations using data from FAO (2012).

| | (Percent) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | China | | India | | Pakistan | | Thailand | Vietnam |
| *Exporters* | | | | | | | | |
| 1970–79 | 17.4 | | −2.2 | | 6.6 | | 14.9 | −6.5 |
| 1980–89 | 4.5 | | 4.0 | | 8.7 | | 25.9 | −0.2 |
| 1990–99 | 3.1 | | 9.9 | | 6.4 | | 25.6 | 8.7 |
| 2000–09 | 2.4 | | 14.2 | | 8.4 | | 25.8 | 11.6 |
| | Bangladesh | Indonesia | Iran | Malaysia | Nigeria | Philippines | Korea | Sri Lanka |
| *Importers* | | | | | | | | |
| 1970–79 | −2.4 | −13.7 | −2.9 | −2.7 | −2.2 | −0.9 | −4.8 | −2.8 |
| 1980–89 | −1.4 | −2.9 | −4.9 | −2.1 | −3.7 | −0.3 | −2.6 | −0.8 |
| 1990–99 | −1.6 | −4.9 | −4.9 | −2.2 | −1.8 | −2.0 | −0.1 | −0.6 |
| 2000–09 | −1.4 | −2.2 | −3.5 | −2.2 | −3.5 | −4.0 | −0.8 | −0.2 |

**Table 3**
Panel results to explain changes in national annual rice NACs, 1961–2009.[a] *Source*: Authors' results.

| | Fixed effects estimates with main variables | | Fixed effects including control variables | | Pooled OLS |
|---|---|---|---|---|---|
| | Reg (1) | Reg (2) | Reg (3) | Reg (4) | Reg (5) |
| Δ Log price | −.388*** | −.387*** | −.435*** | −.433*** | −.433*** |
| | (.045) | (.045) | (.042) | (.042) | (.031) |
| Δ Log (*GDP pc*) | | | .684** | .677** | .574*** |
| | | | (.311) | (.312) | (.207) |
| Δ Log (*land pc*) | | | .327 | .321 | .286 |
| | | | (.244) | (.244) | (.235) |
| Δ Log (*exchange rate*) | | | −.056 | −.057 | −.058** |
| | | | (.036) | (.036) | (.023) |
| Constant | .013*** | 1.768** | .007 | 1.108 | .009 |
| | (.001) | (.658) | (.008) | (.691) | (.010) |
| Country fixed effects | Yes | Yes | Yes | Yes | No |
| Country trend | No | Yes | No | Yes | No |
| No. of observations | 1458 | 1458 | 1376 | 1376 | 1376 |
| No. of countries | 36 | 36 | 36 | 36 | |
| Test for serial correlation (Prob > *F*) | 0.808 | 0.808 | 0.769 | 0.769 | 0.769 |

Notes: The dependent variable is Δ Log NAC. The method of estimation is least squares. Columns (1)–(4) report fixed-effects estimates and column (5) reports pooled OLS estimates. Standard errors are given in parentheses and are robust in terms of heteroskedasticity.

[a] The SSM also includes a volume of imports trigger. Given that the correlation coefficient between *volume of imports* and international price is very low with 0.14, we have also tested the respective regressions including "*volume of imports*" as a regressor. The size of the coefficient is very small and significant with the correct sign. The overall model results are similar in size and significance to those reported in Table 3. Hence we report the regressions relevant to just the international price trigger as our main focus in this paper is on international price changes. Significantly different from 0 at * 90%, ** 95% and *** 99%.

price responds to the (production-weighted) average of the national NACs. As expected, the $R^2$ is high and the coefficient is negative and significant.

Table 5 presents results for high-income countries with those of developing countries, and for periods of extreme spikes with other periods. Chow tests[8] indicate that there is a significant difference between the magnitudes of the estimated coefficients for high-income and developing countries' trade policy responses to international rice price variations, with developing countries more responsive to rice price variations. Test results for asymmetry in policy responses between extreme spikes and other periods suggest there are no significant differences between their NAC adjustment sensitivities – which means there is more adjustment in absolute terms the more the international price changes.

Table 6 presents test results comparing estimates between importers and exporters as well as estimates during upward versus downward price spikes. The results support our hypothesis that there is no significant difference in policy behavior between rice-importing and -exporting countries, although rice-importing countries respond to international price variations more than exporting countries. The results also support our hypothesis that countries respond more when the international rice price spikes downward than when it spikes up. Table 7 further reveals that, when the importers and exporters are separated, responses among the importing countries are nearly twice as great during periods in

**Table 4**
Impact on international price of changes in NACs of all countries (weighted by volume of production).

| Variable | Estimated coefficient |
|---|---|
| Δ Log weighted avg of NAC | −1.110*** |
| | (.1154) |
| Constant | −1.210 |
| | (3.233) |
| Trend | Yes |
| Adjusted $R^2$ | 0.654 |
| No of observations | 49 |
| Durbin–Watson statistic | 1.91 |

Notes: The dependent variable is Δ Log international price of rice. The independent variable is Δ Log mean NAC of all countries weighted by volume of production in each country. The method of estimation is least squares. Standard errors are given in parantheses. The table reports the Prais–Winsten and Cochrane–Orcutt estimator to test for possible serial correlation. Significantly different from 0 at * 90%, ** 95% and *** 99%.

[8] The null hypothesis of the Chow test is that two relevant estimated coefficients are equal. That hypothesis is rejected if the test *p* value is less than the standard significant values (i.e., 0.05).

**Table 5**
Testing for asymmetry in national annual rice policy responses between high-income and developing countries, and between years of extreme spikes and other years. *Source*: Authors' results.

| | High-income countries | Developing countries | Extreme-spike periods | Other periods |
|---|---|---|---|---|
| Δ Log price | −.274*** (.044) | −.428*** (.055) | −.388*** (.045) | −.390*** (.046) |
| *Chow test – p value* | 0.036 | | 0.622 | |
| Country fixed effects | Yes | | Yes | |
| No. of observations | 1458 | | 1458 | |
| No. of countries | 36 | | 36 | |

Notes: The dependent variable is Δ Log NAC. The method of estimation is least squares. Robust standard errors are given in parentheses. Periods of extreme spikes are 1972–1976, 1984–1986 and 2004–2008, which include extreme spike years plus a year on each side of the spike period. Significantly different from 0 at * 90%, ** 95% and *** 99%.

**Table 6**
Testing for asymmetry in national annual rice policy responses between rice importers and exporters, and between periods of upward and downward rice price movements. *Source*: Authors' results.

| | Exporters | Importers | Downward price spikes | Upward price spikes |
|---|---|---|---|---|
| Δ Log price | −.336*** (.053) | −.415*** (.061) | −.503*** (.060) | −.320*** (.057) |
| *Chow test - p value* | 0.336 | | 0.021 | |
| Country fixed effects | Yes | | Yes | |
| No. of observations | 1458 | | 1458 | |
| No. of countries | 36 | | 36 | |

Notes: The dependent variable is Δ Log NAC. The method of estimation is least squares. Robust standard errors are given in parentheses. Significantly different from 0 at * 90%, ** 95% and *** 99%.

which the international price spikes downward than when it spikes up, whereas exporters' responses are similar regardless of the direction of the price spike.

## Time-series results for individual countries

Turning to responses of individual countries, Table 8 presents first-differenced estimates for rice-importing Indonesia, Sri Lanka and Nigeria. They suggest Indonesia is slightly more sensitive than the average country to changes in the international price: a 10% decrease in international price of rice increases the country's nominal rate of assistance by 4.8%. Nigeria is twice as sensitive.

As for the rice-exporting countries, Table 9 shows that their NAC responses to international rice price changes also are significant, with Thailand being similar to the average for the full sample, and Pakistan being slightly more sensitive. India is twice as sensitive as the average of the exporter sub-sample.

## Policy implications

This paper points to possible adverse effects of the proposed SSM that appear to have been overlooked in Doha Round debates. The empirical results for the world's rice market support the hypotheses from the political economy theory of loss aversion in that there is a negative and non-trivial association between national rice NACs and international price slumps. The results (Table 5) also show that governments are as sensitive during years of extreme spikes as in other periods. This suggests they would make use of an SSM even when prices fall only a little more than the proposed threshold of a 15% slump.

Importantly, the results confirm that exporters, in addition to import-competing countries, are significant interveners. This finding, which is consistent with earlier work by Anderson and Nelgen (2012b) for rice and other cereals, means that an SSM would be less effective than its proponents imply in averting losses for producers when international prices slump. When account is also taken of the fact that both country groups' altered trade measures exacerbate the international price fall, producers in other open economies are harmed even more.

One might question whether action by exporting countries will be as prevalent in the future as in the past, given the phasing out of export taxes in developing countries over recent decades (Croser and Anderson, 2011) and the prospective banning of export subsidies if and when WTO members complete the Doha Development Agenda. Export restrictions are more common than is commonly assumed thought, even if they are not explicit export taxes. In fact in the sample of countries in the above rice case study, just over half the countries had at least one year in which it was both a net exporter of rice and had an NAC less than unity (implying an export restriction was in place); and on average that sub-sample of countries had such a restriction one-third of the years in the time series.

Part of the motivation of importing countries advocating the SSM may be the fact that the insulating actions of both country groups turn the terms of trade in favor of importing countries, which causes a welfare transfer to them from the responsive exporting countries (area $P'E'E''P''$ in Fig. 2). If this has been a motivation for the proposal, two countering aspects need to be recognized. First, if prices slump for several farm products simultaneously, then for countries that are an importer of some but an exporter of other affected products, the transfer benefit from one set of (import-competing) products could be partly or more than fully offset by a transfer cost from another set of (exported) products. And second, if no multilateral initiatives are taken to reduce such insulating tendencies, governments will respond similarly but in the opposite direction when prices spike upwards, according to the results in Tables 5 and 6 (and for other cereals too, see Anderson and Nelgen, 2012b). In that latter situation, the welfare transfer will also be opposite, that is, from the importing countries to exporting countries.[9] Thus the net transfer between country groups will tend to be zero in the long run.[10]

This ineffectiveness of an SSM, together with the numerous other critiques of the proposal including those listed in the introduction plus the equal and opposite problems with insulation when prices spike upwards, underscores the importance of strengthening WTO's multilateral disciplines on both import and export trade interventions.

The case for such rule strengthening so as to reduce domestic market-insulating actions has been made much stronger in recent years thanks to the fact that alternative policy instruments to price-distorting policies that are becoming more efficient and effective than trade measures in averting losses for significant groups. The information and communication technology (ICT) revolution is gradually making it cheaper and easier to target direct income supplements as and when needed and just to the most vulnerable households, however remotely they may be located. In the past such payments were unaffordable in developing countries because of the fiscal outlay involved and the high costs

[9] A recent empirical study using a global economy-wide model estimated the magnitude of such a transfer in the case of the 2008 wheat price spike (Rutten et al., 2013).

[10] These various offsetting features may also mean the global poverty effects of the various governments' responses may be close to zero too. Indeed that is the finding from a recent study of the poverty effects of the 2008 upward food price spike, drawing on data on the household distribution of earnings and spending in each of a representative sample of 30 key countries (Anderson et al., 2014).

**Table 7**
Testing for asymmetry in annual rice policy responses between rice importing and rice exporting countries during years of upward versus downward price movements. *Source*: Authors' results.

| | Importers | | Exporters | |
|---|---|---|---|---|
| | Downward price spikes | Upward price spikes | Downward price spikes | Upward price spikes |
| Δ Log price | −.582*** | −.314*** | −.341*** | −.333*** |
| | (.074) | (.074) | (.084) | (.090) |
| *Chow test - p value* | 0.004 | | 0.959 | |
| Country fixed effects | Yes | | Yes | |
| No. of observations | 963 | | 495 | |
| No. of countries | 24 | | 12 | |

Notes: The dependent variable is Δ Log NAC. The method of estimation is least squares. Robust standard errors are given in parentheses. Significantly different from 0 at * 90%, ** 95% and *** 99%.

**Table 8**
National time series results to explain changes in annual rice NACs in rice-importing countries. *Source*: Authors' results.

| | Indonesia (1) | Sri Lanka (2) | Nigeria (3) |
|---|---|---|---|
| Δ Log price | −.487*** | −.197 | −.875*** |
| | (.078) | (.135) | (.134) |
| Δ Log (*land pc*) | −.368 | .964* | −1.28 |
| | (.365) | (.479) | (1.69) |
| Δ Log (*exchange rate*) | −.315*** | −.760*** | −.698*** |
| | (.058) | (.215) | (.138) |
| Δ Log (*oil price*) | | | .122 |
| | | | (.117) |
| Constant | −7.667** | −.460 | −4.15 |
| | (3.517) | (4.61) | (4.80) |
| Trend | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.71 | 0.21 | 0.54 |
| No. of observations | 33 | 47 | 47 |
| Durbin–Watson statistic | 2.25 | 2.17 | 2.40 |

Notes: The dependent variable is Δ Log NAC. Method of estimation is least squares. Standard errors are given in parenthesis. Column 1 presents robust-standard errors as the model suffers from heteroskedasticity, and therefore the *R*-squared is reported instead of adjusted *R*-squared. Columns 2 and 3 present normal standard errors as no heteroskedasticity is diagnosed in the model. Significantly different from 0 at * 90%, ** 95% and *** 99%.

**Table 9**
National time series results to explain changes in annual rice NACs in rice-exporting countries. *Source*: Authors' results.

| | Thailand (1) | India (2) | Pakistan (3) |
|---|---|---|---|
| Δ Log price | −.365** | −.643*** | −.463*** |
| | (.137) | (.127) | (.099) |
| Δ Log (*land pc*) | .054 | 6.578 | .355 |
| | (2.398) | (8.656) | (1.323) |
| Δ Log (*exchange rate*) | −.626 | −.229 | −1.046*** |
| | (.387) | (.412) | (.236) |
| Constant | 1.432 | .633 | 1.732 |
| | (7.962) | (5.555) | (3.537) |
| Trend | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.31 | 0.34 | 0.57 |
| No. of observations | 38 | 43 | 46 |
| Durbin–Watson statistic | 2.75 | 2.87 | 1.90 |

Notes: The dependent variable is Δ Log NAC. Method of estimation is least squares. Standard errors are given in parenthesis. Column 1 presents robust-standard errors as the model suffers from heteroskedasticity, and therefore the *R*-squared is reported instead of adjusted *R*-squared. Columns 2 and 3 present normal standard errors as no heteroskedasticity is diagnosed in the model. Significantly different from 0 at * 90%, ** 95% and *** 99%.

of collecting taxes and administering small handouts. Evidence of the practical workability of such social safety net programs in developing countries is growing rapidly, however.[11] This emergence of new, lower-cost social protection mechanisms, often involving conditional cash e-transfers, is encouraging. It provides even low-income countries a way to target assistance just to the most needy and to thereby avoid harming many others both domestically and abroad though market-insulating trade measures.

For those countries not yet able to implement social protection via direct cash transfers, other ways are becoming available to assist adjustment to price (and yield) fluctuations. For example, a wider range of financial instruments have emerged over recent years to help producers cope with price instability (Byerlee et al., 2006). If governments provide the right regulatory environment and enough infrastructure (e.g. telecoms) for such financial markets to operate, this again would reduce the need for them to continue to rely on trade measures to achieve domestic social protection objectives.

## Conclusions

Earlier studies demonstrate that if there are equal loss-averting responses from food-exporting and food-importing countries to an upward spike in international food prices, those government responses will be offsetting if the reactions involve altering their restrictions on trade: it will be as if neither group of countries responded, and their domestic prices will rise as much as the international price. The present study demonstrates why that same theory is pertinent to the SSM proposal, and shows that in the past, loss-averting responses to international rice price slumps have been triggered not only in food-importing countries but also in food-exporting countries. This suggests that the proposed SSM would deliver at most only a fraction of the loss-averting benefits that have been advertised by the proponents of the SSM.

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[11] The evidence covers Latin America (Fiszbein and Schady, 2009, Ch. 4; Hoddinott and Wiesmann, 2010; Gertler et al., 2012), Sub-Saharan Africa (Adato and Bassett, 2012) and Asia (Alatas et al., 2012).

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