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## Food Prices and Political Instability

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# Food Prices and Political Instability

## Abstract

We examine the effects that variations in the international food prices have on democracy and intra-state conflict using panel data for over 120 countries during the period 1970-2007. Our main finding is that in Low Income Countries increases in the international food prices lead to a significant deterioration of democratic institutions and a significant increase in the incidence of anti-government demonstrations, riots, and civil conflict. In the High Income Countries variations in the international food prices have no significant effects on democratic institutions and measures of intra-state conflict. Our empirical results point to a significant externality of variations in international food prices on Low Income Countries' social and political stability.

JEL-Code: O000, P000, Q000.

Keywords: food prices, conflict, political institutions.

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## I. INTRODUCTION

It is often claimed by policy makers and the media that increases in international food prices put at stake the intra-state stability of the world's poorest countries. World Bank's President Zoellick for example claimed at the joint World-Bank IMF 2008 spring meeting that a drastic increase in food prices could mean "seven lost years" in the fight against worldwide poverty. At the same meeting IMF's managing director Strauss-Kahn expressed that "... the consequences [of food price increases] on the population in a large set of countries ... will be terrible ... disruptions may occur in the economic environment ... so that at the end of the day most governments, having done well during the last five or 10 years, will see what they have done totally destroyed, and their legitimacy facing the population destroyed also."<sup>2</sup> The question of how and whether variations in the international food prices affect the intra-state stability of the world's poorest countries is therefore of clear policy relevance. Yet, little formal empirical evidence exists on the link between food prices and political and social instability.

In this paper, we make an attempt to close this gap. We construct a country-specific food price index that is driven by the variation in the international food prices for a panel of over 120 countries during the 1970-2007 period. We use rigorous panel data techniques that account for both unobservable cross-country heterogeneity and common year shocks, and we identify the effects that international food price variations have on political and social stability from the within-country variation of the data.

Our first main finding is that increases in the international food prices lead to a significant deterioration of democratic institutions in the Low Income Countries. A one standard deviation increase in the international food price index significantly reduced Low Income Countries' polity score by about 0.03 standard deviations on average. We document that this result is robust to different measures of democracy, time periods, and estimation strategies. To provide an explanation for the adverse effects of food price increases on Low Income Countries' political institutions, we document that food price increases significantly increase the incidence of intra-state conflict. In particular, we show that for the Low Income Countries increases in the international food prices significantly increase the incidence of anti-

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<sup>2</sup> <http://edition.cnn.com/2008/WORLD/americas/04/14/world.food.crisis/>

government demonstrations, riots, and civil conflict. In the High Income Countries, where the incidence of anti-government demonstrations, riots, and civil conflict is relatively low, increases in the international food prices did not have a significant effect on intra-state stability. International food price increases also did not significantly affect these countries' political institutions. Our empirical analysis therefore yields that the world's poorest countries, that arguably are the least responsible for changes in the international food prices, are strongest hit.

Beyond informing the policy debate on the socio-economic effects of food price increases, our empirical results shed novel insights on the academic debate on the effects of economics shocks on political institutions. Acemoglu and Robinson (2001, 2006) develop a formal theory of democratic transitions where transitory economic shocks can give rise to a “democratic window of opportunity”. Recent empirical evidence by Bruckner and Ciccone (2010b) and Burke and Leigh (2010) on the effects of rainfall shocks on democratic change in Africa has provided supportive empirical evidence for the Acemoglu and Robinson theory. Our paper complements these empirical studies by showing that externally driven changes in the international food prices significantly affect the likelihood of democratic change in the Low Income Countries. Our empirical results are broadly consistent with case study evidence such as Berger and Spoerer (2001) that show that food riots can induce significant political change.

Our paper is also related to the literature on the determinants of state fragility. A large part of this literature has focused on civil war. This particular focus on civil war is understandable as these types of intra-state conflicts have killed and maimed millions of people (e.g. World Bank, 2003). We complement this conflict literature by focusing on the effects that food prices have on civil conflict risk – a focus that to the best of our knowledge is unique, as no paper has examined yet exclusively for food commodities the effects that variations in these international prices have on civil conflict risk.<sup>3</sup> In addition to shedding novel light on the question of how international food price variations affect the likelihood of civil conflict in the world's poorest countries, we also examine more minor forms of intra-state instability, such as anti-government demonstrations and riots, which are of considerable interest in and of themselves from a political economy point of view.

Finally, our paper contributes to the literature on food insecurity. One of the issues that this

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<sup>3</sup> Most closely related to our analysis on conflict is the paper by Bruckner and Ciccone (2010a) who show for Sub-Saharan African countries that increases in a commodity export price index significantly reduce the risk of civil war. The main difference between our paper and Bruckner and Ciccone (2010a) is that Bruckner and Ciccone focus on a general commodity export price index (mineral and agricultural goods) and that they do not focus on the exclusive effects that food prices have on civil war.

literature is well aware of but struggling with, is that actual food production is endogenous to civil conflict and democratic change. Country examples indicate that the presence of civil war is associated with an increase in domestic food prices. For example, in Darfur prices of the main food staples increased rapidly after widespread violence started in late 2003/early 2004 (see e.g. Brinkman and Hendrix, 2010). If this is indeed systematically the case across country-periods, then using domestic food prices to estimate the average effect that higher food prices have on civil war will be complicated by a positive simultaneity bias. Our paper seeks to make a contribution to this literature on food insecurity by using variations in the international food prices -- which are for most Low Income Countries a plausibly exogenous source of variation in food expenditures -- to examine the effects that changes in food prices have on intra-state conflict and political institutions in the developing world. The remainder of the paper is organized as followed. Section 2 describes the data. Section 3 discusses the estimation strategy. Section 4 presents the main results. Section 5 presents further robustness checks. And Section 6 concludes.

## II. DATA

**Food Price Index.** We construct a country-specific international food price index as:

$$\text{FoodPI}_{i,t} = \prod_{c \in C} \text{FoodPrice}_{c,t}^{\theta_{i,c}}$$

where  $\text{FoodPrice}_{c,t}$  is the international price of food commodity  $c$  in year  $t$ , and  $\theta_{i,c}$  is the average (time-invariant) value of net-exports of food commodity  $c$  in the GDP of country  $i$ . It is important to note that our index weights the international commodity prices by the country-specific net export GDP shares. This weighting scheme ensures that we take into account that, for an exporter an increase in the price of the exported commodity good carries a positive wealth effect while for an importer it carries a negative wealth effect.<sup>4</sup> We use the

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<sup>4</sup> The reason why we use net export shares is that we want to capture the average income shock. Because changes in the international food prices affect countries incomes (and income distribution) differently, depending on whether countries are exporters or importers, we have to weigh by the net export share in GDP. This follows by log-linearizing GDP and taking derivatives with respect to the international food prices. We use net exports weights rather than weights based on the share of food consumption in total consumption, as the latter would miss that the impact of the international commodity price shocks depends on net share of exports in GDP.

average rather than the year-to-year variation in the net export share in order to reduce concerns that food exports and imports as a share of GDP are endogenous to year-to-year changes in countries' socio-political environment. We also note that the exponential form of the food price index can be motivated by log-linearizing GDP and taking total differentials with respect to the food prices. This yields that the log-change in GDP should be related to the log-changes in the food prices weighted by the steady state shares of the net food exports in GDP.

We obtain data on annual international food prices for the 1970-2007 period from UNCTAD Commodity Statistics. Our data on the value of net food exports are from the NBER-United Nations Trade Database. The food commodities included in our food price index are beef, maize, rice, sugar, and wheat. In case there were multiple prices listed for the same commodity, we used a simple average of all the relevant prices.

**Measures of Democracy and Intra-State Conflict.** Democracy is measured by the revised combined Polity score (Polity2) of the Polity IV database (Marshall and Jaggers, 2009). The Polity2 score ranges from -10 to +10, with higher values indicating more democratic institutions. Following Persson and Tabellini (2003, 2006) and the Polity IV project, we code countries as democracies (autocracies) if their Polity2 score is strictly positive (negative). We further classify countries as deep democracies if their Polity2 score is larger than 6; and as deep autocracies if their Polity2 score is smaller than -6. To examine also specifically the political competition and executive constraints channel, we use the polity sub-scores on constraints on the chief executive and political competition. According to the Polity IV project, constraints on the executive is a measure of the extent of institutionalized constraints on the decision making powers of chief executives and ranges from 1 to 7, with greater values indicating tighter constraints. Political competition measures the extent to which alternative preferences for policy and leadership can be pursued in the political arena. This indicator ranges from 1 to 10, with greater values denoting more competition.

Our main measure of intra-state instability is a civil conflict indicator variable that is equal to unity if the country experienced a civil conflict (i.e. an intra-state conflict that incurred more than 25 battle deaths, as recorded by the PRIO UPSALLA 2010 database). We also consider more minor forms of intra-state instability such riots and anti-government demonstrations by using data from Banks (2010) on the number of riots and anti-government demonstrations. Panel A of Table 1 shows that the Low Income Group is characterized by low average democracy scores, and a high incidence of civil conflict. The mean Polity2 score is -2.4 and the mean incidence of civil conflict is 0.25 for the Low Income Group; for the Middle and High Income Group the mean Polity2 scores are 2.3 and 4.7 respectively and the mean

incidence of civil conflict are 0.14 and 0.07. While certainly this does not imply causality, it is interesting to note that in the Middle and High Income Group the average democracy score is much higher, and the incidence of civil conflict is much lower than in the Low Income Group (e.g. World Bank, 2003).

### III. ESTIMATION STRATEGY

To examine the effects that changes in the international food prices have on democratic institutions and other key variables of interest, we estimate the following econometric model:

$$\Delta(Polity)_{i,t} = \alpha_i + \beta_t + \gamma\Delta(FoodPI)_{i,t} + u_{i,t}$$

where  $\alpha_i$  are country fixed effects that capture time-invariant country-specific unobservable characteristics and  $\beta_t$  are year fixed effects that capture common year shocks.  $u_{i,t}$  is an error term that is clustered at the country level. As a baseline regression, we estimate the average marginal effect that food price fluctuations have on democracy (and other outcomes of interest) in the Low Income Countries sample.<sup>5</sup> We restrict our baseline analysis to the Low Income Group (as defined by World Bank 2010) as these are precisely the kind of countries where a large share of the population lives in extreme poverty. As an identification check on our main premise that food price changes have particularly large effects on political and social stability in poor countries, we repeat our regressions when restricting the sample to the Middle and High Income Countries.

### IV. MAIN RESULTS

Table 2 presents our estimates of the average marginal effect that food price changes have on democracy in the Low Income Countries. Column (1) shows estimates where the within-country change in countries' Polity2 score is related to the within-country change in countries' food price index. Column (2) adds to this regression country fixed effects and column (3) adds year fixed effects. The main result is a negative and highly significant effect of food price increases on the Polity2 score. Quantitatively, the estimated coefficient implies that on average a one standard deviation increase in the food price index significantly reduced the Polity2 score by about 0.03 standard deviations in the Low Income Countries.<sup>6</sup>

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<sup>5</sup> The group of Low Income Countries is identified using the WDI (2010) classification scheme and includes both countries classified by the World Bank as Low Income as well as those classified as Lower Middle Income. Hereafter, we refer to those countries as Low Income Countries.

<sup>6</sup> The standard deviation of the log-change in the food price index is 0.004; the standard deviation of the change in the Polity2 score is 1.99.



In column (4) we add lags of the food price index to check whether there are significant lagged effects of food price increases on the countries' democracy scores. The estimated coefficients on the lagged food price index are negative, thus indicating that even after several periods an increase in the food price index induces a negative effect on the polity score. However, statistically these lagged effects are not significant at conventional confidence levels. Hence, we note that the main negative effect on the polity score from food price increases is on impact.

To take into account dynamics in countries' polity score, we show in columns (5) and (6) dynamic panel estimates that include on the right-hand side of the estimating equation the lagged level of polity score. Both the least squares and system-GMM estimates show that there is quite a bit of persistence in the dynamics of the polity score. The estimated convergence coefficient is -0.13 and implies a half-life in shocks to the level of the polity score of around 4 years. Most importantly, the dynamic panel data estimates confirm that there is a significant negative impact effect of food price increases on the polity score. In Table 3, we document that our finding of a negative effect of food price increases on political institutions in the Low Income Countries is robust to the use of alternative democracy measures. In column (1), we present results when using the Polity2 score that excludes periods of interregnum and transition.<sup>7</sup> Columns (2) and (3) present results for the polity sub-scores on executive constraints and political competition, and in column (4) and (5) we present the results for the democracy and autocracy score.<sup>8</sup> We find that regardless of which measure is used our main result survives: increases in the international food prices lead to a significant deterioration of political institutions in Low Income Countries. As an intermediate step to explain the adverse effects of food price increases on political institutions in Low Income Countries, we document the effects that food price increases have on these countries' macroeconomies. In column (1), we show that increases in food prices lead to significant increases in GDP per capita. This is primarily due to the terms of trade effect that raises the return to capital and hence investment in the net food exporting countries (see column (2)).<sup>9</sup> In column (3), we show that beyond the significant increase in

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<sup>7</sup> These periods are coded in the executive constraints and political competition sub-scores as -77,-88,-66. The revised combined Polity2 score integrates these values by assigning interregnum periods the value of zero; and linearly interpolating transition periods.

<sup>8</sup> Both the democracy and autocracy score range between 0 and 10, with higher values indicating more democracy (autocracy).

<sup>9</sup> Recall that our estimates identify the effects of food price increases by weighting the (log)-change of the food price by the net export share in GDP. This weighting scheme takes into account that for a food exporter an increase in the international food price is a positive terms-of-trade shock. See also Section 2 for further discussion.

private investment, real per capita government expenditures also increased significantly. On the other hand, column (4) documents that private consumption decreased. Given that food expenditures constitute a large share of total consumption expenditures in the Low Income Countries, the significant decrease in private consumption should not be surprising.

However, the significant decrease in private consumption also indicates that beyond their average effect on income per capita food price increases may carry important distributional and compositional effects. Indeed, column (5) shows that even with the relatively sparse panel data that are available for Low Income Countries on income inequality, higher food prices induced significant increases in the Low Income Countries' Gini coefficients.<sup>10</sup> This suggests that food price increases induced an increase in the gap of income between the rich and the poor, thus increasing relative deprivation.

In Table 5, we examine the effects that food prices have on intra-state conflicts. In column (1), we report the effect that food price changes have on the number of anti-government demonstrations and in column (2) we report the effect that food price changes have on the number of riots. Our main finding is that increases in food prices significantly increase both the number of anti-government demonstrations and the number of riots. The estimates in columns (2) and (3) imply that on average a one standard deviation increase in the food price index increased the number of anti-government demonstrations and riots by about 0.01 standard deviations. We also document in column (3) that there is a significant increase in the risk of expropriation, as measured by the Political Risk Service (PRS) expropriation score. Finally, columns (4) and (5) show that higher food prices significantly increase the incidence of civil conflict.<sup>11</sup> Table 5 therefore resonates the common held view in the conflict literature that economic shocks are a significant determinant of intra-state conflicts (e.g. Miguel et al., 2004; Bruckner and Ciccone, 2010a).

## V. ROBUSTNESS CHECKS

In Tables 6-8, we report a number of robustness checks to strengthen our results. In Table 6, we show that there continues to be a significant effect of food prices on measures of intra-state conflict when excluding the (few) Low Income Countries that are large food suppliers

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<sup>10</sup> The data on Gini coefficients is obtained from the United Nations WIDER (2008) database.

<sup>11</sup> We present in column (5) conditional logit fixed effects estimates to take into account the binary nature of the dependent variable. Note that these estimates do not represent marginal effects because this would require knowledge of the distribution of the country fixed effects (e.g. Wooldridge, 2002).

to the world food market.<sup>12</sup> The identifying assumption in the previous tables was that Low Income Countries are price takers on the international food market. This seems a plausible assumption for the majority of the Low Income Countries, as these countries produce and consume individually only a very small fraction of world food production. Thus, the fact that there continues to be a highly significant effect of food prices on measures of intra-state conflict when excluding potentially large food producing countries from the Low Income Countries sample is reassuring that our baseline assumption of international food prices being exogenous is reasonable.

A further interesting issue that we are able to examine with our panel data is whether the relationship between food prices and intra-state conflict has changed over time. One particular difference in the relationship could have occurred due to the end of the Cold War (see also Fearon and Laitin, 2003). In Table 7, we check this by reporting estimates from an interaction model where the marginal effect of food prices on intra-state conflict is allowed to differ for the pre- and the post-1990 period. Our main finding from these interaction regressions is that (i) there is a significant positive average effect of food prices on intra-state conflict for the pre-1990 period; and (ii) there is some evidence that for the post-1990 period the effect of food price changes on intra-state conflict has become significantly larger (see e.g. columns (1) or (3)).

As a further check on our identification, we report in Table 8 estimates of the effects that changes in the international food prices have on the incidence of intra-state conflicts in the High Income and Middle Income Countries. One of the key characteristics that distinguishes the Low Income Countries from the High and Middle Income Countries is the large number of people who live in extreme poverty. Food expenditures constitute a large share of the consumption basket for the extremely poor, and it is precisely these people -- the poor -- where food price increases bear the direst consequences. Not surprising therefore, Table 8 shows that food price increases did not lead to a significant increase in the incidence of intra-state conflicts in the High Income and Middle Income Countries.

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<sup>12</sup> The excluded countries are China, Guatemala, India, Indonesia, Pakistan, Thailand, Uganda, Ukraine and Vietnam. These Low Income Countries produce a significant (more than 3 percent) share of world food production and might therefore have an effect on world food prices. The reason why we focus here on large food producers -- rather than just exporters -- is that minor changes in domestic conditions can have large impacts on (net)-food exports, and thus potentially on world food production. Indeed, in the world market, the price of a specific (traded) good is determined by supply and demand (consumption and production), thus it should be clear that using the "producer" criteria is appropriate.

## VI. CONCLUSION

We examined in this paper empirically the effects that changes in the international food prices have on measures of democracy and intra-state stability in a panel of over 120 countries during the period 1970-2007. Our main finding was that during times of international food price increases political institutions in Low Income Countries significantly deteriorated. To explain this finding we documented that food price increases in Low Income Countries significantly increased the likelihood of civil conflict and other forms of civil strife, such as anti-government demonstrations and riots.

From a macroeconomic perspective, it is worthwhile to restate that international food price increases induced in the net food exporting countries a significant increase in real per capita GDP and real per capita investment (the “terms of trade effect”). At the same time, international food price increases induced a significant decrease in real per capita consumption and a significant increase in income inequality. Thus, increases in the international food prices had real macroeconomic effects that went beyond average per capita income: they were associated with a significant decrease in consumption and a significant increase in the gap between rich and poor. All in all, our empirical results are broadly consistent with the often made claim by policy makers and the press that food price increases put at stake the socio-economic and political stability of the world's poorest countries. Arguably a large share of the variation in the international food prices is due to changes in the demand and supply of the High and Middle Income Countries. A natural question beyond the scope of this paper is what can and should be done by the developed world and international organizations in response to drastic increases in international food prices.

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**Table 1: Descriptive Statistics**

Variable	Mean	Std. Dev.	Obs.
Panel A: Low Income Countries			
Polity2	-2.42	6.02	2676
Executive Constraints	3.76	3.01	2544
Political Competition	3.07	1.91	2544
GDP Per Capita (PWt 6.3)	2444	1739	2627
Gini	0.42	0.10	423
Riots	0.48	1.43	2642
Anti-Government Demonstrations	0.45	1.75	2642
Civil Conflict	0.25	0.43	2676
Panel B: Upper Middle Income Countries			
Polity2	2.34	6.89	1106
Executive Constraints	5.92	3.55	1077
Political Competition	4.57	2.23	1077
GDP Per Capita (PWt 6.3)	8002	5041	1122
Gini	0.43	0.11	373
Riots	0.77	1.96	1171
Anti-Government Demonstrations	0.59	1.77	1170
Civil Conflict	0.14	0.35	1269
Panel C: High Income Countries			
Polity2	4.74	7.89	1435
Executive Constraints	7.40	3.88	1421
Political Competition	5.42	2.36	1421
GDP Per Capita (PWt 6.3)	20687	12077	1372
Gini	0.28	0.06	459
Riots	0.79	2.84	1384

Anti-Government Demonstrations	0.56	2.60	1384
Civil Conflict	0.06	0.24	1435

**Table 2: Food Prices and Political Institutions**

	<u>Polity2</u>					
	(1)	(2)	(3)	(4)	(5)	(6)
	LS	LS	LS	LS	LS	SYS-GMM
FoodPI, t	-16.379***	-16.901***	-15.093***	-14.801***	-12.165***	-12.144**
	(-3.05)	(-3.32)	(-3.19)	(-3.84)	(-3.34)	(-2.60)
FoodPI, t-1				-5.536		
				(-1.41)		
FoodPI, t-2				-2.761		
				(-0.68)		
Polity2, t-1					-0.131***	-0.141***
					(-8.31)	(-4.68)
Country Fe	No	Yes	Yes	Yes	Yes	Yes
Year Fe	No	No	Yes	Yes	Yes	Yes
Observations	2676	2676	2676	2589	2676	2676
Countries	61	61	61	61	61	61

Note: The method of estimation in columns (1)-(5) is least squares; column (6) system-GMM (Blundell and Bond, 1998). The t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable is the change in the Polity2 score. The explanatory variable is the log-change in the food price index. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.



**Table 3: Food Prices and Political Institutions  
(Alternative Measures)**

	<u>Polity</u>	<u>Exconst</u>	<u>Polcomp</u>	<u>Democ</u>	<u>Autoc</u>
	(1)	(2)	(3)	(4)	(5)
FoodPI	-18.717*** (-6.44)	-7.836*** (-6.02)	-9.703*** (-11.07)	-8.029*** (-5.72)	10.687*** (6.85)
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes
Countries	2496	2496	2496	2496	2496
Observations	61	61	61	61	61

Note: The method of estimation is least squares. t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the change in the Polity score; column (2) the change in the executive constraints score; column (3) the change in the political competition score; column (4) the change in the democracy score; column (5) the change in the autocracy score. All scores exclude values that are recorded as -66, -77, and -88. The explanatory variable is the log-change in the food price index. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.

**Table 4: Food Prices and Macroeconomic Outcomes**

	<u>GDP</u>	<u>Inv</u>	<u>Gov</u>	<u>Cons</u>	<u>Gini</u>
	(1)	(2)	(3)	(4)	(5)
FoodPI	1.122***	1.978***	1.175***	-0.684**	0.228*
	(3.39)	(3.19)	(4.31)	(-2.54)	(1.82)
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes
Countries	2444	2444	2444	2444	411
Observations	61	61	61	61	57

Note: The method of estimation is least squares. t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the log-change in real per capita GDP; column (2) the log-change in real per capita investment; column (3) the log-change in real per capita government expenditures; column (4) the log-change in real per capita private consumption. The explanatory variable is the log-change in the food price index. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.

**Table 5: Food Prices and Intra-State Conflict**

	<u>Demonstrations</u>	<u>Riots</u>	<u>Expropriation</u>	<u>Civil Conflict</u>	
	(1)	(2)	(3)	(4)	(5)
	LS	LS	LS	LS	Logit FE
FoodPI	4.899***	4.693***	32.997***	1.259**	180.014*
	(2.75)	(4.93)	(9.58)	(2.06)	(1.68)
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes
Countries	2450	2450	1059	2450	2450
Observations	61	61	53	61	61

Note: The method of estimation in column (1)-(4) is least squares; column (5) maximum likelihood. t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the change in the number of anti-government demonstrations; column (2) the change in the number of riots; column (3) the change in the Political Risk Service Expropriation score (the score is re-scaled so that higher values denote a higher risk of expropriation); column (4) and (5) and indicator variable that is equal to unity if the country experienced a civil conflict. The explanatory variable is the log-change in the food price index. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.

**Table 6: Robustness Check I: Excluding Large Food Producers**

	<u>Demonstrations</u>	<u>Riots</u>	<u>Expropriation</u>	<u>Civil Conflict</u>	
	(1)	(2)	(3)	(4)	(5)
	LS	LS	LS	LS	Logit FE
FoodPI	5.615***	5.187***	32.378***	1.264**	253.145*
	(3.75)	(5.40)	(9.80)	(2.06)	(1.87)
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes
Countries	2060	2060	877	2102	2102
Observations	51	51	44	51	51

Note: The method of estimation in column (1)-(4) is least squares; column (5) maximum likelihood. t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the change in the number of anti-government demonstrations; column (2) the change in the number of riots; column (3) the change in the Political Risk Service Expropriation score (the score is re-scaled so that higher values denote a higher risk of expropriation); column (4) and (5) and indicator variable that is equal to unity if the country experienced a civil conflict. The explanatory variable is the log-change in the food price index. The excluded large food producing countries for the Low Income Group are China, Guatemala, India, Indonesia, Pakistan, Thailand, Uganda, Ukraine, and Vietnam. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.

**Table 7: Robustness Check II: Are the Post-1990s Different?**

	<u>Demonstrations</u>	<u>Riots</u>	<u>Expropriation</u>	<u>Civil Conflict</u>	
	(1)	(2)	(3)	(4)	(5)
	LS	LS	LS	LS	Logit FE
FoodPI	3.348*	5.009***	11.157*	1.044*	111.21
	(1.80)	(4.42)	(1.68)	(1.87)	(0.96)
FoodPI*Post 1990s	11.021**	-2.254	30.856***	1.539	475.859
	(2.31)	(-0.53)	(3.15)	(0.71)	(1.57)
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes
Countries	2450	2450	1059	2450	2450
Observations	61	61	53	61	61

Note: The method of estimation in column (1)-(4) is least squares; column (5) maximum likelihood. t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the change in the number of anti-government demonstrations; column (2) the change in the number of riots; column (3) the change in the Political Risk Service Expropriation score (the score is re-scaled so that higher values denote a higher risk of expropriation); column (4) and (5) and indicator variable that is equal to unity if the country experienced a civil conflict. The explanatory variable is the log-change in the food price index. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.

**Table 8: Robustness Check III: Food Price Effects in Middle and High Income Countries**

	<u>Demonstrations</u>	<u>Riots</u>	<u>Expropriation</u>	<u>Civil Conflict</u>	
Panel A: High Income Countries					
	(1)	(2)	(3)	(4)	(5)
FoodPI	-11.390	18.129	-112.305	-0.292	-98.047
	(-0.17)	(0.33)	(-1.22)	(-0.08)	(-0.11)
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes
Countries	1357	1357	670	1414	1414
Observations	34	34	33	34	34
Panel B: Middle Income Countries					
	(1)	(2)	(3)	(4)	(5)
FoodPI	10.625	-3.402	28.295	0.997	37.729
	(1.43)	(-0.71)	(0.80)	(1.15)	(0.14)
FoodPI	Yes	Yes	Yes	Yes	Yes
Country Fe	Yes	Yes	Yes	Yes	Yes
Year Fe	1046	1046	488	1060	1060
Countries	26	26	25	26	26

Note: The method of estimation in column (1)-(4) is least squares; column (5) maximum likelihood. t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the change in the number of anti-government demonstrations; column (2) the change in the number of riots; column (3) the change in the Political Risk Service Expropriation score (the score is re-scaled so that higher values denote a higher risk of expropriation); column (4) and (5) and indicator variable that is equal to unity if the country experienced a civil conflict. The explanatory variable is the log-change in the food price index. \*Significantly different from zero at 90 percent confidence, \*\* 95 percent confidence, \*\*\* 99 percent confidence.