Appendix: Food imports, international prices, and violence in Africa

Stijn van Weezel

Department of Economics, Royal Holloway, University of London, Egham, Surrey, TW20 0EX; e-mail: stijn.vanweezel.2011@live.rhul.ac.uk

Appendix A. Descriptive statistics

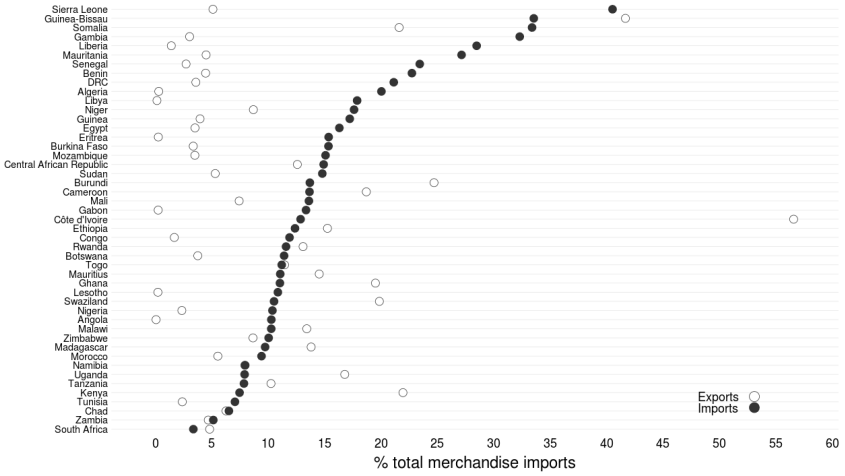

Figure A1: Food imports and exports relative to total merchandise imports per country, average for 1990-2010. Average share of food imports relative to total merchandise imports is 14%. Out of a total of 53 African countries 16 (30%) are net-exporters of food. The average net-imports of foodstuffs relative to total imports, including the net-exporters, is 7%. In 2011, in the top 20 of countries for share of agricultural imports relative to total merchandise 15 were from Africa (FAO Statistical Division, 2013). Data: FAOSTAT.

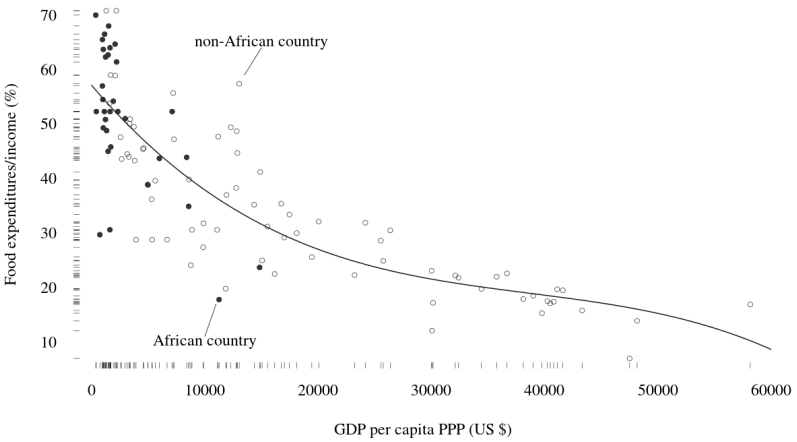

Figure A2: Food expenditures as a share of disposable income versus GDP per capita. The third-degree polynomial fit illustrates the decreasing trend in food expenditures as income increases. The average African consumer spends around 50% of its disposable income on food alone. Data: Global Food Security Index (105 countries for 2013).

Table A1: Descriptive statistics of food price index (FPI).

Country	N	Mean FPI	SD FPI	Minimum FPI	Maximum FPI
Algeria	263	2.1439	0.3345	1.4639	3.0905
Angola	263	0.4103	0.0901	0.2611	0.6474
Benin	263	0.7834	0.1805	0.5101	1.3821
Botswana	263	0.5402	0.0988	0.3561	0.805
Burkina Faso	263	0.9026	0.2493	0.4898	1.7822
Burundi	263	0.3513	0.0829	0.1491	0.5908
Cameroon	263	0.3045	0.0509	0.2085	0.4625
CAR	263	0.8884	0.1858	0.5041	1.3993
Chad	263	0.3297	0.0619	0.2251	0.4968
Congo	263	0.338	0.0677	0.2157	0.6009
Côte d'Ivoire	263	0.7033	0.1741	0.4192	1.3458
DRC	263	0.7818	0.1431	0.5573	1.2773
Egypt	263	2.0727	0.3372	1.4432	3.1742
Eritrea	228	2.5176	0.4266	1.7264	3.9351
Ethiopia	263	0.8313	0.1464	0.5897	1.3733
Gabon	263	0.1408	0.0271	0.0968	0.2408
Gambia	263	3.6014	0.8628	2.0977	5.8463
Ghana	263	0.5941	0.1177	0.3896	0.8875
Guinea	263	1.7834	0.4218	1.1941	2.9876
Guinea-Bissau	263	3.2392	0.8104	1.9899	5.9465
Kenya	263	0.5823	0.165	0.3382	1.032
Lesotho	263	2.4043	0.3891	1.6077	3.4649
Liberia	263	8.5513	2.3203	4.9505	16.3605
Libya	263	1.1437	0.1755	0.8373	1.6281
Madagascar	263	0.1378	0.1436	-0.1663	0.7038
Malawi	263	1.2477	0.3533	0.3299	2.2689
Mali	263	1.2053	0.2972	0.675	1.986
Mauritania	263	4.9022	1.0373	2.9401	7.6819
Mauritius	263	-4.8309	1.7295	-9.2711	-1.3514
Morocco	263	0.7819	0.1381	0.5066	1.1867
Mozambique	263	2.6044	0.4555	1.9366	3.9137
Namibia	263	0.5295	0.1253	0.274	0.8746
Niger	263	1.6753	0.3696	1.0782	2.6918
Nigeria	263	0.1895	0.0432	0.1205	0.2969
Rwanda	263	0.596	0.1494	0.3758	1.0094
Senegal	263	2.0277	0.475	1.2525	3.7074
Sierra Leone	263	3.4957	0.864	2.1566	6.4144
Somalia	263	5.4933	1.1218	3.6803	9.4107
South Africa	263	-0.3336	0.0499	-0.4703	-0.2245
Sudan	263	0.3337	0.0965	0.176	0.6468
Swaziland	263	-6.5922	2.2601	-12.5205	-2.0807
Tanzania	263	0.2001	0.0563	0.1065	0.3667
Togo	263	1.6593	0.3423	1.0775	2.5276
Tunisia	263	1.5749	0.2494	1.1045	2.3604
Uganda	263	0.1574	0.0354	0.0946	0.2585
Zambia	263	0.3942	0.0627	0.2781	0.592
Zimbabwe	263	-1.0286	0.2269	-1.6515	-0.5679

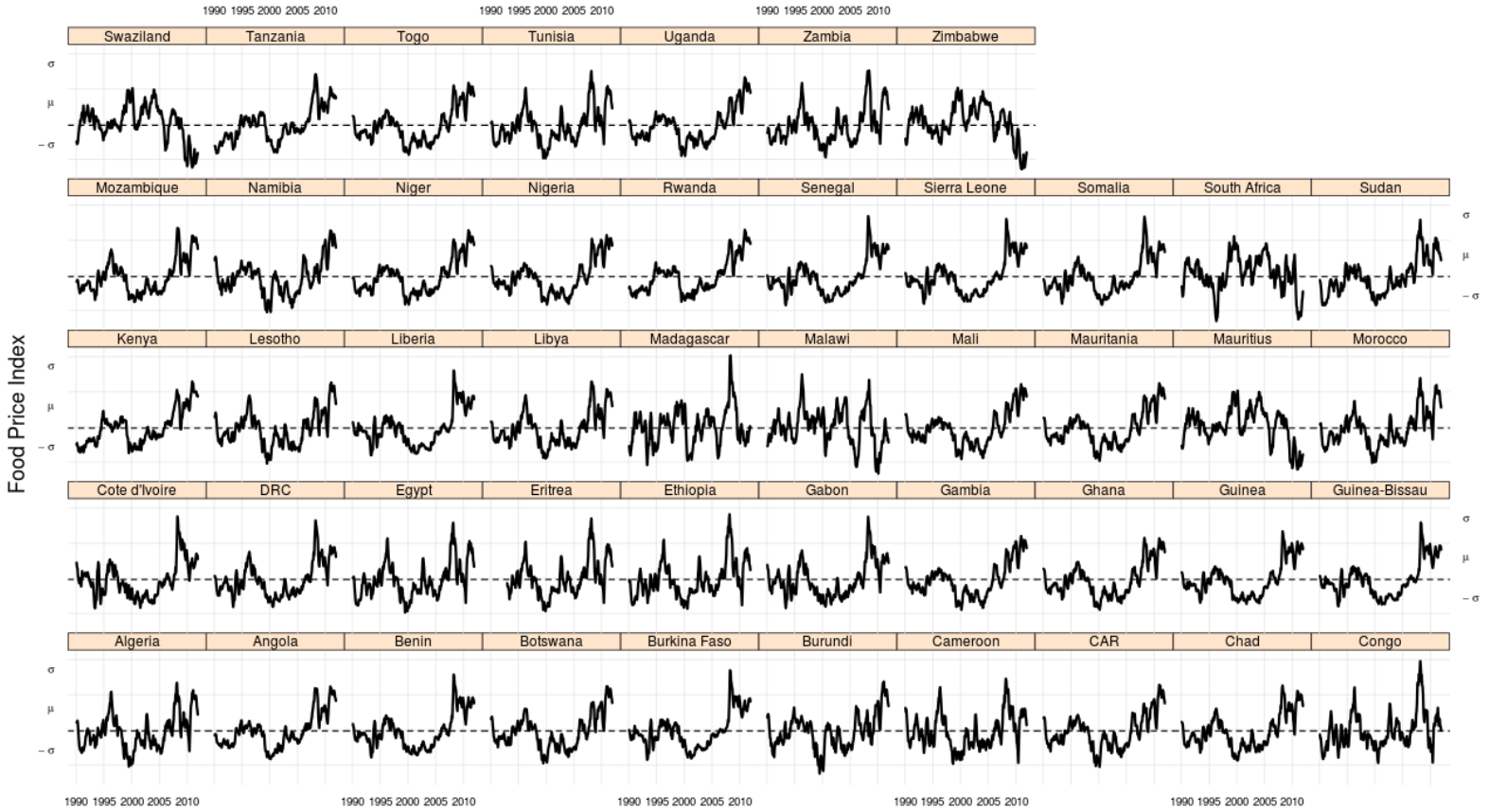

Figure A3: Food price index values over time per country.

Table A2: Overview political heterogeneity across countries, oil exporters, and landlocked countries.

Autocracy	Anocracy	Democracy	Democratisation process	Oil exporters	Landlocked
Algeria	Central African Republic	Benin	Benin	Algeria	Botswana
Angola	Ethiopia	Botswana	Central African Republic	Angola	Burkina Faso
Burkina Faso	Lesotho	Ghana	Ethiopia	Cameroon	Burundi
Burundi	Madagascar	Mali	Gambia	Chad	Central African Republic
Cameroon	Malawi	Mauritius	Ghana	Congo	Chad
Chad	Mozambique	Namibia	Lesotho	Egypt	Ethiopia
Congo	Niger	Senegal	Madagascar	Gabon	Lesotho
Congo, DR	Nigeria	South Africa	Malawi	Ghana	Malawi
Ivory Coast	Tanzania		Mali	Libya	Mali
Egypt	Zambia		Mozambique	Nigeria	Niger
Eritrea			Niger	Sudan	Rwanda
Gabon			Nigeria		Uganda
Gambia			Senegal		Zambia
Guinea			South Africa		Zimbabwe
Guinea-Bissau			Tanzania		
Kenya			Zambia		
Liberia					
Libya					
Mauritania					
Morocco					
Rwanda					
Sierra Leone					
Sudan					
Swaziland					
Togo					
Tunisia					
Uganda					

Appendix B. Complementary results

B1 Comparison of delayed prices effects and price spikes

Table B1: Comparison of the effect of different measures for food price shocks on violence (N=10585).

Specifications	(1)	(2)	(3)	(4)	(5)
FPI	0.4				0.7
	(0.2)**				(0.3)***
$FPI_{(t-1)}$	−0.1				
	(0.2)				
FPI_{growth}		0.42			
		(0.04)***			
$FPI_{growth,(t-1)}$		0.42			
		(0.04)***			
$FPI_{5-month\ growth}$			0.02		
			(0.04)		
FPI_{level}				0.6	
				(1.0)	
$FPI_{level,(t-1)}$				1	
				(2)	
$FPI_{level,(t-2)}$				−4	
				(2)**	
$FPI_{level,(t-3)}$				5	
				(1)***	
$FPI_{level,(t-4)}$				−3	
				(1)**	
$FPI_{level,(t-5)}$				0	
				(0.7)	
FPI × food crisis					−0.3
					(0.1)***
AIC	8704.009	8712.122	8713.094	8708.372	8708.939
AUC	0.7057	0.7047	0.7039	0.7042	0.7053
Unreported covariates	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels. FPI is the country-specific food price index. AIC, Akaike information criterion; AUC, Area Under the Curve.

The main model focuses on the contemporaneous effect of anomalies in food price levels on violence. However, since I use international food prices there is the possibility that there is a delay in the responsiveness of domestic prices (Baquedano and Liefert, 2014). I therefore include a lag of the FPI

in the model (table B1 col. 1). Surprisingly the results show an increase in the effect at time t and a negative effect at $t-1$, which comes with a lot of uncertainty however. As discussed in the main text, the effect of the lags could indicate the effect of growth shocks. Including current and lagged growth rates (col. 2) shows a positive effect of food prices on violence with an expected combined increase of 2.3 in the log count of the outcome variable. Accounting for a 5 month growth rate (col. 3) shows that there is likely no effect. Recent research has shown that over the past years volatility of prices has not increased Minot (2014) and that the link between food prices and unrest is mainly associated with a level effect Bellemare (2015). I therefore estimate the model using current levels, the results show a positive correlation between fluctuations from the long term trend in food prices and violence (col. 4) at time t, $t-1$, and $t-3$ but negative effects and $t-2$ and $t-4$. I also estimate the model including an interaction term between the FPI and a dummy indicating whether there was a food crises in that particular month, based on the characteristics described in Cuesta et al. (2014). For both 5 months of positive growth or an increase in prices of at least 15% in 5 months time. Interestingly the interaction term indicates a negative effect on violence levels as a result of food price crisis.

B2 Other outcome variables

One of the advantages of the SCAD dataset, compared to other available datasets on violence and conflict, is that it includes various types of civil unrest, covering a large spectrum of violence intensity ranging from protests to civil conflict. It also includes information on the location of the event, for instance whether it took place in a rural or urban area. I use this information to examine the relation between shocks in food prices and particular events,

be they for instance non-violent events, unrest targeted at the government, or violence in urban areas. The results for which are summarized in figure A4 (see also table B2) which shows the estimated coefficient on the backdrop of the 95% interval of the preferred model indicated by the shaded area.

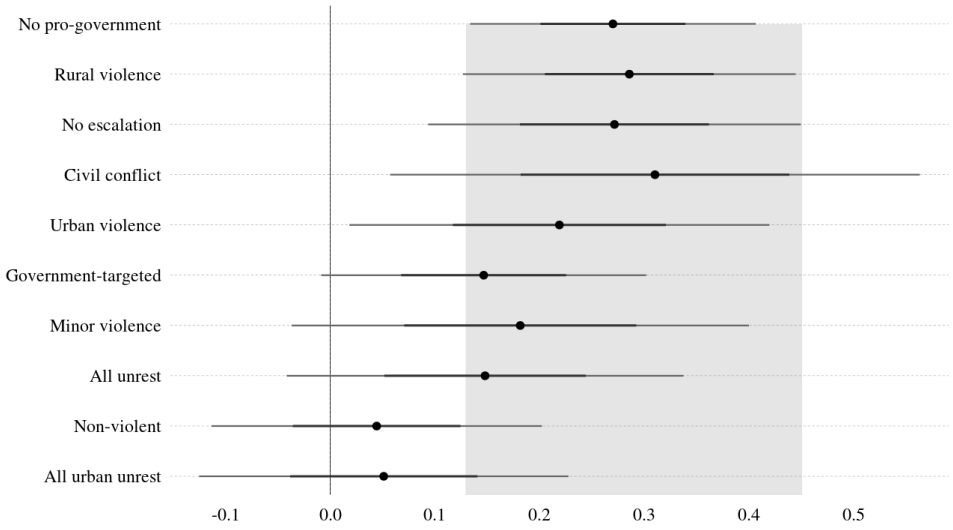

Figure A4: Effect of shocks in food prices on different event types. Figures shows the estimated coefficient along with its 68% and 95% interval. The shaded area indicates the 95% interval of the preferred model. See also table B2 for more details.

To account for possible within-country differences I test whether the effect of food prices is different in urban compared to rural areas. Although urban dwellers tend to be relatively wealthier and have higher purchasing power than their rural counterparts, they also tend to be food net-consumers, whereas rural inhabitants often dependent on subsistence agriculture which makes them slightly less dependent on food imports and international price changes (Cohen and Garrett, 2010). The results show that there is a slight

difference in the estimated effect in urban areas ($\beta = 0.21$, $s.e = 0.10$) compared to rural areas ($\beta = 0.28$, $s.e = 0.08$).[1] As people might flock to a city to express their grievances I also estimate the model accounting for all outbreaks of unrest but find that the estimated effect of food prices is near zero.

In the coding of the main outcome variable, events are included that initially start out as non-violent but then escalate into violence. I test the robustness of the result omitting these escalations (*No escalation*) from the outcome variable and see that this does not affect the results greatly. The same conclusion is reached when excluding pro-government types (*No pro-government*) of violence from the outcome variable. Since the original outcome variable covers different intensities of violence, I test whether food prices are more strongly correlated with low-intensity types of violence (*Minor violence*) or more serious cases such as civil conflict events (*Civil conflict*).[2] The results show a slightly stronger effect of food prices on civil conflict, although the larger coefficient also comes with a larger standard error. Interestingly, estimating the model for the effect on minor violence shows that the FPI coefficient ceases to be statistically significant. We should be cautious here however, as higher intensity events are more likely to be picked up by the media. The link between food prices and government targeted events or all unrest is also weaker compared to the link with violence. Even weaker is the estimated effect of all unrest.

[1] The total number of reported violent incidents is almost equal: urban, 2020; rural, 2152.

[2] Civil conflict is in this case defined as a violent event waged by militant factions.

Table B2: Effect of food prices on different types of civil unrest.

Outcome variable	FPI	AIC	AUC	Unrest months	N
Excluding violent escalations	0.27 (0.09)***	8155.92	0.7156	1126	10723
Excluding pro-government violence	0.27 (0.07)***	8453.944	0.7105	1189	10653
Minor violence	0.2 (0.1)	6749.968	0.7244	895	11179
Non-violent events	0.04 (0.08)	9230.718	0.6879	1313	10688
Conflict events	0.3 (0.1)**	5235.726	0.7844	650	11195
Government-targeted	0.15 (0.08)*	9775.031	0.6844	1388	10629
All civil unrest	0.15 (0.10)	10789.57	0.6715	1590	9733
All urban civil unrest	0.05 (0.09)	9603.092	0.6982	1374	10642
Violent urban events	0.2 (0.1)**	6585.591	0.7282	872	11223
Violent rural events	0.29 (0.08)***	6041.492	0.7701	789	11150

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. All specifications include country controls (not reported), country and year fixed effects. FPI is the country-specific food price index. AIC, Akaike information criterion; AUC, Area Under the Curve.

B3 Political heterogeneity

As mentioned in the main text, the study by Hendrix et al. (2009) found that the food-unrest nexus was largely contingent on regime type. In the results I also find that the variable for regime type is a strong explanatory variable. Here I further examine if there is a potential link between political heterogeneity, food prices, and violence using data from Papaioannou and Siourounis (2008) to categorize countries into three main groups: autocracies, anocracies, and democracies. A separate category is included for countries that have undergone a democratisation process, as these states might suffer more from instability. I re-estimate the model including an interaction effect between the country type and the FPI to estimate if the effect might be stronger based on this political heterogeneity. Additionally, based on the studies by Ng and Aksoy (2008) and Messer (2009), who found that conflict affects food security, I also specify a model including an interaction with a dummy variable whether a particular country experienced civil conflict

within that given year.[3] The results shown in table B3 indicate that in general the effect of food prices seems to be homogenous across the different country types. The only exceptions to this are anocracies and countries that have undergone a process of democratisation (see table A2 for details). For these countries there is a negative effect of food prices on the outbreak of violent civil unrest. Considering the increase in the coefficient for the FPI, the net-effect is still largely positive though.

Table B3: Effect of food prices on violence across different regime types and countries experiencing civil conflict (N=10585).

	Conflict countries	Autocracies	Anocracies	Democratisation process	Democracies
Specifications	(1)	(2)	(3)	(4)	(5)
FPI	0.27	0.2	0.34	0.39	0.30
	(0.09)***	(0.1)	(0.09)***	(0.09)***	(0.08)***
FPI × country type	0.1	0.2	−0.2	−0.2	−0.1
	(0.1)	(0.1)	(0.1)*	(0.1)*	(0.2)
AIC	8701.804	8701.573	8701.677	8700.628	8704.121
AUC	0.7069	0.7061	0.7062	0.7062	0.7057
Unreported covariates	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. FPI is the country-specific food price index. AIC, Akaike information criterion; AUC, Area Under the Curve.

B4 Robustness checks

I run a number of robustness checks (table B4) to test the sensitivity of the model to different measurements of the outcome variable, additional control variables, and sample selection. Rather than looking at the outbreak of violence I consider the effect of food prices on the incidence of violence. In

[3]Data on civil conflict is taken from the UCDP/PRIO Armed Conflict Dataset.

column 1 I specify a really simple model including the food price index, the lagged outcome variable to account for autocorrelation (Bazzi and Blattman, 2014; Beck and Katz, 2011), the measure for regime type, and a linear year trend. The estimated effect of shocks to the food price index on the incidence of violence is similar to that found in the baseline model.[4] However, the fit of this model seems better as illustrated by the high AUC statistic. Including the other explanatory variables, and year indicators rather than a time trend, gives results similar to that of the main model: food prices are positively linked to the incidence of violence.[5] However, a stronger predictor for violence seems to be the past violence level.

As the example of Nigeria in the introduction showed, it could be that oil prices rather than food prices, are driving the results as movements in the agricultural markets are likely driven by changes in oil prices (Gilbert, 2010). I therefore specify a model including world oil prices along with the other variables measured at a monthly frequency (col. 3) and re-estimating the preferred model including a country-specific oil price index (col. 4).[6] Including oil prices does not alter the results. Additionally, since oil exporter tend to be large food importers I include an interaction term to indicate whether a country is an oil exported, but do not find effect of food prices to be any different for oil exporting countries (col. 5).

Besides the standard suit of explanatory variables I include a number of additional controls to account for income levels (col 6.), the effect of food aid (col. 7), or whether a country is landlocked as it might isolate a country from

[4]Note that both these models did not account for shocks in income.

[5]See also the appendix for results using other outcome variables accounting for within-country variation and differences in the intensity of violence.

[6]Data on oil imports are taken from the U.S. Energy Information Administration.

fluctuations in international prices (col. 8). But find that these do not alter the results or conclusion. I do find that food aid itself is linked to violent unrest, similar to the results by Nunn and Qian (2014). As figure A4 showed, most of the violent events in this sample tend to occur in Nigeria and South Africa. I re-estimate the model on a sub-sample of the data excluding these two countries which results in a slight increase in the magnitude of the effect. Since the main results could be driven by the events related to the Arab Spring in 2011 I exclude the North African countries; this does not affect the results greatly.

Over the past decades there has been a decreasing trend in food prices reaching an all time low between 2003-2005. This was followed by a sudden surge in prices in 2007-2008, which saw food prices reach similar levels to those in the 1970s.[7] Considering the events following the world food price crisis and the Arab Spring it would be interesting to see how the covered period influences the estimated effect. It could be that the results are largely driven by events following the recent surge in food prices. I re-estimate the model, beginning with the period 1990-1992 and progress by including one additional year, results for which are shown in figure A5 where the shaded area indicates the 95% interval. The figure illustrates that during the 1990s food prices had a large effect but when prices decrease over time, the estimated effect also becomes smaller. It's only after 2007 that the estimated effect starts to increase again. Indeed if I repeat this exercise but by changing the start year to include the period from any given year till 2011, we see a very strong effect from 2007 onwards (see figure C1).[8]

[7] The long term trend has been taken into account due to the detrending of the data.
[8] As the robustness checks showed, this effect is not driven by the Arab Spring.

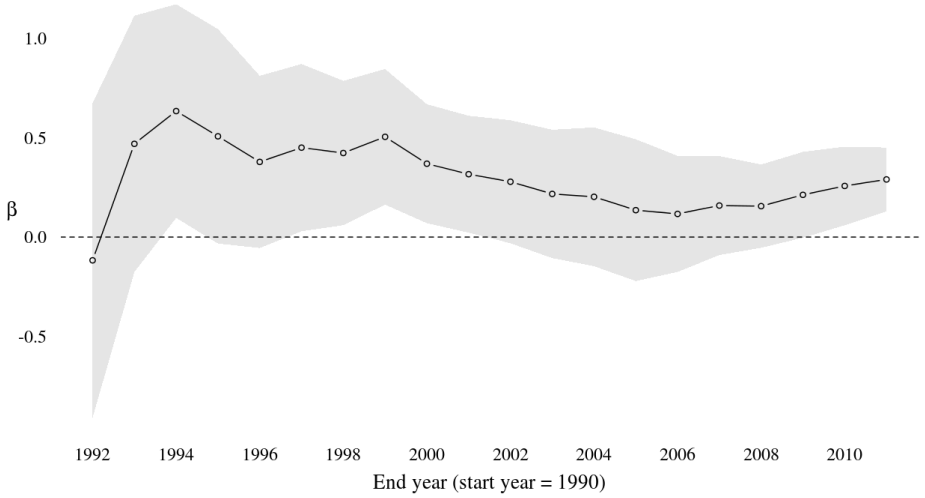

Figure A5: Estimated effect of food prices for different sample periods with different end years. Figure shows the estimated coefficient on the food price index along with the 95% interval as a result of estimating the model changing the end year of the sample period, beginning at 1990-1992 and progressing by one year up until 2011.

Table B4: Robustness checks effect of food prices on violence.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outcome variable	Violence incidence		Violence outbreak							
Specifications	*Simple model*	*Violence incidence*	*Oil price index*	*General oil prices*	*Oil exporters*	*Including income level*	*Including food aid*	*Landlocked countries*	*Excluding Nigeria and South Africa*	*Excluding North African countries*
FPI	0.11	0.25	0.27	0.29	0.29	0.28	0.29	0.26	0.33	0.29
	(0.06)*	(0.06)***	(0.09)***	(0.08)***	(0.08)***	(0.09)***	(0.09)***	(0.09)***	(0.09)***	(0.10)***
Violence$_{(C-i)}$		−0.24	−0.18	−0.18	−0.18	−0.18	−0.18	−0.18	−0.18	−).15
		(0.04)***	(0.07)**	(0.07)**	(0.07)**	(0.07)**	(0.07)**	(0.07)**	(0.08)**	(0.08)**
Δ GDP pc.$_{(y-1)}$		−0.3		0.03	0.03	0.04	0.04	0.03	0.04	0.03
		(0.1)***		(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)
Regime type$_{(y-1)}$	−0.5	−0.3		−0.3	−0.25	−0.25	−0.25	−0.26	−0.27	−0.3
	(0.2)***	(0.1)*		(0.1)***	(0.10)**	(0.10)**	(0.10)***	(0.10)***	(0.10)***	(0.1)***
Population$_{(y-1)}$		1.4		−4	−4	−5	−5	−4	−5	−2
		(0.2)***		(2)	(3)	(2)	(3)*	(3)	(2)	(3)
Violence$_{(t-1)}$	1.21	0.75								
	(0.06)***	(0.09)***								
Year	0.4									
	(0.1)***									
World oil prices			−0.1							
			(0.2)							
Oil price index				0.1						
				(0.3)						
FPI × Oil exporter					0.1					
					(0.1)					
GDP pc.$_{(y-1)}$						−1.2				
						(0.9)				
Food aid							0.3			
							(0.2)*			
FPI × Landlocked								0.1		
								(0.1)		
Intercept	−1.3	−2.4	−2.7	−2.5	−2.6	−2.3	−2.5	−2.5	−2.1	−2.7
	(0.1)***	(0.3)***	(0.2)***	(0.3)***	(0.2)***	(0.4)***	(0.3)***	(0.3)***	(0.4)***	(0.5)***
AIC	16823.14	14493.31	8714.869	8704.024	8702.885	8700.141	8699.603	8703.723	8236.337	7823.745
AUC	0.7222	0.7617	0.7022	0.7056	0.7055	0.7062	0.7068	0.7058	0.7000	0.7058
N	12326	11645	10585	10585	10585	10585	10585	10585	10370	9519
Country FE	–	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. FPI is the country-specific food price index; AIC, Akaike information criterion; AUC, Area Under the Curve.

B5 Different specifications of the Food Price Index

So far the estimation results have been based on shocks in the food price index based on fluctuations in food prices from the long-term trend, weighted by the fixed share of food net-imports relative to GDP. I continue the analysis making adjustments to the food price index in order to examine the sensitivity of the results to the specific FPI construction. I will focus on the i) price series used, ii) included foodstuffs, and iii) the relative weights of the foodstuffs in order to further disentangle the link between food prices, imports, and violence. For each different specification, the estimated FPI coefficient along with its 68% and 95% interval are visually summarized in figure A6, the grey-shaded area indicates the 95% interval of the estimated FPI in the preferred model.[9]

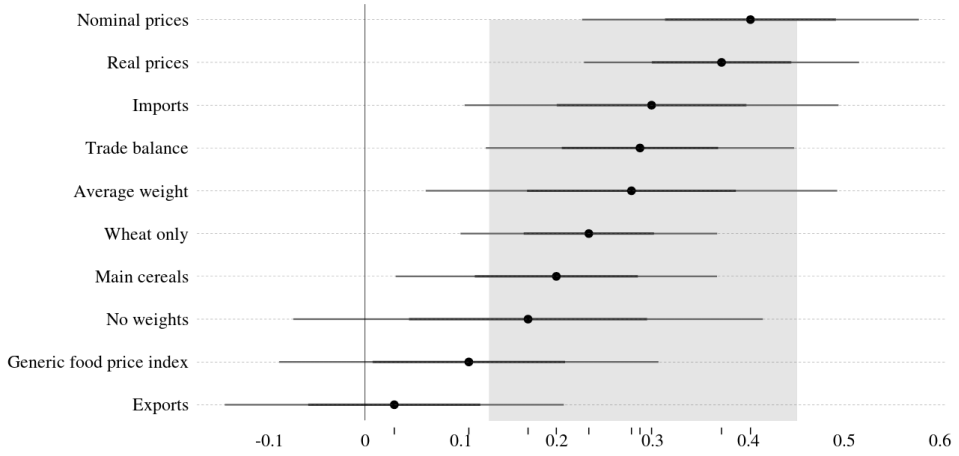

Figure A6: Estimates, 68% intervals, and 95% intervals for the food price index coefficient according to different specifications.

[9]Results for estimated coefficients and models statistics are given in table C4

The reason for using detrended prices is to account for the trend in food prices which allows us to estimate the real level effect. However, the trend in the data might actually matter with regard to violence intensity, as this is the actual price paid at time t, and therefore I re-estimate the model using nominal and real food prices. The results show that there are some differences where the estimated magnitude for nominal and real prices is about 1.3 to 1.4 times larger than that of detrended prices. In contrast, using average net-imports of food relative to GDP for 1990-2011 leads to only a 3% decrease in the coefficient size. The average weight might account better for shifts in consumption over time compared to a fixed weight, but is also likely endogenous. Estimating the model using a FPI constructed using only the trade balance (net-imports) gives almost identical results to the main index. The relation between food prices and violence seems indeed to be mainly driven by import dependence as splitting the price index into a separate import and export variable shows that the estimated effect of exports is near zero. The estimated effect of imports is again very similar to that of the main index.

Similar to the instrument used by Smith (2014) I construct a price index using only the main cereals: wheat, rice, and maize. Although in this case the net-imports are fixed and relative to GDP in the period before the outcome variable is measured. The results shows a large decrease (30%) in coefficient size. Looking at only on the impact of wheat prices as Hendrix et al. (2009) do produces a statistically significant coefficient and seems to indicate that shocks in global wheat prices indeed explain some of the observed violence. This result at least partially counters the point I made in the introduction concerning a potential bias due to unaccounted substitution effects. The effect of wheat alone is larger than that of the cereals combined surprisingly.

Removing the weights from the food price index, therefore not accounting for the import pattern, results in a smaller estimated effect accompanied by a large standard error. The generic food price index produces the smallest point estimate also accompanied by a large standard error and has the lowest explanatory power compared to the other measures, except for the exports. This is potentially due to the fact that it includes foodstuffs which might not be relevant to African countries. The main take away from these results is that the effect of food prices on violence is likely driven by a specific basket of foodstuffs which includes mainly cereals.

Appendix C. Additional tables and figures

Table C1: Results for different sets of indicators (N=10585)

Included indicators	FPI	AIC	AUC
Country	0.16 (0.07)**	8742.288	0.6899
Year	0.22 (0.07)***	9290.042	0.5567
Country-specific time trend	−0.01 (0.08)	8688.611	0.712
Month	0.13 (0.06)**	9286.08	0.5435

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. FPI is the country-specific food price index. AIC, Akaike information criterion; AUC, Area Under the Curve.

Table C2: Regression results OLS (N=10585).

Outcome variable	*Count*		*Log-count*		*Binary*	
Specifications	(1)	(2)	(3)	(4)	(5)	(6)
FPI	0.02	0.04	0.010	0.024	0.009	0.025
	(0.01)*	(0.01)***	(0.006)	(0.006)***	(0.007)	(0.007)***
Violence$_{(C-i)}$	0.01	−0.03	0.006	−0.016	0.009	−0.020
	(0.07)	(0.01)**	(0.007)	(0.006)***	(0.008)	(0.008)***
Δ GDP pc.$_{(y-1)}$	0	0.007	−0.005	0.004	−0.01	0.003
	(0.01)	(0.008)	(0.008)	(0.005)	(0.01)	(0.006)
Regime type$_{(y-1)}$	−0.02	−0.04	−0.01	−0.02	−0.02	−0.03
	(0.02)	(0.02)**	(0.01)	(0.01)**	(0.01)	(0.01)**
Population$_{(y-1)}$	0.16	−0.3	0.09	−0.1	0.10	−0.1
	(0.03)***	(0.4)	(0.02)***	(0.2)	(0.02)***	(0.2)
Intercept	0.16	0.08	0.098	0.05	0.121	0.06
	(0.01)***	(0.05)*	(0.008)***	(0.03)*	(0.008)***	(0.03)*
AIC	14380.15	13982.84	1846.044	1493.29	5646.203	5400.148
AUC	0.6457	0.7009	0.6457	0.7033	0.6456	0.7045
Country FE	–	Yes	–	Yes	–	Yes
Year FE	–	Yes	–	Yes	–	Yes

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. FPI is the country-specific food price index; AIC, Akaike information criterion; AUC, Area Under the Curve.

Table C3: Regression results maximum likelihood estimation (N=10585).

Outcome variable	*Count*		*Log-count*		Binary			
Estimation method	Poisson	Poisson	Quasi-Poisson	Quasi-Poisson	Logit	Logit	Rare-Event Logit	Rare-Event Logit
Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FPI	0.10	0.26	0.09	0.25	0.09	0.27	0.09	0.26
	(0.06)	(0.08)***	(0.06)	(0.07)***	(0.07)	(0.08)***	(0.07)	(0.08)***
Violence$_{(C-i)}$	0.08	−0.18	0.09	−0.17	0.11	−0.21	0.11	−0.20
	(0.08)	(0.07)***	(0.07)	(0.07)***	(0.08)	(0.08)***	(0.08)	(0.08)**
Δ GDP pc.$_{(y-1)}$	−0.1	0.04	−0.1	0.03	−0.1	0.02	−0.1	0.02
	(0.1)	(0.06)	(0.1)	(0.06)	(0.1)	(0.07)	(0.1)	(0.07)
Regime type$_{(y-1)}$	−0.2	−0.26	−0.2	−0.25	−0.2	−0.3	−0.2	−0.3
	(0.1)	(0.10)	(0.1)	(0.09)	(0.1)	(0.1)**	(0.1)	(0.1)**
Population$_{(y-1)}$	1.1	−4	1.0	−3	1.1	−2	1.1	−2
	(0.2)	(3)	(0.2)***	(2)	(0.2)***	(2)	(0.2)***	(2)
Intercept	2.00	−2.5	−2.46	−3.0	−2.08	−2.7	−2.08	−2.7
	(0.08)***	(0.4)***	().07)***	(0.3)***	(0.07)***	(0.4)***	(0.07)***	(0.4)***
AIC	9374.831	8965.113	–	–	7306.869	7107.729	7306.869	7107.729
AUC	0.6456	0.7053	0.6455	0.7070	0.6455	0.7077	0.6455	0.7077
Country FE	–	Yes	–	Yes	–	Yes	–	Yes
Year FE	–	Yes	–	Yes	–	Yes	–	Yes

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. FPI is the country-specific food price index; AIC, Akaike information criterion; AUC, Area Under the Curve.

Table C4: Different specifications of the food price index.

FPI specification	Estimate	AIC	AUC
Imports	0.30 (0.10)***	8707.891	0.7053
Exports	0.03 (0.09)		
Nominal prices	0.40 (0.09)***	8698.99	0.7054
Real prices	0.37 (0.07)***	8698.169	0.7054
Average GDP weight	0.3 (0.1)**	8704.447	0.7054
Terms of trade weight	0.29 (0.08)***	8702.227	0.7057
No weight	0.2 (0.1)	8711.84	0.7041
Generic food price index	0.1 (0.1)	8710.504	0.7039
Cereals	0.21 (0.08)**	8708.121	0.7051
Wheat only	0.24 (0.07)***	8705.86	0.7048

Notes. Robust standard errors, clustered at country-level, in parentheses where ***, **, and * respectively indicate statistical significance at the 1%, 5%, and 10% levels. All specifications include country controls (not reported), country and year fixed effects. FPI is the country-specific food price index; AIC, Akaike information criterion;AUC, Area Under the Curve. $N = 10585$

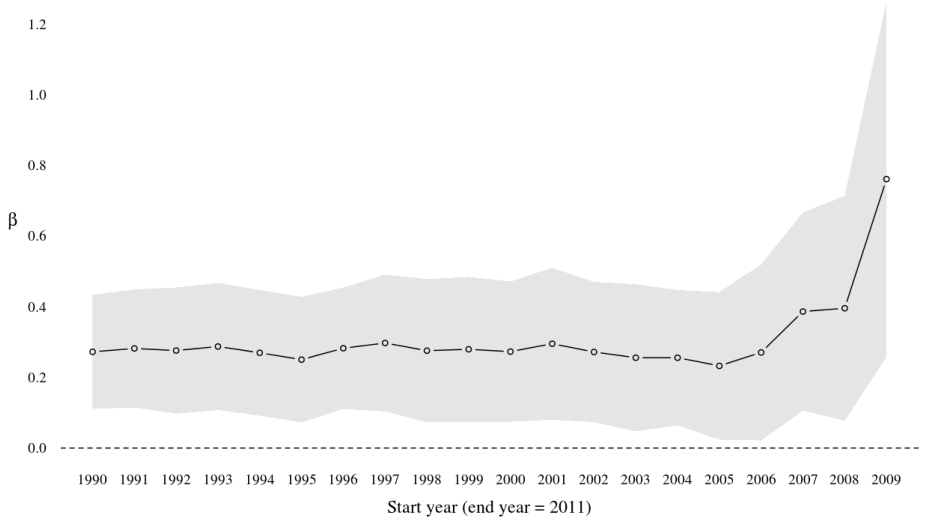

Figure C1: Effect of sample period on the estimated coefficient and 95% interval. Figure shows the results of estimating the model changing the start year of the sample period, beginning at 1990-2011 and progressing by one year.

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