FOOD AID AND POLITICAL UNREST

by

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The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "FOOD AID AND POLITICAL UNREST" by Steven Ryan in partial fulfilment of the requirements for the degree of Master of Arts.

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ABSTRACT

In light of reports of protests and riots in response to rising food prices and food insecurity, this study asks whether the provision of food aid has an effect on the incidence of political unrest in recipient countries. It uses annual data on the quantities of American wheat aid delivered to 143 countries between 1972 and 2006. To overcome the potential for bias due to endogeneity, variations in U.S. agricultural production and recipient countries' probability of receiving aid are used to predict the annual quantity of food aid provided to each country. Results from the instrumented regressions suggest that the provision of food aid does not have any impact on the incidence of political unrest.

LIST OF ABBREVIATIONS USED

CNTS – Cross National Time Series
OECD – Organization for Economic Cooperation and Development
FAO – Food and Agriculture Organization
FAOSTAT – Food and Agriculture Organization Statistical Database
GDP – Gross domestic product
INTERFAIS – International Food Aid Information System
IV – Instrumental variable
MT – Metric tonnes
2SLS – Two-stage least squares
U.S. – United States
WFP – World Food Programme

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Chapter 1 – Introduction

Over the past 60 years, the provision of food aid by industrialized countries has been used as a tool to combat food insecurity in developing countries. In light of recent reports of food riots and protests against rising food prices during the past five years, this paper seeks to determine whether the provision of food aid has an effect on the incidence of political unrest in recipient countries. For the purposes of this study, political unrest is defined as demonstrations, riots, strikes and other acts of "...collective action, some peaceful and others violent, that publicly signal a grievance against the existing government" in recipient countries (Hendrix et al., 2009, p. 6).

Models of political protest and rioting suggest that individuals decide whether to participate on the basis of private benefits and costs. On the one hand, the provision of food aid may lower the incidence of political unrest in recipient countries by decreasing the price of food for urban consumers, which increases the value of real wages and the opportunity cost of participating in collective action against the government. On the other hand, if food aid reduces agricultural incomes, it may result in protests by farm workers. The misappropriation of food aid by the ruling elite may also foster a sense of grievance among the general public and lead to anti-government demonstrations and riots.

To determine whether the provision of food aid has any impact on the incidence of political unrest in recipient countries, this study uses annual data on the quantities of American wheat aid delivered to 143 countries between 1972 and 2006. To overcome the potential for bias due to endogeneity, variations in U.S. agricultural production and recipient countries' probability of receiving aid are used to predict the annual quantity of food aid provided to each country. Results suggest that the provision of food aid does not have any impact on the incidence of political unrest.

Chapter 2 – Background

The provision of food aid to developing countries was initiated by the United States in 1954, the year that Congress passed Public Law 480, the Agricultural Trade Development and Assistance Act, (later renamed 'Food for Peace'). While the United States was the first major donor of food aid, it was soon joined by the European Community, Canada, Australia, and Japan. Figure 1 in the appendix provides an illustration of the quantity of food aid provided by both the United States. and by all donor countries in total between 1972 and 2006, the period of interest for this study. As can be seen from the chart, the United States has consistently provided the majority of all food aid donated to developing countries.

From its inception, food aid has been scrutinized by economists wary of unintended consequences and sceptical of donors' intentions. Schultz (1960) offered one of the first critiques of food aid, using theoretical models to argue that the provision of food by donor countries generated price disincentives for farmers in recipient countries that decreased the level of agricultural production and led to aid dependence. Since the publication of Schultz's critique, a number of empirical studies have examined the effects of food aid on food production, imports, and consumption in recipient countries. In general, these studies have refuted Schultz's predictions about the disincentive effects of food aid, finding instead that food aid has either no effect or a slightly positive effect on agricultural production (Barrett et al., 1999, Lowder, 2004). Rather than displace agricultural production, the receipt of food aid tends to displace commercial imports (Lavy, 1990).

While the economic impact of food aid has been the focus of a sizable body of academic literature, much less attention has been devoted to the question of the political consequences of food aid.

A number of media reports have linked the provision of food aid with greater political stability in recipient countries. For example, Ciezdalo (2011) argues that authoritarian regimes in the Arab world held on to power for decades through the provision of subsidized food to the poor, a practice Tunisian scholar Larbi Sadiki called *dimuqratiyyat al-khubz*, the "democracy of bread".

Some of these countries, notably Egypt, relied heavily on American wheat aid to provide consumers with food subsidies.

While food aid may increase political stability in some circumstances, it is also plausible that the misappropriation of food aid may lead to political unrest. Much of the food aid given by donors is known as 'program aid', which is frequently sold on the domestic market to generate revenues for the recipient government. In some countries, the value of program food aid relative to government budget is large: for instance, during the early 1990s, the revenues generated from the sale of food aid was equivalent to 15% of all government expenditures in Georgia, while in Mozambique they covered 30% of public sector spending (Gupta et al. 2004).

As Besley and Persson (2011) note, in undemocratic, 'redistributive' regimes, foreign economic assistance – including food aid – is often misappropriated and used to reward supporters of the government. Harrison (1999) reports that up to 20% of the food aid delivered to Mozambique in the 1980s was diverted by officials in the Department for the Prevention and Combat of Natural Calamities. Using Rwanda prior to the 1994 genocide as a case study, Uvin (1998) describes how food aid was stolen by elites and distributed to regime loyalists, leading to discontent and conflict among the general population. During the early 1990s, the theft and misuse of food aid by the Rwandan government became so problematic that deliveries of food aid were cancelled by donor countries on several occasions.

While the misappropriation of program food aid may lead to political unrest, the same is also true for 'emergency' food aid, which is intended to be distributed by relief organizations directly to victims of natural and man-made disasters instead of being sold on the market. Nunn and Qian (2012) report that the provision of emergency food aid leads to an increase in the incidence and duration of civil conflicts (particularly small-scale insurgencies) in recipient countries; rather than helping the victims of conflict, food aid is stolen by rebel groups to feed combatants or sold to buy armaments.

This study draws on two theoretical approaches to explain how food aid may affect the incidence of political unrest in recipient countries. The first is relative deprivation theory, which focuses on

individuals' motives for participating in riots and demonstrations against the government. According to this theory, citizens have a perceived entitlement to a certain standard of living, and are mobilized politically when these expectations go unmet. This sense of 'relative deprivation' may result from inter-group comparisons of standards of living (e.g., between urban and rural residents, or between different ethnic communities), or from inter-temporal comparisons (e.g., past versus present well-being) (Hendrix et al., 2009). By lowering prices and reducing the share of household expenditures that go towards food, food aid may reduce the sense of relative deprivation experienced by the urban poor, who may feel entitled to a minimum level of subsistence. On the other hand, the lower food prices induced by the receipt of food aid may have adverse effects on agricultural incomes and lead to protests by rural farmers demanding better compensation for their produce. The misappropriation of food aid by elites in government may also foster a sense of grievance among members of the general public resentful of theft and corruption.

The second theoretical approach that informs this study consists of public choice models of riots and anti-government protests. DiPasquale and Glaeser (1998) outline a model whereby an individual's likelihood of participating in a riot depends on both the benefits of participating, such as financial gain through looting, as well as the costs, including the likelihood of injury or arrest. In a similar vein, Tullock (1971) models individuals' participation in political demonstrations and revolutions. While many historical or eyewitness accounts emphasize the noble objectives and civic-mindedness of protestors, Tullock argues that most participants consider only private benefits and costs when deciding whether to take action against the government.

The most salient feature of these economic models of riots and demonstrations is their treatment of opportunity costs. In essence, people who have less to lose are more likely to riot or to participate in anti-government protests. Food aid may increase the opportunity costs of joining in a riot or protest by reducing the price of food, which is equivalent to an increase in real income for households that are net consumers of food. Consequently, individuals are more likely to work for wages rather than participate in anti-government protests and riots. For rural farmers,

however, food aid may reduce the price of crops, thereby lowering the opportunity cost of participating in collective political action against the government.

There is some evidence to suggest that the prices paid by urban consumers for food are a more important determinant of the number of riots, demonstrations, and strikes in low-income countries than the prices received by farmers for their crops. For one, owing to higher population densities, it is much easier for urban residents to congregate in public spaces to spontaneously demonstrate or riot against the government – little preparation is required. With a larger pool of potential protestors to draw upon, urban residents also benefit from 'safety in numbers': because there is an upper bound to the number of anti-riot police that can be deployed in a given area, a larger number of protestors reduces the likelihood that any one protestor will be arrested or injured by the authorities, thereby lowering the cost of participation.

In contrast, rural farmers must overcome the coordination problem of gathering a sufficient number of protestors in a given location at a specific time. The transportation costs of such an undertaking can be significant, particularly for smallholder farmers who lack access to a vehicle and who live far from an urban centre. Furthermore, due to the fact that demonstrations by farmers must have some degree of planning, it is easier for authoritarian governments to intervene to stop rural residents from gathering to protest.

That government officials in low-income countries tend to be more concerned with placating their urban constituents rather than responding to the needs of rural farmers is evidenced by the anti-producer, pro-consumer bias of many low-income countries' agricultural pricing policies. Even though most low-income countries have a comparative advantage in agriculture, the governments of low-income countries tend to adopt agricultural pricing policies that pay farmers less than the market rate for their produce while subsidizing urban residents' food consumption (Gawande and Hoekman, 2010).

A number of empirical studies have shown that food aid does, in fact, decrease food prices in recipient countries. Using Mozambique as case study, Tschirley, Donovan and Weber (1996) report that the receipt of yellow maize food aid in the early-1990s had the effect of reducing the

price of all types of maize, including domestically-produced white maize. The receipt of food aid has also been linked to higher levels of consumer subsidies. Hoffman et al. (1994) find that an additional kilogram of per-capita U.S. wheat aid increased the consumer subsidy by between $0.52 to $0.87 per metric ton of wheat in nine food-aid receiving countries. Bylerlee (1983) reports that in forty-one tropical countries that imported at least 60% of their food supply, there was a significant negative correlation between subsidized bread prices and cumulative past food aid. Bezuneh, Deaton, and Zuhair (2003) and Hall (1980) also find that food aid was used by the governments of Tunisia and Brazil, respectively, to provide grains to domestic mills at lower prices, which in turn reduced the prices of processed foods for consumers.

Although the economic literature on conflict and political instability has not explicitly examined the relationship between food aid and demonstrations and riots, a number of studies have found that higher food prices are associated with an increase in the incidence of political unrest. Using world food prices as a plausibly exogenous source of variation in domestic prices, Bellemare (2012), Hendrix et al. (2009), and Arezki and Bruckner (2011) find that higher prices led to increases in the number of riots and demonstrations, particularly in low-income countries where food expenditures take up a large share of household budgets. Walton and Seddon (1992) also document rioting and unrest in developing countries that eliminated consumer food subsidies following the imposition of structural adjustment policies by the International Monetary Fund.

Chapter 3 – Methodology

The hypothesis that will be tested in this study is whether food aid leads to a reduction in the incidence of political unrest in recipient countries. The basic regression specification used in this study is as follows:

$$UNREST_{irt} = \beta F_{irt} + \boldsymbol{X}_{irt}\boldsymbol{\Gamma} + \varphi_{rt} + \delta_i + \varepsilon_{irt}$$

where *i* denotes countries, *r* denotes geographic region, and *t* denotes years. The dependent variable $UNREST_{irt}$ represents the level of political unrest in country *i* in region *r* and year *t*. The level of political unrest is given by the total number of riots, anti-government demonstrations, and general strikes that occur in a country in a year. The main variable of interest is F_{irt}, the quantity of food aid received by country *i* in year *t*. A negative estimated value of the β coefficient would imply that the receipt of food aid is associated with a decrease in the number of riots, demonstrations, and general strikes, while a positive value would indicate that food aid increases the incidence of these types of events.

Included in the specification are country fixed effects, δ_i, which control for time-invariant differences across countries, and region-year fixed effects, φ_{rt}, which control for common shocks experienced by countries within a geographic region. The regional groupings (which are taken from the World Bank) are South Asia, East Asia and Pacific, Europe and Central Asia, Latin America and the Carribean, Middle East and North Africa, and Sub-Saharan Africa. $\boldsymbol{X}_{irt}$ is a vector of country-year covariates described below, and ε_{irt} is the error term.

The receipt of food aid may lead to a decrease in political unrest, as food aid lowers the price of food and decreases the costs to governments of implementing food subsidies. Lower prices and higher subsidies are likely to benefit urban dwellers, who are net consumers of food, and who are more likely to protest the government than rural farmers who are unable to organize themselves as effectively. Alternatively, if food aid is misappropriated by elites in government, or distributed only to supporters of the regime or to a certain segment of the population, this could foster a sense of grievance among the public and lead to protests and riots.

A challenge facing any attempt to quantify the impact of food aid on political unrest is the potential for biased estimates due to endogeneity: while food aid may have an effect on the political stability of a recipient country, it may also be the case that donor countries' decisions to provide aid are influenced by the political conditions in recipient countries. To overcome this potential bias, it is necessary to find an instrument for the provision of food aid that is exogenous to the conditions in recipient countries.

Fortunately for the purposes of this study, the provision of food aid is not wholly dependent on the needs of recipient countries. In fact, for some donor countries – notably the United States – recipients' needs are secondary to domestic interests. As Barrett and Maxwell note, "[t]he US government's food aid programs have always aimed to advance self-serving goals of surplus disposal, export promotion and geopolitical leverage to benefit privileged domestic interest groups. While the rhetoric of American food aid has always emphasized its altruistic appearance, the design and use of US food aid programs have always been driven primarily by donor-oriented concerns, not by recipients' needs or rights" (Barrett and Maxwell, 2005, p. 35).

That the provision of American food aid is motivated by domestic interests rather than recipient needs has been shown by a number of studies. Diven (2001) reports that the quantity of inventoried wheat in the United States has a significant impact on the provision of wheat aid in the following year, while the level of agricultural production in recipient countries has no significant effect on the quantity of wheat aid received from the U.S. In other words, the provision of U.S. aid is primarily motivated by the need to dispose of agricultural surpluses without lowering prices for American farmers. Diven also finds that there is a strong, positive relationship between the quantities of American food aid shipped to recipients in year t and t-1, which suggests that the decision to provide food aid is subject to bureaucratic incrementalism, with the list of countries receiving food aid varying little from one year to the next (Diven, 2001, p. 459).

In a similar study, Nunn and Qian (2011) examine the provision of cereal aid (which accounts for 90% of all food aid in terms of quantities provided) by all donor countries between 1971 and 2008. Nunn and Qian find that food aid from large cereal-producing countries such as the United

States, Canada, and China respond most weakly to recipient countries' food production, and that the U.S. is the only donor country that systematically determines the level of food aid based on its own domestic agricultural production.

In light of these findings, Nunn and Qian (2012) propose a two-stage least squares (2SLS) regression in which American wheat aid is instrumented using the interaction between the 1-year lag of wheat production and the probability that a country is a recipient of wheat aid. The identification strategy is premised on the assumption that the provision of U.S. wheat aid is driven by the need to dispose of surplus wheat inventories and is subject to bureaucratic incrementalism whereby the same countries receive food aid year after year, regardless of need. The focus on wheat as opposed to other commodities is justified by the fact that wheat and wheat flour represent over half of all food aid delivered to recipients, and that the quantity of wheat aid provided is closely linked to variations in American wheat production.

The first stage of the two-stage least squares regression is as follows:

$$F_{irt} = \alpha(P_{t-1} \times \overline{D}_{ir}) + \boldsymbol{X_{irt}}\boldsymbol{\Gamma} + \varphi_{rt} + \delta_i + \varepsilon_{irt}$$

where F_{irt} is the amount of U.S. wheat aid received by country *i* in region *r* in year *t.* P_{t-1} denotes the lagged U.S. wheat production in metric tonnes, while $\overline{D}_{ir} = \frac{1}{35}\sum_{t=1972}^{2006} D_{irt}$, where D_{irt}takes a value of 1 if country *i* is a recipient of U.S. wheat aid in year *t*. The predicted level of U.S. wheat aid is a function of the lag of U.S. wheat production and the time-invariant probability that a given country is a recipient of U.S. food aid. As with the second stage regression specification, φ_{rt} denotes region-year fixed effects, while δ_i are country-specific fixed effects and $\boldsymbol{X_{irt}}$ is a vector of country-year covariates.

The identification strategy relies on the assumption that U.S. wheat production affects the political instability of the sample countries only through its effect on the provision of U.S. food aid. This exclusion restriction would be violated if it were found that U.S. wheat production affected the political stability of the sample countries through its effects on world food prices. While the inclusion of region-year fixed effects in the baseline regression specification should account for the effects of both global and region-specific changes in the price of wheat, there

remains the possibility that changes in world food prices caused by variations in U.S. wheat production could have systematic within-region, country-specific differential effects.

Fortunately, this type of violation of the exclusion restriction seems unlikely due to the fact that there is little correlation between international wheat prices and U.S. wheat production due to domestic supply management policies in the United States that minimize the effects of fluctuations in wheat production on international price levels. A regression of international prices for U.S. wheat (in constant 2005 U.S. dollars) on U.S. wheat production is statistically insignificant (see table 2 in the appendix). Nonetheless, to control for the possibility that price changes from one year to the next have differential effects on countries within regions, recipient countries' time-invariant averages of per capita net exports of cereals and per capita cereal production are interacted with year fixed effects. This allows for the effect of international wheat prices to vary across countries within regions according to the extent to which they produce, export, or import cereals.

To control for the fact that regular food aid recipients may be more likely to be recipients of other forms of U.S. economic aid, which could in turn affect the level of political instability, the average amount of U.S. economic aid (net of food aid) received by each country over the 1972-2006 period is interacted with year fixed effects. A dummy variable is also included to control for when countries in the sample have a temporary seat on the United Nations Security Council, as a number of previous studies have shown that holding a temporary seat leads to increases in the amount of aid given by the permanent members of the Council (Kuziemko and Werker, 2006, Dreher et al., 2009).

Chapter 4 – Descriptive Statistics

Data on food aid deliveries, as well as food production, comes from the Food and Agriculture Organization (FAO)'s FAOSTAT database. Food aid is reported in terms of quantities delivered rather than dollar values due to the fact that the U.S. government's valuation of aid includes the cost of shipping, and may not reflect the value of food aid to recipients. Supplementary data on food aid is obtained from the World Food Programme's International Food Aid Information System.

Figure 1 in the appendix illustrates total food aid deliveries in metric tonnes from all donors for the years 1972-2006, as well as the quantities donated by the United States. American donations account for an average of 59% of total food aid deliveries, and 59% of all cereal aid deliveries. Figure 2 shows, wheat and wheat flour make up a large share of all American food aid in terms of quantities delivered, on average comprising 57% of all U.S. food aid, and 63% of its cereal aid. The mean total annual amount of wheat and wheat flour donated by the U.S. between 1972 and 2006 is 3.47 million metric tonnes (MT), which represents approximately 5.9% of the average annual U.S. wheat production.

With respect to the 143 countries that are the focus of this study, the average amount of U.S. cereal aid received by each country is 40,300 MT, and the average amount of wheat aid is 25,900 MT with a standard deviation of 11,200 MT. The probability that a country receives U.S. wheat aid in any given year is 34.7%, with some countries never receiving any American food aid (e.g., Cuba, South Africa), and others receiving aid every year (e.g., Haiti, Bolivia). Among recipient countries that produce wheat domestically, the quantity of U.S. wheat aid received on average represents more than one-and-a-half times (166%) the level of domestic production.

The identification strategy relies on the fact that the effects of increased U.S. wheat production on the provision of food aid differs across regular and irregular recipients of U.S. aid. Figures 3 and 4 provide an illustration of the differences between regular and irregular aid recipients with respect to the one-year lag of U.S. wheat production. In these graphs, countries are designated as regular recipients if the probability they receive U.S. wheat aid in a given year is equal to or

greater than the median aid probability ($\overline{D}_i \geq 28.6\%$), while irregular recipients have an aid receipt probability below the median probability ($\overline{D}_i < 28.6\%$).

As figure 3 shows, there is a positive and significant relationship between lagged US wheat production and the average annual wheat aid shipments to regular aid recipients. In figure 4, there is no significant relationship between lagged wheat production and the provision of wheat aid. This result lends support to the existing literature on American food aid, which finds that the decision to increase food aid is motivated by the need to dispose of surplus wheat and that the choice of recipient countries is subject to bureaucratic incrementalism.

Banks' Cross National Time Series (CNTS) data archive provides information about each country's political stability. The CNTS has information on the number of riots, anti-government demonstrations, and general strikes that take place each year in each country in the sample. The average number of riots is 0.33, with a standard deviation of 1.36, a minimum of 0 and a maximum of 26. In terms of anti-government demonstrations, the annual average is 0.49, with a standard deviation of 1.47, while the average number of general strikes is 0.125.

For the purposes of this study, the number of general strikes, anti-government demonstrations, and riots are added together to create a single variable, *UNREST*, measuring the level of low-intensity political instability. This measure excludes armed conflicts, as the effects of food aid on the incidence of civil and inter-state wars have already been examined by Nunn and Qian (2012). While demonstrations and riots may take place at the same time as a war is ongoing, they are also common in the absence of any armed conflict.

Additional data on recipient countries' population and gross domestic product is obtained from the World Bank's World Development Indicators database, while information on the level of American economic aid to recipient countries comes from the Organization for Economic Cooperation and Development's (OECD) Development Assistance Committee.

Chapter 5 – Results

5.1 Ordinary Least Squares and Negative Binomial Regressions

Table 3 summarizes the results from the regressions using ordinary least squares to estimate the effect of U.S. wheat aid on the incidence of political instability in the 143 focus countries. With standard errors clustered at the country level, the estimated effect of wheat aid is statistically insignificant for all specifications using different control variables.

Due to the fact that *UNREST* is a count – rather than a continuous – variable, parameter and standard error estimates derived using ordinary least squares may be inconsistent. Accordingly, the regression specifications from table 3 were re-run using a negative binomial model. The negative binomial model is a modification of the negative Poisson model that takes into consideration the fact that the variance of an over-dispersed count variable is greater than its mean.

Table 4 reports the results using the negative binomial model. When controlling only for year and country fixed effects, the estimated effects of food aid are positive but statistically insignificant. When region-year fixed effects are used in place of year fixed effects, there is a positive and statistically significant at the 5% level of confidence. Due to the computational limitations of Stata data analysis software, it was not possible to run negative binomial regressions that controlled for recipient countries' cereal production, net exports, or official development assistance net of food aid.

The results of the regressions using both ordinary least squares and negative binomial models suggest that there is a positive correlation between political unrest and the receipt of food aid. Due to the potential for endogeneity between political unrest and the provision of food aid, however, it is difficult to reach any conclusions regarding the causal effect of food aid on political unrest. The following section will deal with the problem of endogeneity using an instrumental variable approach.

5.2 IV Regressions

The first-stage estimates of the two-stage least squares regressions are shown in panel (b) of table 5. The estimates indicate that there is a strong positive correlation between the level of lagged U.S. wheat production interacted with the time-invariant probability of receiving food aid and the provision of wheat aid. The F-statistics for the first stage range from 9.54 to 20.91, which exceed (or nearly exceed) the rule of thumb of F=10 for a strong instrument proposed by Stock, Wright, and Yogo (2002).

The estimated coefficient in column 5 of panel (b) indicates that a country that received wheat aid from the United States in every year during the sample period, a 1,000 MT increase in U.S. wheat production would result in an increase of 2.11 MT in the provision of wheat aid the following year. For the 143 sample countries, the average time-invariant probability of wheat aid receipt is 35.5%, meaning that a 1,000 MT increase in U.S. wheat production in the previous year would result in a 0.749 MT increase in the amount of U.S. wheat aid received.

The results of the second stage of the two stage least squares regressions are presented in panel (a) of table 5. When controlling for year and country fixed effects, the effect of U.S. wheat aid on political unrest is significant at the 5% level. The effect of U.S. wheat aid remains significant at the 10% level when controlling for region-year fixed effects in column 2, and is again significant at 5% after controlling for recipients' average per-capita cereal production and net exports in column 3.

In column 4, the effect of U.S. wheat aid on the incidence of political unrest is no longer significant after controlling for the average amount of American economic aid (net of food aid) interacted with year fixed effects. This suggests that food aid may not have any impact on the level of political unrest in a recipient country after controlling for the probability that that country is a recipient of other forms of American economic assistance – in other words, other forms of economic aid (with which the provision of food aid is correlated) may have a larger impact on the incidence of instability.

Column 5, which includes a dummy for temporary membership in the United Nations' Security Council, also shows that the effects of wheat aid on recipient countries' political stability is insignificant. Interestingly, the estimated coefficient on the Security Council dummy in the first stage of the regression, which is significant at the 5% level, suggests that a country receives 12,000 fewer metric tonnes of wheat aid from the United States when it holds a temporary seat on the council. This is an unexpected result, given that previous studies have found that Security Council membership leads to an increase in economic aid from permanent members of the Council.

Because the dependent variable used to measure the level of political instability in each country is a count variable, regressions were also run using a two-stage Poisson model proposed by Mullahy (1997). Again, due to computational limitations, it was not possible to run the regressions using all control variables described above. In the first column of table 6, the instrumental variable used to predict the level of food aid received by each country is the one-year lag of U.S. wheat production, rather than the lag of U.S. wheat production interacted with the time-invariant probability of food aid receipt. Accordingly, only country fixed effects were included as control variables, since year fixed effects would absorb all variation in the lagged wheat production. In the second column, the instrumental variable used is the lag of U.S. wheat production interacted with aid probability, with both country and year fixed effects included as controls.

The results from these two-stage Poisson regressions are shown in table 6. The estimated magnitude of the effect of U.S. wheat aid on the incidence of political unrest found using the two-stage Poisson model is smaller than the estimates generated using two-stage least squares regressions, and is statistically insignificant. Since the two-stage Poisson method produces more consistent estimates for instrumented count data, the significant estimates found using linear two-stage least squares regressions in table 5 may be the result of model misspecification and should be interpreted with caution.

5.3 Heterogeneous Effects

In this section, the impact of food aid on the incidence of political unrest is allowed to vary on the basis of recipient countries' level of economic development, the share of the population living in urban areas, the democratic nature of state institutions, and the degree of ethnic fractionalization. For countries with a low real GDP per capita, the receipt of food aid may have a different impact on political unrest than is the case in wealthier countries. Likewise, the impact of food aid may differ in countries where a large share of the population lives in urban areas, as urban residents are net consumers – rather than producers – of food, and are therefore likely to benefit from lower food prices. The consideration of democratic institutions and ethnic fractionalization is motivated by reports that the receipt of food aid may generate political unrest if it is appropriated by unaccountable elites in authoritarian regimes or distributed only to a particular segment of society.

In order to allow for heterogeneous effects, the second stage of the regression equation takes the following form:

$$UNREST_{irt} = \beta_1 F_{irt} + \beta_2 (F_{irt} \times I_{ir}) + \boldsymbol{X}_{irt}\boldsymbol{\Gamma} + \varphi_{rt} + \delta_i + \varepsilon_{irt}$$

where all of the variables are the same as before, with the exception of I_{ir}, which is an indicator variable that takes a value of 1 if a recipient country's characteristic of interest is greater or lower than the median value of that characteristic for the 143 focus countries. For instance, a country is deemed to fall into the highly urbanized category if it's time-invariant urban population share is greater than the sample median value, while a country is classified as belonging to the lowest income category if its time-invariant real per capita GDP falls below the sample median value.

The first stage equation of the regression specification is similarly modified:

$$F_{irt} = \alpha_1 (P_{t-1} \times \overline{D}_{ir} \times I_{ir}) + \alpha_2 (P_{t-1} \times \overline{D}_{ir}) + \boldsymbol{X_{irt}}\boldsymbol{\Gamma} + \varphi_{rt} + \delta_i + \varepsilon_{irt}$$

F_{irt} is instrumented both by the interaction between the lag of U.S. wheat production and the time-invariant likelihood of aid receipt, and by the interaction between those two variables and I_{ir}. In the regression specifications in both stages, the direct effect of I_{ir} is absorbed by the

country fixed effects. $F_{irt} \times I_{ir}$ captures only the differential effects of food aid based on recipient countries' time-invariant characteristics.

To assess the impact of the interaction between the receipt of wheat aid and recipient countries' overall economic development, each country's average (i.e., time-invariant) real GDP per capita is calculated for the period from 1972-2006. The data on real GDP per capita comes from the World Bank's World Development Indicators database, and is reported in constant 2000 U.S. dollars. $I_{ir} = 1$ if a country's average real GDP per capita is less than the median sample value of $1041.07.

With respect to the share of urban population, $I_{ir} = 1$ if the average share of urban residents is greater than the median value of 37.4%. To assess the differential impacts of democratic institutions, $I_{ir} = 1$ if the average polity2 value for a country is greater than 6. The polity2 score comes from the Polity IV database, and ranges from -10 for totalitarian regimes to +10 for established democratic governments. Following Garcia and von Haldenwang (2011), governments with a polity2 score greater than or equal to six are considered to be (reasonably) democratic. The measure of ethnic fractionalization is taken from Fearon and Laitin (2003), with $I_{ir} = 1$ if a country's level of fractionalization is greater than the sample median of 0.566 (where 0 denotes a totally homogenous society where all members belong to the same ethnic group, and 1 a totally heterogeneous society in which no two members belong to the same ethnic group).

The results of the linear two-stage least squares regressions allowing for heterogeneous effects are reported in table 7. All regressions were run using controls for country and region-year fixed effects, as well as controls for average wheat production and net exports interacted with year fixed effects, and average American economic assistance (net of food aid) interacted with year fixed effects.

For most of the regressions, the estimated parameters of both the direct and heterogeneous effects of food aid are statistically insignificant. A notable exception is the estimate in column 2 of table 7 reporting the extent to which the impact of U.S. wheat aid varies for countries with

more than 37.4% of the total population living in urban areas. According to the regression results, the receipt of wheat aid increases the number of riots, demonstrations, and general strikes in countries that are not highly urbanized, with each 1000 MT of wheat aid increasing the count of UNREST by 0.032. The negative effect of food aid on political stability is offset in highly urbanized countries, with the estimated parameter of the interaction term being -0.033.
While both estimates in column 2 are significant at the 5% level of confidence, there is reason to believe that this may simply be the result of a statistical aberration in light of the fact that nearly all of the other estimated parameters in table 7 are insignificant. Furthermore, all of the results reported in the table were produced using two-stage least squares estimates rather than a Poisson model due to computational limitations. As previously noted, the estimates generated using a Poisson model tend to be smaller in magnitude and less statistically significant than those produced using a linear model.

5.4 Effects on Domestic Production, Commercial Imports, and Subsidies

This section examines possible explanations for why U.S. wheat aid does not appear to have a statistically significant effect on the incidence of riots, demonstrations, and general strikes. As noted in the background section, the most likely mechanisms through which food aid (and program food aid in particular) would have an effect on a recipient country's political stability would be through its effects on domestic price levels by increasing the food supply or by inducing the government to provide consumer subsidies.

To examine whether U.S wheat aid had an impact on the supply of food in recipient countries, it is necessary to consider recipients' cereal production and net cereal exports. Column 1 of table 8 shows between the relationship between the predicted level of U.S. wheat aid and recipients' cereal production. While the regression coefficient for the predicted level of American wheat aid is negative, it is not statistically significant, which suggests that American wheat aid has no effect on the level of cereal production in recipient countries. This is in line with the findings of Lavy (1990) and Barrett et al. (1999), and provides evidence to reject the claims made by Ciezdalo (2011), who argues that, in the long run, the provision American food aid sowed the

seeds of the Arab spring by displacing recipient countries' agricultural production and creating unemployment among farm workers.

Column 2 in table 8 assesses the effect of U.S. wheat aid on recipient countries' net exports of cereals. In contrast to the findings of previous studies, which report that the receipt of food aid led displaced commercial imports in the short-run, American wheat aid appears to have no statistically significant impact on commercial imports. If the receipt of food aid does not, in fact, displace commercial imports of food, this may have the effect of increasing the food supply and lowering prices in recipient countries, although the extent to which prices are lowered may not be sufficient to reduce the incidence of political unrest.

While an attempt was made to assess the effect of U.S. wheat aid on consumer subsidies in recipient countries, information on wheat subsidies from the World Bank's agricultural distortions database was only available for only 20 of the 143 non-OECD countries that are the focus of this study. With such a limited number of countries, it was not possible to produce statistically-significant estimate of the amount of wheat aid received by each country.

5.5 Robustness Checks

To test the robustness of the instrumental variable, the first-stage regressions were re-run using data from the World Food Programme's International Food Aid Information System (INTERFAIS). The INTERFAIS data differs from the FAOSTAT data in terms of its coverage: whereas FAOSTAT has food aid data from the 1960s to 2006, INTERFAIS covers the period starting in 1988 and ending in 2010. Another difference between INTERFAIS and FAOSTAT is that the former provides disaggregated data on the quantity of emergency, project, and program food aid shipments, while the latter only has information about total food aid deliveries. INTERFAIS data also distinguishes between direct transfers, triangular transactions, and local purchases.

Table 9 reports the results of regressing U.S. cereal and wheat aid on lagged U.S. wheat production, as well as the interaction of lagged U.S. production and the recipient countries'

time-invariant probability of receiving aid. The quantities of cereal and wheat aid refer to direct deliveries of program and project aid, since these are the types of aid most likely to be affected by the level of U.S. production in the previous year.

As can be seen in columns 1,2, 3 and 4 of table 9, both the one-year lag of U.S. wheat production and the interaction of lagged wheat production with recipients' aid-receipt probability have a statistically significant impact on direct deliveries of U.S. cereal and wheat aid. The reported magnitudes are also similar to those found using the FAOSTAT data. One difference between the results is that the regressions using INTERFAIS data produce F-statistics that fall below the threshold of 10 needed for a strong instrument. Nonetheless, the results included in table 9 provide support for the validity of the instrument proposed by Nunn and Qian (2012).

Returning to regressions using the FAOSTAT data, table 10 reports the results of a falsification exercise in which the instrumental variable is used to predict past food aid rather than future food aid. The purpose of this exercise is to demonstrate that there are no spurious correlations between U.S. wheat production and shipments of wheat aid. Columns 1 and 2 of table 10 report the results when the dependent variable is the quantity of wheat aid shipped one and two years before the production shock, respectively. The results are statistically insignificant, suggesting that there is no relationship between past food aid and the instrumental variable, and provide support for the identification assumption used in the two-stage regressions.

Chapter 6 – Conclusions

This study has found that U.S. food aid – specifically, shipments of U.S. wheat aid – does not have a statistically-significant effect on the number of riots, demonstrations, and general strikes (which are collectively referred to as 'political unrest') in recipient countries. One explanation for this result is that the quantity of food aid delivered to most countries does not lower food prices to the extent necessary to have an effect on the incidence of unrest.

Multiple reasons have been put forward to explain the incidence of political unrest in developing countries, including socio-economic inequality, the growth rate of income, and the level of urbanization. Recent studies have shown that increases in food prices do have a statistically significant impact on the number of riots and demonstrations in low-income countries.
While the effect of food prices on political stability remains a pressing issue, this paper has shown that food aid does not have an impact on the incidence of political unrest. International policymakers seeking a guarantor of political stability in low-income countries should look elsewhere by, for instance, funding agricultural research and development that can increase the level of production and the availability of food in developing countries to the extent necessary to keep prices affordable for poor households.

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APPENDIX

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Average Probability of Receiving U.S. Wheat Aid	4540	0.355	0.313	0	1
U.S. Cereal Aid (1000 MT)	4540	40.4	13.5	0	2484.8
U.S. Wheat Aid (1000 MT)	4540	25.9	11.3	0	1957.8
1-year lag of U.S. wheat production (1000 MT)	4540	59697.1	8567.2	42081.6	75806.3
Recipient Cereal Production (1000 MT)	4540	9163.2	38066.8	0	458395.2
Riots	4410	0.330	1.357	0	26
Demonstrations	4409	0.495	1.470	0	26
General Strikes	4410	0.125	0.490	0	6
Political Unrest	4407	0.951	2.788	0	49

Figure 1: Total World and U.S. Food Aid 1972-2006

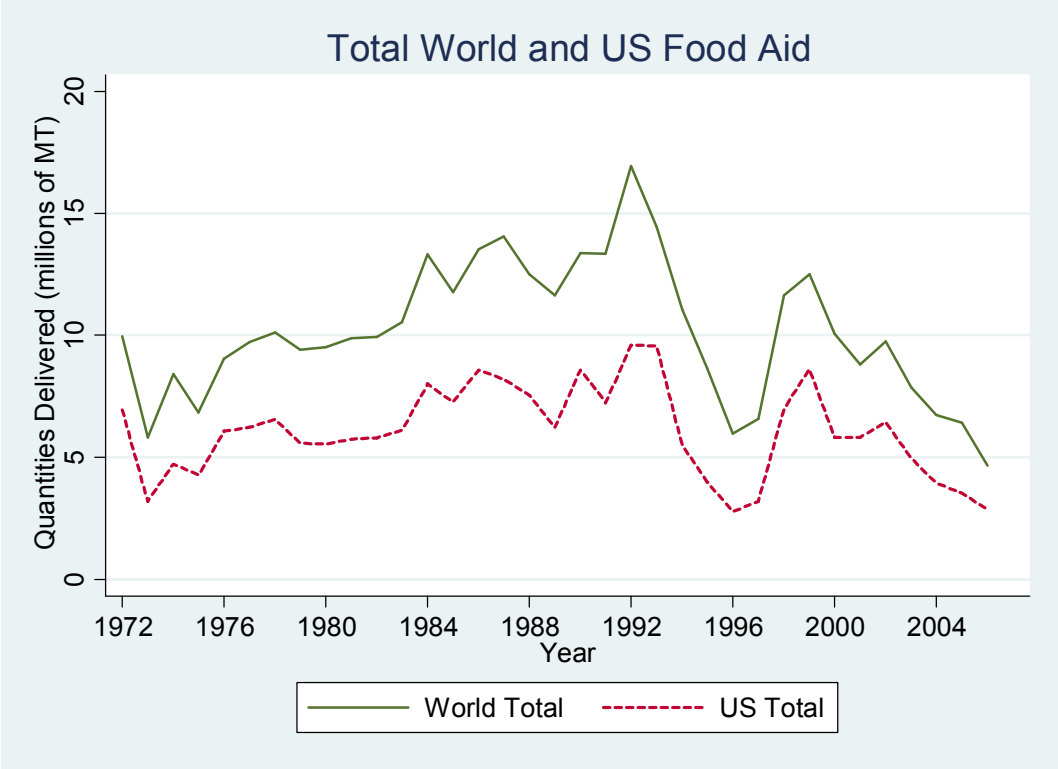


Figure 2: U.S. Food Aid by Product Type 1972-2006

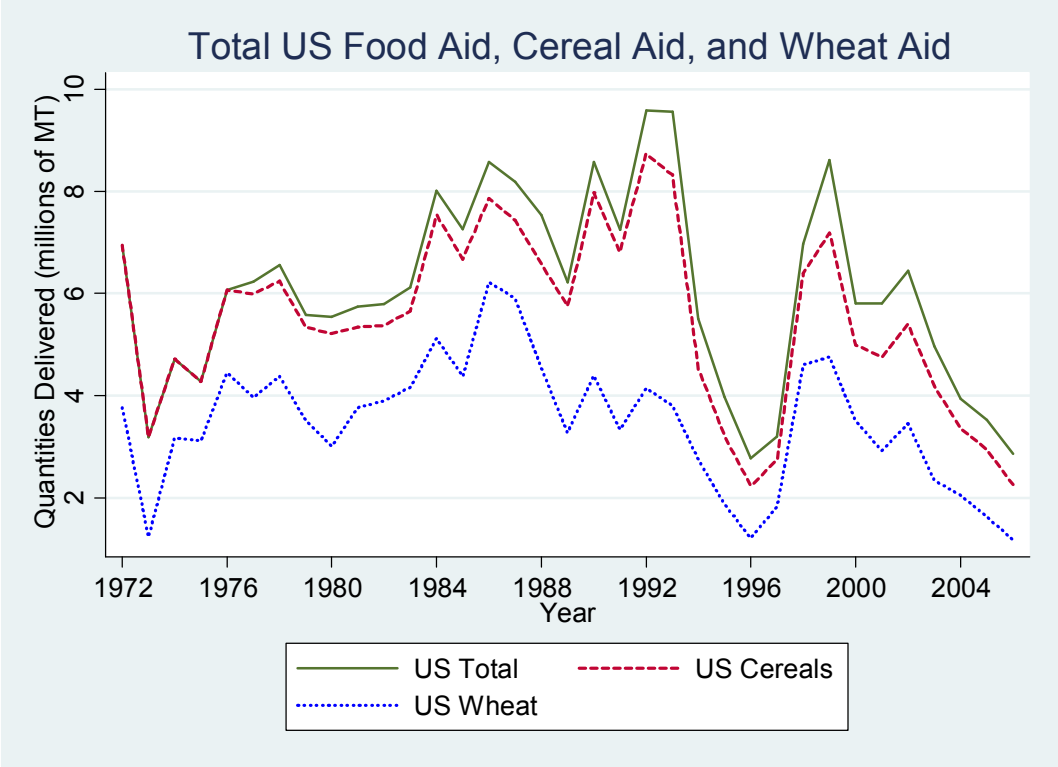
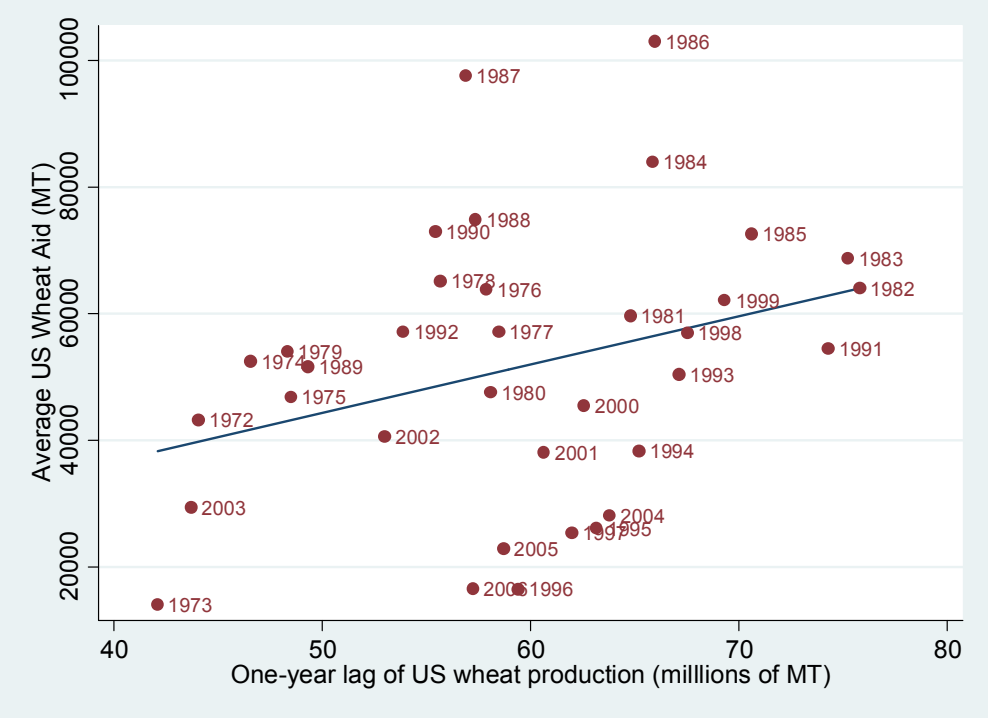
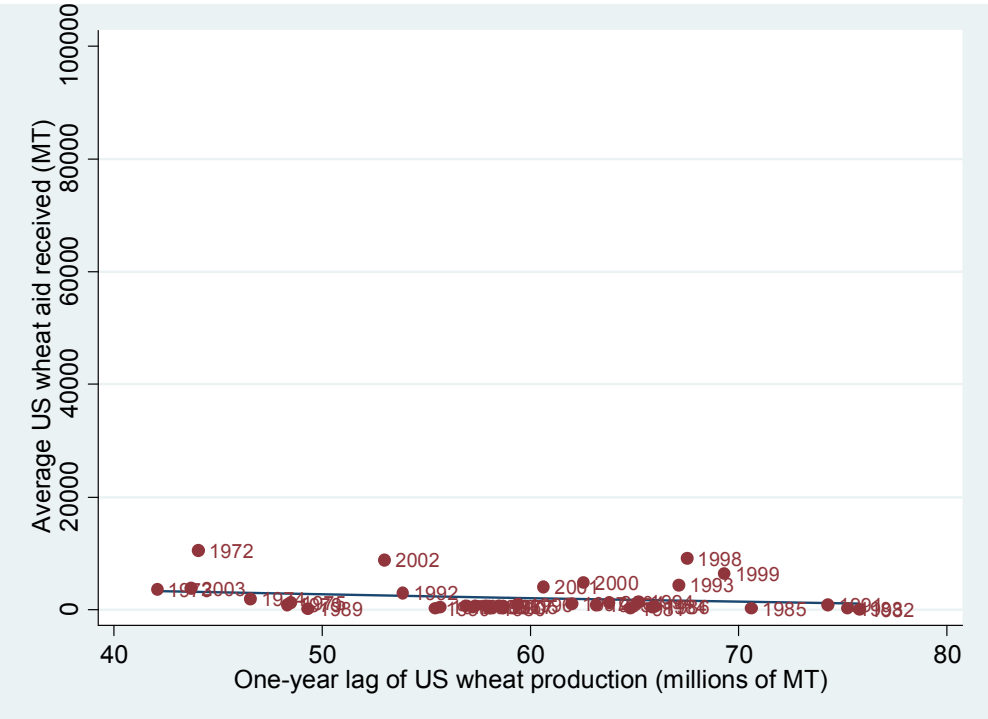


Figure 3: Average U.S. Wheat Aid and Lagged U.S. Wheat Production – Regular Recipients



(Coefficient= 0.0007626, t= 2.83, R-squared=0.0984)

Figure 4: Average U.S. Wheat Aid and Lagged U.S. Wheat Production – Irregular Recipients



(Coefficient= -0.000649, t= -1.11, R-squared=0.0436)

Table 2: The Effect of U.S. Wheat Production on International Wheat Prices

	Dependent Variable
	International Price for U.S. Wheat (2005 constant USD)
U.S. Wheat Production (1000 MT)	-.00205 (.00148)
No. of Observations	35
R-squared	0.0725

(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 3: Ordinary Least Squares Regressions

	Dependent Variable: UNREST				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
U.S. Wheat Aid (1000 MT)	.000988 (.000836)	.000719 (.000776)	.000585 (.000753)	.000585 (.000780)	.000610 (.000794)
Controls					
Country FE	Y	Y	Y	Y	Y
Year FE	Y	N	N	N	N
Region-Year FE	N	Y	Y	Y	Y
Avg. Per Capita Cereal Production Interacted with Year FE	N	N	Y	Y	Y
Avg. Per Capita Cereal Net Exports Interacted with Year FE	N	N	Y	Y	Y
Avg. Per Capita U.S. Economic Aid (Net of Food Aid) Interacted with Year FE	N	N	N	Y	Y
Security Council Dummy	N	N	N	N	Y
No. of Observations	4407	4407	4294	4175	4175

Note: standard errors clustered by country are reported in parentheses.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 4: Negative Binomial Regressions

	Dependent Variable: UNREST	
	(1)	**(2)**
U.S. Wheat Aid (1000 MT)	.000677 (.000439)	.000577** (.000285)
Controls		
Country FE	Y	Y
Year FE	Y	N
Region-Year FE	N	Y
No. of Observations	4407	4407

Note: standard errors clustered by country are reported in parentheses.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 5: Two-Stage Least Squares Regressions

	(1)	(2)	(3)	(4)	(5)
	(a) SECOND STAGE ESTIMATES **Dependent Variable: UNREST**				
U.S. Wheat Aid (1000 MT)	0.0168** (0.00821)	0.0133* (0.00732)	0.0142** (0.00657)	0.00581 (0.00478)	0.00778 (0.00491)
R-squared	0.054	0.214	0.206	0.338	0.316
	(b) FIRST STAGE ESTIMATES **Dependent Variable: U.S. Wheat Aid (1000 MT)**				
Lag U.S. Wheat Production x Avg Prob of Wheat Aid	0.00188*** (0.000484)	0.00204*** (0.000501)	0.00237*** (0.000522)	0.00212*** (0.000534)	0.00211*** (0.000534)
First Stage F-statistic	20.91	12.32	10.27	9.56	9.54
Controls :					
Country FE	Y	Y	Y	Y	Y
Year FE	Y	N	N	N	N
Region-Year FE	N	Y	Y	Y	Y
Avg Per Capita Cereal Imports x Year FE	N	N	Y	Y	Y
Avg Per Capita Cereal Production x Year FE	N	N	Y	Y	Y
Avg Per Capita U.S. Economic Aid (Net of Food Aid) x Year FE	N	N	N	Y	Y
Security Council Dummy	N	N	N	N	Y
No. of Observations	4407	4407	4294	4179	4175

Table 6: Two-stage Poisson Regressions

	Dependent Variable: UNREST	
	(1)	**(2)**
Predicted U.S. Wheat Aid (1000 MT)	0.00690 (0.00952)	0.00704 (0.00530)
Controls		
Country FE	Y	Y
Year FE	N	Y
No. of Observations	4407	4407

Note: standard errors clustered by country are reported in parentheses.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 7: Heterogeneous Effects of Wheat Aid on Political Unrest

	Dependent Variable: Political Unrest			
	(1)	**(2)**	**(3)**	**(4)**
U.S. Wheat Aid (1000 MT)	-0.00258 (0.00494)	0.0319** (0.0143)	(0.00352) (0.00527)	-0.000355 (0.00515)
U.S. Wheat Aid x Indicator for:				
Low Real GDP Per Capita	(0.0267)** (0.0116)			
Highly Urbanized		-0.033** (0.0154)		
Democratic Government			(0.00419) (0.0121)	
High Ethnic Fractionalization				0.0232 (0.0145)
Controls				
Country FE	Y	Y	Y	Y
Region-Year FE	Y	Y	Y	Y
Avg. Cereal Prodution x Year FE	Y	Y	Y	Y
Avg. Cereal Net Exports x Year FE	Y	Y	Y	Y
Avg. U.S. Economic Aid x Year FE	Y	Y	Y	Y
No. of Observations	4179	4179	4179	4179

Note: results for second stage of linear 2sls regressions reported in table.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 8: Effect of U.S. Wheat Aid on Recipient Cereal Production and Net Exports

	(a) SECOND STAGE ESTIMATES **Dependent Variable:**	
	(1)	**(2)**
	Cereal Production (1000 MT)	**Cereal Net Exports (1000 MT)**
U.S. Wheat Aid (1000 MT)	-18.44 (15.86)	-1.487 (2.50)
R-squared	0.959	0.755
	(b) FIRST STAGE ESTIMATES **Dependent Variable: U.S. Wheat Aid (1000 MT)**	
Lag U.S. Wheat Production x Avg Prob of Wheat Aid	0.00203*** (0.000523)	0.00203*** (0.000523)
First Stage F-statistic	9.69	9.69
No. of Observations	4285	4285

Note: regressions include controls for country and region-year fixed effects, and for recipients' average cereal production and net exports, and average U.S. economic aid (net of food aid) interacted with year fixed effects.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 9: Effect of U.S. Wheat Production on Food Aid Deliveries, WFP INTERFAIS Data

	Dependent Variable			
	U.S. Cereal Aid (MT)		**U.S. Wheat Aid (MT)**	
	(1)	**(2)**	**(3)**	**(4)**
1-year lag U.S. Wheat Production	0. 000426** (0.000215)		0.000254* (0.000147)	
1-year lag U.S. Wheat Production x Avg. Wheat Aid Probability		0.00160* (0.0008353)		0.00122** (0.0005729)
R-squared	0.202	0.238	0.231	0.321
F-stat	6.06	4.81	7.22	5.30
No. of Observations	3425	3425	3425	3425
Country FE	Y	Y	Y	Y
Region-Year FE	N	Y	N	Y

Note: OLS estimates are reported. The unit of observation is a country in a year. The sample includes 137 non-OECD countries that received food aid between 1988 and 2010. The regressions only use data from WFP's INTERFAIS system on program and project aid delivered directly to recipients.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.

Table 10: Falsification Test

	Dependent Variable	
	(1)	**(2)**
	U.S. Wheat Aid in t-1	**U.S. Wheat Aid in t-2**
U.S. Wheat Production	0.00121 (0.000744)	-0.000246 (0.000704)
R-squared	0.514	0.524
No. of Observations	4399	4256

Note: regressions include controls for country and year fixed effects.
(*), (**), and(***) denote significance at the 1, 5, and 10% levels of confidence, respectively.