



Food Price Shocks: Macro and Investment Implications

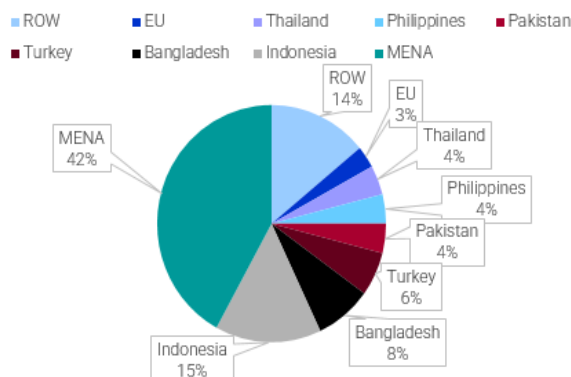
July 2022

Executive Summary

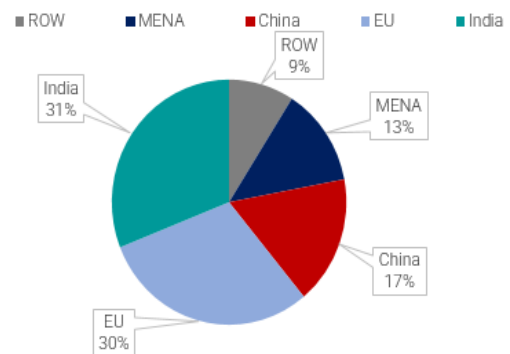
- **Food prices are acutely elevated.** They remain pressured by the conflict in Ukraine and only a gradual recovery in supply chains.
- The disruption of food supplies from the Black Sea basin directly affects countries in the Middle-East & North Africa (MENA) region and we also see adverse impacts across Asia including **India, Indonesia, and even China.**
- Additionally, we are growing concerned about the **long-run consequence of a prolonged food price shock.** Our findings suggest:
 - High and middle-income countries may cope well with inflation pressures dissipating a year after the price shock.
 - **Low-income countries will face persistent pressures,** where headline inflation continues to rise even in the following year after a food price shock.
- **A stronger USD comes as a double-whammy for many low income** and high-yielding (HY) emerging markets (EMs).
- Food and inflation pressures are also driving the highest levels of “**severe food insecurity**” in a decade.
- **Investment Implications:** Until the USD stabilizes or food prices normalize, EM HY issuers face volatile and possibly dwindling access to international credit markets. Relative to US HY issuers, EM HY borrowers are struggling and already “paying up” to retain access to credit markets.

Exhibit 1: Ukraine is a major food supplier to many developing nations

Ukraine Wheat exports



Ukraine sunflower oil exports



Source: Food and Agriculture Organization (FAO), TS Lombard. Data as of July 26, 2022.

It all began when supply chain snarls contributed to the run up in food prices through 2020-2021, and the Ukraine conflict has made things worse. The pandemic resulted in reduced port operations, crews stuck in quarantine, or farm hands not able to show up for the harvest season. All of these slowed deliveries, resulted in a pile-up of grain shipments, and drove food shortages and price increases around the world. Subsequently, the outbreak of the Ukraine conflict has worsened the outlook for specific staples like wheat, maize and sunflower where export markets are dominated by supplies from Russia and Ukraine. Moreover, the protectionist policies of a few countries –undertaken to stanch domestic inflation– have added fuel to the current situation.

In this setting, given what we know about existing agricultural production and trade linkages, inflation vulnerability to spikes in food prices will be greater in countries which are heavily dependent on food shipments from the Black Sea basin disrupted by Russia's invasion.

Overall, the Ukraine conflict now impacts around 32% of the world's bread wheat grain exports. Food shortages can improve if the official Ukrainian estimate of 16 million tonnes of stranded grain inventories were to be unblocked through Black Sea terminals because of any military de-escalation in the coming weeks. The export of these inventories by rail (including northwards through Baltic ports) will only move about 10% of these stocks.

Within the MENA region, a range of countries will suffer acutely as they are dependent on wheat imports from Russia & Ukraine, as well as flour imports from Turkey- which in turn is dependent on Black Sea wheat. From a supply point of view, MENA countries such as Turkey and Egypt are the largest buyers of Russian (and Ukrainian) grain by volume and their economies suffered due to the stranded inventories in Ukrainian ports. Going forward, Russia will continue to give assurances (and use it as leverage) to these customers on continued supply – again for political reasons since neither country has sanctioned Russia and both countries benefit from Russian demand -especially tourism. But countries are also looking to diversify their imports hit due to the war– it seems that the EU – France and Germany, among others – will be the major import substitutes.

It's not just wheat. Maize (or, corn) prices have also risen as Ukraine and Russia are, respectively, the 6th and 10th largest producers of maize accounting for around 18% of total global corn supply. This could adversely impact the needs of the largest corn importers as far afield as Japan, Mexico, Italy, Spain and several other Asian economies.

Several Asian economies such as India, Indonesia and even China will also not go unscathed (Exhibit 1). India is heavily dependent on sunflower oil from the Black Sea region. It may be feasible to substitute some of this with its even larger imports of palm oil from Indonesia. But vulnerabilities will persist as the Indonesians have imposed export restrictions from time to

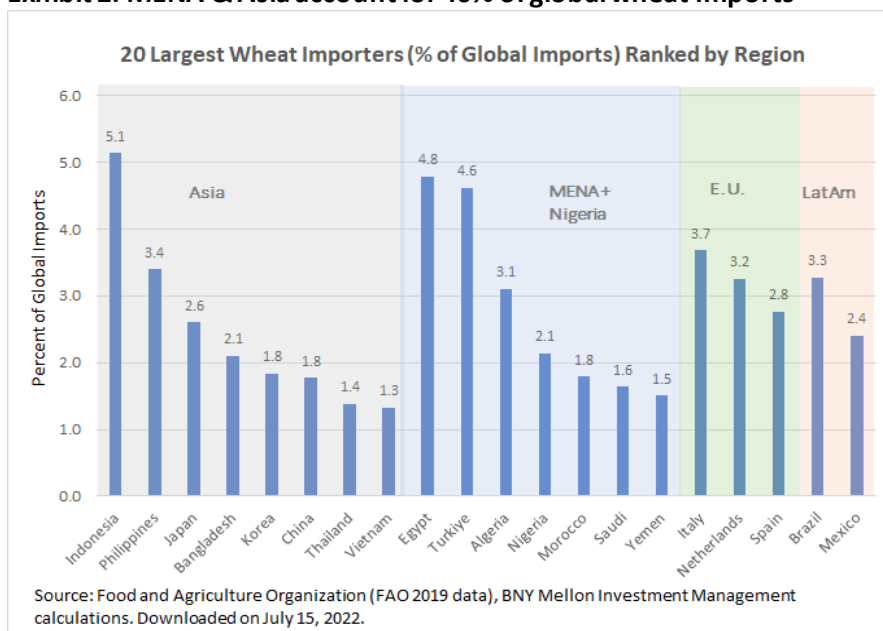
time to maintain their own domestic cooking oil supply. Moreover, the rise in Indonesian palm oil export taxes will in any case contribute to high world prices.

In other countries, even where food prices are not directly driven by ‘Black Sea’ linkages, the general increase in food prices will be aggravated by local extreme weather events – especially the continuation this year of the **severe drought in the Horn of Africa**. Here a food emergency appears increasingly likely.

Additionally, elevated food prices could cause social unrest in countries affected the most. Hunger mobilizes people, triggering riots and ensuing political instability—as seen most recently, during the Arab Spring, but also going back in history, during the French Revolution.

Political considerations may come into play in favor of some countries more than others. For instance, Saudi Arabia is likely to be treated differently. Even if Russia maintains its wheat grain export quotas --imposed earlier this year to contain domestic food price inflation pressures-- exceptions would most likely be made for the Saudis, given that they have invested in agricultural producing assets in Russia and also considering the strong political relationship forged between the two countries in OPEC+ is all the more important to Russia in the present sanctions environment.

Exhibit 2: MENA & Asia account for 40% of global wheat imports



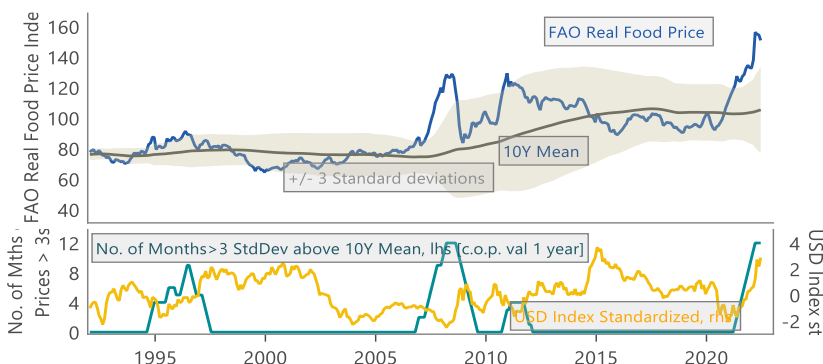
Food Price Shocks and Impact on Inflation

The high cost of food is weighing on global inflation and could be especially harmful for low-income countries. Food costs have risen more than 3 standard-deviations¹ above their long-term (10-year) average for nearly a year now. **This is more acute than, and as prolonged as, the food price shocks in the noughties (2000-2009), just before the global financial crisis.** What is different this time around, however, is that the USD is also at record highs –also around 3 standard-deviations above its long-term average (Exhibit 3).

Exhibit 3: The global food price shock and USD appreciation

Food Price Index, its 10-Year Mean and (+/-3) Standard Deviations

Lower Panel: Number of months of Food Prices > 3 Standard Deviations Vs. Standardized USD Index



Source: Macrobond, BNY Mellon Investment Management, United Nations Food & Agriculture Organization (FAO), Intercontinental Exchange (ICE)
Data as of 7/21/2022

The immediate impact of a food price shock on headline inflation is important to understand. By utilizing the World Bank’s monthly inflation indices (going back to 1993) by income-groups, we estimate that a one-standard deviation shift in food prices drives a 35 basis points (bp) change in headline inflation at “high-income” countries, just over 1% of additional inflation at “middle income” countries and as much as 2.7% of additional inflation at “low income” countries.

So, looking past the immediate impacts of production and export shocks emanating from the Black Sea basin, we remain more concerned about the medium-term implications (through

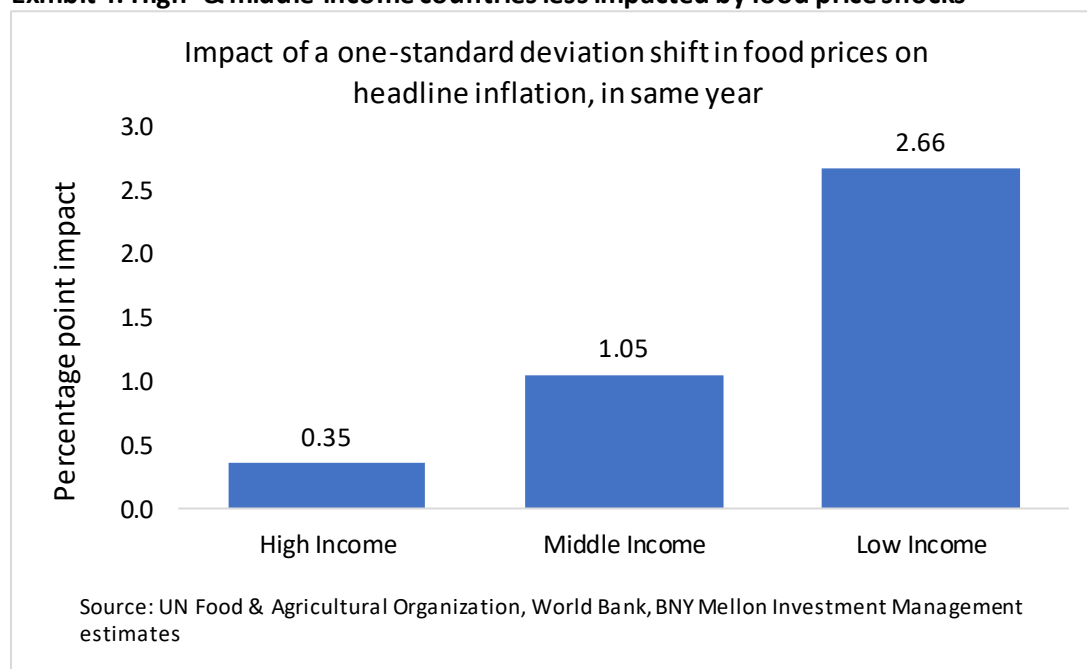
¹ **Standard deviation** is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance.

2023) of higher food prices, in particular, for countries classified as “low income” by the World Bank.

We find that “high-income” and even “middle-income” countries can cope with higher food prices. These economies can fend off the initial impact of the cost-push pressure from food, in any given year, such that the headline inflation rate is lower in the subsequent year. Using a simple regression model, we find a (statistically significant) negative relationship between a food price shock at time “t” and the change in the inflation rate, for high- and middle-income countries, in the subsequent, “t+12” months period (Exhibit 5). In other words, inflation reverts to a lower/normal rate despite facing a food price shock in a prior period.

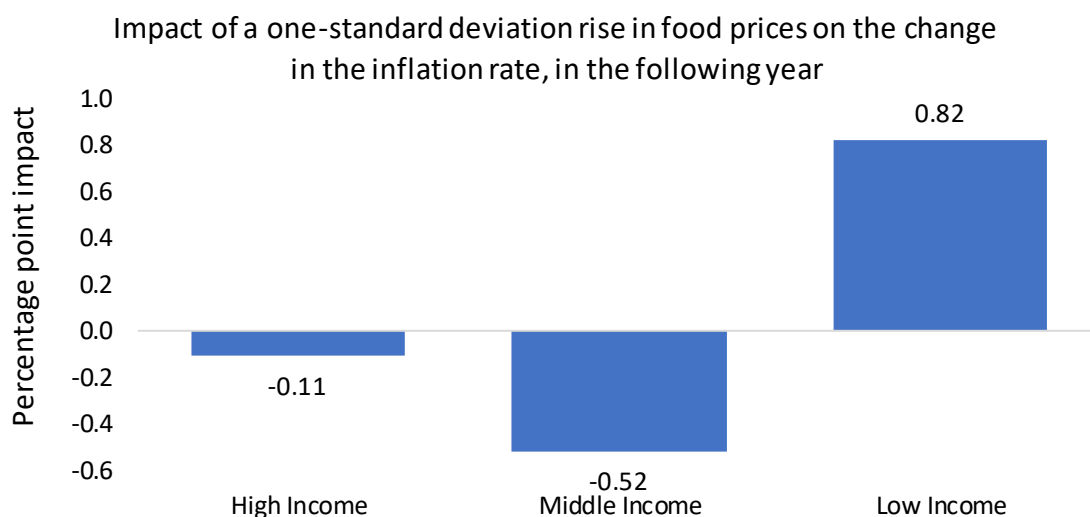
But this is not the case for “low income” countries. After encountering a food price shock in a given year, which raises inflation much more than at their higher-income peers, poorer countries tend to experience a further increase in the rate of inflation in the subsequent year. In contrast to the experience of high- and middle-income countries, we find a (statistically significant) positive relationship between a food price shock at time “t” and the change in the inflation rate of low-income nations in the subsequent “t+12” months time period. **Put simply, lower-income countries’ inflation does not fall back in the second year after facing a food price shock –it tends to keep on rising** (see the technical appendix for more detail).

Exhibit 4: High- & middle-income countries less impacted by food price shocks



Latest data utilized, as of July 21, 2022.

Exhibit 5: Low-income countries' inflation is persistent even a year following a food price shock



Source: UN Food & Agricultural Organization, World Bank, BNY Mellon Investment Management estimates

Latest data utilized as of July 21, 2022.

What all this implies is that high- and middle-income countries are able to reverse one-third to one-half of the initial impact of higher food prices by the subsequent year. However, inflation keeps on rising in poorer countries.

There are a variety of reasons why wealthier countries cope relatively better with high food prices in comparison with their low-income counterparts:

- High-income countries tend to have low weights for food in their consumer price baskets, cost of living adjustments to wages temporarily push up prices but they also ease in the following year as food shocks abate. More broadly, stronger and more credible monetary institutions alongside higher disposable incomes and a lower weight for food, in the consumption basket, ensure that the adverse impacts of food price shocks are temporary and do not alter the long-term course of wages and prices.
- Middle-income countries tend to more actively deploy domestic price controls, restrictive exports as well as food stock buffers to manage through food price shocks. These countries are also likely to have sizable informal sectors where the bargaining power for higher wages is limited, in comparison with more advanced countries. Many middle-income countries also have inflation targeting regimes and lower weights for food—at least in comparison with low-income countries.

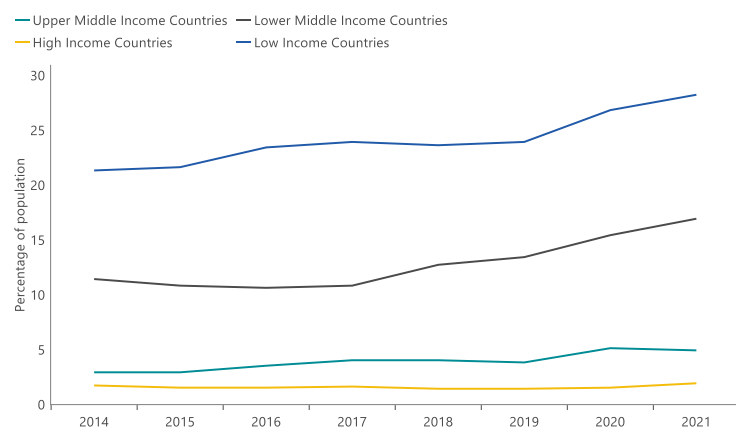
- Low-income countries tend to have narrower economic bases, much more reliant on food imports, and very high weights for food in their consumer price indices. Even though labor market informality may be quite high (and labor-wage bargaining power nearly non-existent), relatively weak government institutions and the lack of credible policy anchors may be key reasons for poor inflation management and heightened medium-term susceptibility to food price shocks. Many lower income countries are also likely to be more vulnerable to natural disasters and climate change, with thin social safety nets or policy buffers.

The challenges confronting low-income and frontier markets --especially countries heavily reliant on Ukrainian or Russian food supplies-- look worse coupled with a rising USD. Tighter USD liquidity implies rising borrowing costs and widening credit spreads.

It is not a surprise then that “severe food insecurity” is on the rise at many low-income and even at lower-middle-income countries. This is a situation when people have to cut back on food consumption, for several days in a month.

Exhibit 6: Rising food insecurity, at lower-income countries...

Percentage of population facing severe food insecurity



Source: Macrobond, BNY Mellon Investment Management, United Nations Food & Agriculture Organization (FAO)
Data as of 7/14/2022

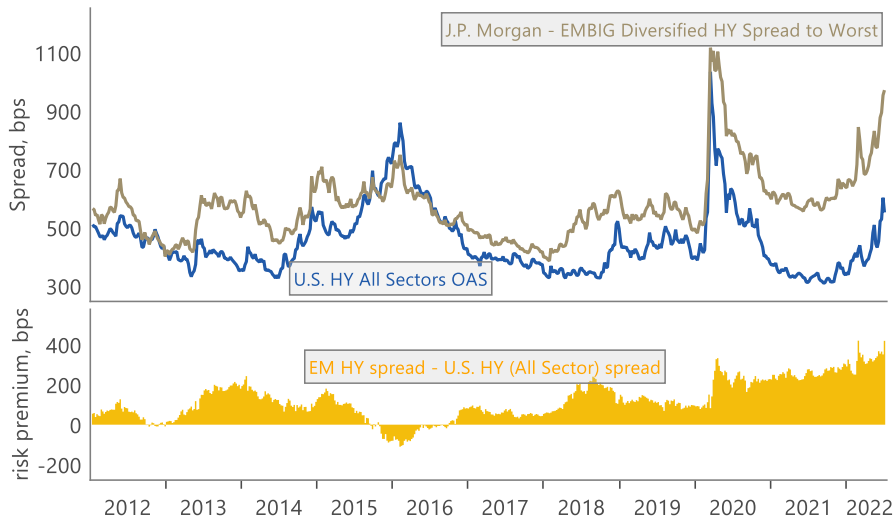
Investment Implications

Needless to say, this has investment implications. The credit spreads of a range of food importing countries in the MENA region facing Black Sea basin shortages or low- and lower-middle income (and, usually single-B rated) countries more broadly are likely to be buffeted by rising food-driven inflation.

As things stand, EM HY issuers' risk premium is at second highest in 13 years with spread widening most acute in MENA high-yielders. Until the USD stabilizes, EM HY issuers face volatile and possibly dwindling access to international credit markets. Relative to US HY issuers, similarly-rated EM HY borrowers are already "paying up" to retain access to credit markets. We fear that a lagged increase in inflation rates at poorer countries could raise political pressure and add to EM HY issuers' credit woes.

Exhibit 7: Emerging Market HY risk premium over U.S. HY steadily widening

Emerging Market Sovereign High-Yield Vs. U.S. High-Yield (All Sector)



Source: Macrobond, BNY Mellon Investment Management, Bloomberg
Data as of 7/15/2022

Exhibit 8: Low- and Lower-Middle Income Countries which are also High-Yield EMs

Low or Lower-Middle Income (Per Capita Income < \$4,255) & High Yield			
Sub-Saharan Africa	LatAm	Asia	MENA
Angola (B3/B-)	Bolivia (B2/B+)	Mongolia (B3/B)	Egypt (B2/B)
Cote D'Ivoire (Ba3/BB-)	El Salvador (Caa3/CCC+)	Pakistan (B3/B-)	Lebanon (C/SD)
Cameroon (B2/B-)	Honduras (B1/BB-)	Papua New Guinea (B2/B-)	Morocco (Ba1/BB+)
Ethiopia (Caa2/CCC)		Sri Lanka (Ca/SD)	Tunisia (Caa1/CCC)
Gabon (Caa1/B-)		Tajikistan (B3/B-)	
Ghana (Caa1/B-)		Vietnam (Ba3/BB+)	
Kenya (B2/B)			
Mozambique (Caa2/CCC+)			
Nigeria (B2/B-)			
Senegal (Ba3/B+)			
Zambia (Ca/SD)			

Low or Lower-Middle Income (Per Capita Income < \$4,255) & Investment Grade			
Sub-Saharan Africa	LatAm	Asia	MENA
		India (Baa3/BBB-)	
		Indonesia (Baa2/BBB)	
		Philippines (Baa2/BBB+)	

Upper Middle-Income (Per Capita Income between \$4,256 & \$13,205) & High-Yield			
Sub-Saharan Africa	LatAm	Asia	MENA
Namibia B1/BB-)	Argentina (Ca/CCC+)		Iraq (Caa1/B-)
South Africa (Ba2/BB-)	Belize (Caa3/B-)		Jordan (B1/B+)
	Brazil (Ba2/BB-)		Turkey (B2/B+)
	Costa Rica (B2/B)		
	Dominican Republic (Ba3/BB-)		
	Ecuador (Caa3/B-)		
	Guatemala (Ba1/BB-)		
	Jamaica (B2/B+)		
	Paraguay (Ba1/BB)		
	Venezuela (C/NR)		

Source: Bloomberg, BNY Mellon Investment Management. Data as of July 15, 2022
Latest sovereign ratings from Moodys/S&P are in parentheses

Technical Appendix

We obtained monthly data, going back to 1993, on food prices from the United Nation's Food and Agriculture Organization (FAO) and headline inflation indices from the World Bank. Specifically, the headline inflation index was for three groups of countries: high-, middle- and low-income countries (per World Bank classification). We then estimated the following regressions to assess the initial and lagged impact of a food price shock on inflation:

$$1. \pi_{i,t} = \alpha_{i,t} + \beta(\delta_t) + \varepsilon_{i,t}$$

and

$$2. (\pi_{i,t} - \pi_{i,t-12}) = \alpha_{i,t} + \beta(\delta_{t-12}) + \varepsilon_{i,t}$$

Where, π =inflation, δ =food price shock (10Y standard deviation of the FAO's food price index), i =country income-group (high-, middle- or low-income), t = current time period, and $t-12$ =twelve months prior.

The first equation estimates the size and direction of the initial (same-year) impact on headline inflation, across the three income-groups, of a one-standard deviation shift in food prices. The regression results showed positive coefficients of 0.34, 1.0 and 2.7 implying food price shocks raise headline inflation. The results were also statistically significant with r-squares ranging from 0.13 to 0.27.

The second equation estimates the size and direction of the 12-month change in the inflation rate following a food price shock in the twelve-month prior period. The regression results showed negative coefficients (-0.11, and -0.52 respectively) for high- and middle-income groups --implying inflation eases in the year following a food price shock. But it was positive (+0.82) for the low-income group --implying inflation keeps rising even a year after a food price shock has occurred. **All coefficients were statistically significant.** But the r-squared was negligible --which is to be expected as this equation does not contain explanatory power rather it seeks to test the strength of the relationship between a food price shock and the inflation response a year later.

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