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How Will the Food Price Shock Affect Inflation in Latin America and the Caribbean?

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Executive Summary[1]

There is widespread concern that recent increases in international food prices may have significant effects on domestic food prices and inflation. This note assesses the impact of the recent food price shock on food, non-food and consumer inflation in the countries of Latin American and the Caribbean (LAC). Vector Autoregressive Regressions (VARs) are estimated for each country to trace the effect of international food prices, the price of oil and the value of the US dollar on domestic prices. The results are then used to calculate the potential impact of higher food prices and to project the expected rise in domestic prices to the end of 2011 and beyond, given the actual increase in food prices until February 2011. It is concluded that, due to the food price surge, increases in inflation could exceed 5 percentage points in Bolivia, Dominican Republic, Guatemala and Honduras unless additional policy actions are taken. In some countries with flexible exchange rate systems, such as Brazil, Colombia and Mexico, currencies tend to appreciate as a response to higher food prices and as a result the impact on domestic prices is muted. However, there is no simple pattern of differences between floaters and fixers; the speed and extent of pass-through is quite heterogeneous and dependent on factors such as the importance of food in the overall inflation index and local policy measures.

JEL classifications: E37, F41, F47
Keywords: Food prices, Food price shock, Commodities, Inflation, Inflation targeting, Exchange rates, Latin America

[1] The authors are members of the Research Department of the Inter-American Development Bank. This document reflects the opinion of the authors only and not that of the IDB.

1. Introduction

International food prices reached all-time records in January and February 2011, surpassing the previous 2008 peak, according to both the IMF and the UN's Food and Agricultural Organization (see Figure 1).[2] The steepest increases in prices have been observed in sugar, wheat and corn (maize).

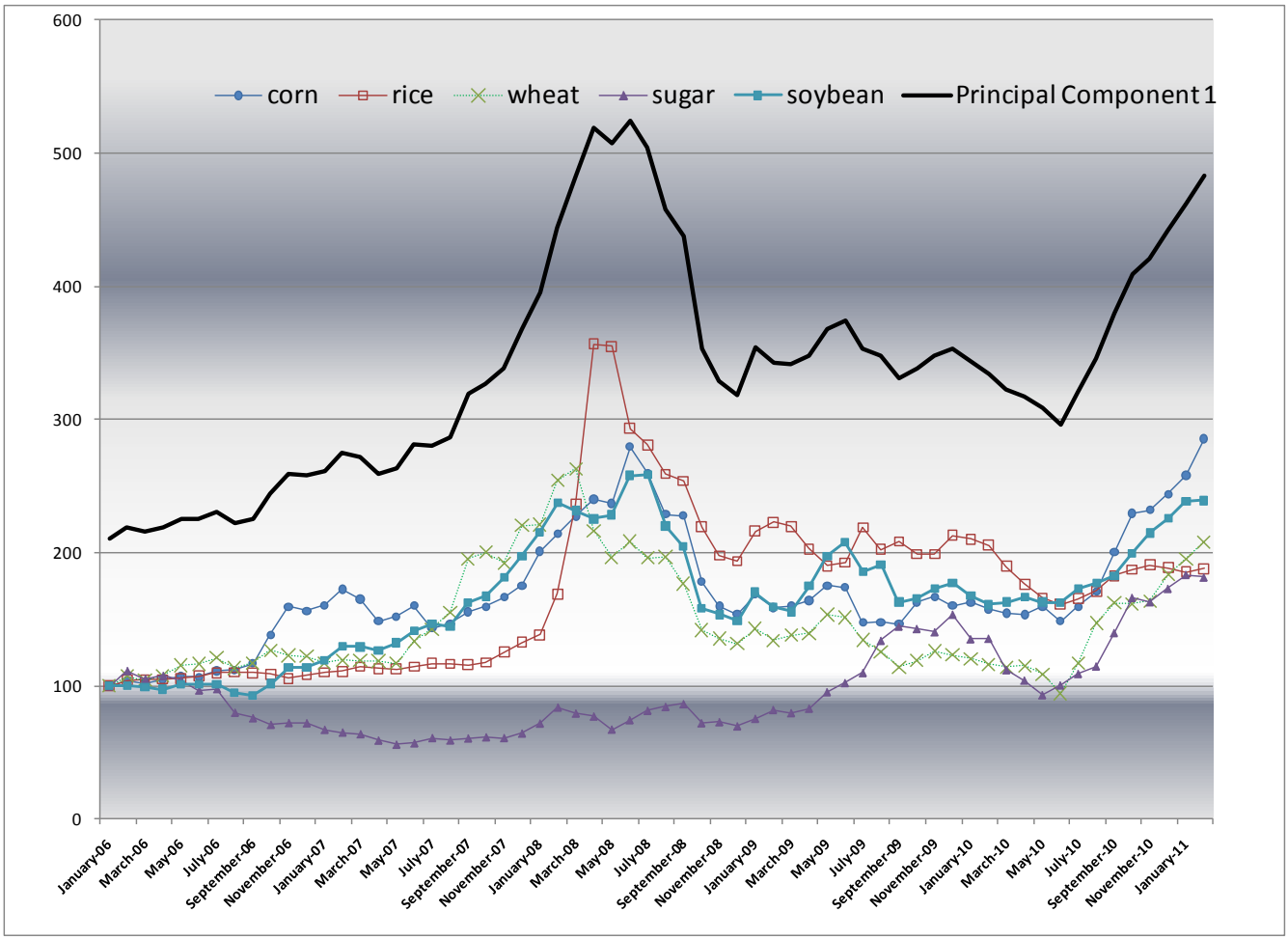
The causes of these price surges are the subject of intense debate, but there is general agreement that they are a result of a combination of medium-term demand increases, slower agriculture productivity growth, and short term supply disruptions. While demand growth has been low among industrialized countries in the wake of the international financial crisis, there has been high demand from the largest emerging markets (the BRICs), which tend to be more commodity intensive in their domestic demand. Among the BRICs China has been growing very strongly and its pattern of demand has been changing. As the purchasing power of China's middle class rises, food demand not only rises, but shifts towards foods such as meat that require more agricultural inputs to produce the same amount of calories for human intake.

In the medium term, worldwide agricultural productivity has not kept up with increasing demand. According to the IMF "over the past decade, global productivity growth—as measured by the amount of crop produced per hectare—has fallen for rice and wheat compared with the 1980s and 1990s and has been broadly stagnant for corn and soybeans."[3]

[2] In February, the IMF food series was 5 percent above its peak of June 2008, whereas the FAO's index was some 6 percent above its peak of June 2008; this difference may stem from the fact that the FAO series places a higher weight on sugar, which has risen more than other commodities. In March food prices fell 3 percent, largely due to the Japanese earthquake, but have subsequently recovered.

[3] Thomas Helbling and Shaun Roache, "Rising Prices on the Menu: Higher Food Prices May be Here to Stay," *Finance and Development*, March 2011, International Monetary Fund, Washington, DC, page 25.

Figure 1. Food Price Indices and Their Principal Component



Source: IMF Primary Commodity Price tables, Actual Price Series:
http://www.imf.org/external/np/res/commod/index.asp

These medium-term trends have been exacerbated by a series of shorter-term events. The increasing use of corn (maize) to produce ethanol in the United States has put extra pressure on demand: in 2010, the production of corn-based ethanol absorbed nearly 35 percent of the US crop, or about 15 percent of the global corn crop. On the supply side, the higher frequency of extreme climatic events (from droughts in Australia, Argentina and Russia, to floods in the staple producing areas of the US) is to blame for the crop failures that contributed to the price surges of both 2007-8 and 2010-11. These shorter-term supply disruptions have created major price pressures because inventories of most foodstuffs are already low, in part due to higher demand. As in the 2008 peak, recent price rises have been greater due to an inadequate and uncoordinated

policy response across countries. Export bans, price controls and attempts to increase inventories in some countries tend to further aggravate this situation.

It has also been argued that prices have been driven higher due to speculation or the "financialization" of commodities. There is no systematic evidence that speculators, who may take long or short positions (typically with short time horizons), have had any effect on the level of prices. Moreover, there is no systematic evidence that the volatility of prices is unusually high given the low level of inventories and the supply shocks that have occurred. There is some evidence that "financialization" (the rise of commodities as a new investment asset class and the growth in commodity funds that tend to take long positions with medium to long time horizons) may have had an impact on prices, but the effects on price levels have not been found to be large. It is hard to see how there could have been a significant impact on the price level independently of fundamentals when stocks have fallen. If commodity funds and speculators had bid up prices away from fundamentals, this would have the effect of reducing demand and increasing supply, and this would then be visible in rising stocks rather than falling stocks, the latter apparently the case for virtually all commodities.

The presence of commodity funds may have other effects on commodity markets. For example, it should be noted that a fund buying a long position, typically in an index, will be offset by the provider of the index hedging its exposure by taking long positions in futures markets. In commodity futures markets there is generally more demand for short positions than long, as producers tend to have more concentrated risks than consumers; the presence of funds taking long positions may therefore reduce the risk premiums that producers need to pay in order to hedge. This may in turn actually stimulate production, as producers may hedge price risk at lower cost. There is also some evidence that commodities that form part of the index that commodity funds tend to buy have higher correlations, so it is possible that shocks that hit one market are transmitted more rapidly to other markets due to the presence of common investors.

Finally, the low price of the US dollar and low US interest rates, as well as the fear of rising inflation in the months or years to come, may also have had an impact on commodity prices. However, the impact of these factors is surely stronger on gold and metals and is the

weakest for non-durable food commodities. As with speculation, it is difficult to construct a convincing argument that the food price peak can be attributable to these factors.

Against this backdrop, the purpose of this policy note is to assess the potential impact of the recent food price surge on inflation in the Latin American and Caribbean countries (LAC). The analysis is mainly focused on the effects through the end of 2011, although we also calculate the effects beyond this cutoff and roughly to the middle of 2012. Although the subject of this note is international *food* prices, we apply the methodology to assess as well the effects of higher oil prices on the same domestic variables (exchange rates, food, non-food and total consumer prices). As oil prices have also risen significantly, and many have argued that oil and food prices are closely connected, it may be advisable to include oil in the analysis.

The countries in the LAC region are diverse in several dimensions, warranting a country-by-country analysis. First, they differ according to degree of exchange rate flexibility, which may provide a cushion to reduce the impact of external food prices on domestic prices. Second, some of the countries with exchange rate flexibility have adopted specific inflation targets. In the presence of a food price shock, the monetary authorities using this framework will likely respond with an increase in the interest rate in order to counteract the impact on the CPI and prevent an increase in inflation expectations. This will in turn induce exchange rate appreciation, which may also be induced by the stronger position of both the current and the capital account if the country is a net food exporter, as is the case of some of the inflation targeters of the region (e.g., Brazil and Uruguay). For this reason, the net food trade balance is a third dimension that might influence the response of exchange rate and the CPI to the external food price shocks. Finally, the weight of international foods in domestic food consumption, the total weight of foods in the CPI and the total weight of all tradable goods in the CPI may affect the results. Obviously, if foodstuffs have a large weight in the CPI, external food price shocks will have a larger impact, other things being equal. However, as long as the exchange rate appreciates when external food prices increase, the weight of all tradables (including food) in the CPI basket will also be important, by cushioning the direct impact.

Table 1 presents information on the various dimensions discussed here for a set of countries in the region. The choice of countries is determined by how well the methodology

described below adapts to the data available. Countries lacking data and countries for which the model did not produce statistically reliable results were excluded. Still, as can be seen there is considerable heterogeneity in the set of countries included in the analysis.

The rest of this policy note is organized as follows. The methodology is described in a non-technical way in the following section. Section 3 presents the estimated elasticities of response to food price increases of exchange rates, food, non-food and total prices. Section 4 summarizes the projections for these same variables for 2011 and beyond. Section 5 assesses the impact of the oil price shocks. The note concludes with a discussion of policy options and their usefulness in responding to the current food price shock.

Table 1. Country's characteristics that may affect the transmission of international food prices to domestic inflation

	Exchange rate regime	Monetary policy framework	Food commodities trade balance / GDP	Food weight in the CPI (%)	Weight in the CPI of the food commodities and products (%)
Bahamas	Other Fixed Peg Arrangement	Exchange Rate Anchor	n.a.	14	n.a.
Bolivia	Crawling Peg	Exchange Rate Anchor	n.a.	49	9
Brazil	Independently Floating	Inflation Targeting	1.10	21	9
Colombia	Managed Floating [1]	Inflation Targeting	-0.31	29	5
Dominican Republic	Managed Floating [1]	Other	n.a.	50	n.a.
Ecuador	Dollarized	Exchange Rate Anchor	-0.40	32	6
El Salvador	Dollarized	Exchange Rate Anchor	-0.58	34	13
Guatemala	Managed Floating [1]	Inflation Targeting	0.58	39	9
Honduras	Other Fixed Peg Arrangement	Exchange Rate Anchor	-1.15	39	8
Mexico	Independently Floating	Inflation Targeting	-0.38	23	3
Panama	Dollarized	Exchange Rate Anchor	-0.44	32	6
Peru	Managed Floating [1]	Inflation Targeting	-0.56	50	12
Uruguay	Managed Floating [1]	Inflation Targeting	2.30	28	5

n.a.: not available.

1 With no pre-determined path for the Exchange Rate

Source: IMF De Facto Classification of Exchange Rate Regimes and Monetary Policy Frameworks Feb 2009, INTRADE- IDB and WEO IMF

2. The Methodology

External price shocks are transmitted gradually and through several channels into domestic price increases. We employ data from January 2006 to August 2010 to estimate the responses of our variables of interest to international food price shocks. This period includes a phase of relative tranquility, followed by the price surge of 2007-8, the subsequent fall in prices and the current price surge that started in mid 2010. Since the period is highly varied, it provides a good basis for our estimates.

Our first step is to construct a summary of "international food prices." The IMF and the FAO compute indices of international food prices using fixed weights (that reflect different measures of the relative importance of the goods), but an issue in using the above indices is that the measures of relative importance used to weight the index (value in world trade or global consumption) may not be the right weights for our purpose, which is to consider the impact of international prices on a set of specific countries. One way would have been to have constructed a country-specific index for each country using import weights. However, commodities are imported in various forms and so even constructing that index is problematic. We therefore decided to follow an alternative route, which is to extract the common movements in a set of food commodity prices. To do this we use a Principal Component (PC) technique, and we employ in what follows only the first PC. The first PC explains some 64 percent of the variation in the five commodity prices that we use (sugar, corn, wheat, soya and rice) and the weights extracted indicate that it reflects more the movement in grains and in rice than in sugar. Figure 1 presents the evolution of prices of the five commodities and the PC.[4]

The second step of the analysis is to assess the reactions of the domestic variables to the price changes. In essence, the objective is to estimate country by country to what extent, each of the months following an increase in our international food price measure, that increase is reflected in the three following domestic variables of interest: the exchange rate, the food CPI and the non-food CPI. In this analysis we take into consideration the possibility that international

[4] We also considered the second component of the five commodity prices, which weights sugar more heavily. In our subsequent VAR modeling, however, we found that this second component was generally not significant in the regressions.

food prices affect these three variables both directly and indirectly (since, for instance, an increase in domestic food prices may affect non-food prices due to demand effects, wage increases, or other reasons that need not be specified). Notice that total CPI is not included in the list of variables above, since the CPI is just a weighted average of its food and non-food components. The technique of choice for undertaking this analysis is vector autoregression (VAR), a type of econometric model used to capture the evolution of and the interdependencies among multiple time series. The evolution of each variable included in a VAR is explained by its own lags and the lags of all the other variables. This is a simple, theory-free method of estimating economic relationships while imposing almost no structure on them. The only restriction that is necessary in our case is that external variables are not influenced by domestic variables.[5]

The third and final step consists of using the response estimates obtained in the previous step to "project" the evolution of the domestic variables in the months ahead, given the recent price surge. This step is more complicated than it sounds because the price surge is not a single event that took place at a definite moment, but rather a series of shocks that have accumulated over several months. Therefore, in order to make the "projections" it is necessary to take into account what part of each monthly shock is already absorbed by the domestic variables as of February, 2011, from where the "projections" start. Our use of quotation marks around the word "projection" has the purpose of highlighting that we are not making a projection in the usual way of predicting the future. Our "projections" are rather the *additional* effects of the domestic variables of the international food price surges observed until February 2011, assuming that *international prices stay* at that level for the remaining of 2011 and that the domestic policy and domestic market *responses in each country are the same as observed in the past*, especially after the price surges of 2007-8.

[5] We also performed the usual stationary tests, which led us to exclude some countries.

3. A Summary of the Typical Responses of Domestic Variables to Food Price Shocks

In order to provide an initial overview, we present estimates of the total CPI response (although, as mentioned, the CPI response is not estimated directly but computed from the estimates of the food and non-food CPI components). Table 2 shows that, within six months of an international food price shock, in four countries (Bolivia, the Dominican Republic, El Salvador and Guatemala) the domestic CPI will increase by more than 10 percent of the increase in international prices, and between 5 and 10 percent in a further six countries (Bahamas, Colombia, Ecuador, Honduras, Panama and Peru). The smallest impacts will take place in Brazil and Mexico. CPI increases continue in some countries until the eighteenth month following the shock. The total CPI response may then reach more than 20 percent of the international food price shock in the Dominican Republic and Guatemala.

Table 2. Elasticities of response of CPI, exchange rates, food and non-food prices to international food prices

	Elasticity of total CPI to international food prices		Elasticity of nominal exchange rate to international food prices		Elasticity of domestic food prices to international food prices		Elasticity of domestic non-food prices to international food prices	
	6 months after the shock	Full response	6 months after the shock	Full response	6 months after the shock	Full response	6 months after the shock	Full response
Bahamas	0.06	0.13			0.07 *	0.29	0.05 *	0.11
					(0.04)	(0.18)	(0.02)	(0.07)
Bolivia	0.12	0.17			0.23 *	0.34 *	0.01	0.00
					(0.10)	(0.18)	(0.02)	(0.03)
Brazil	0.02	0.02	-0.41	-0.50 [1]	0.09 *	0.11 *	0.00	0.00
			(0.29)	(0.39)	(0.04)	(0.06)	(0.01)	(0.01)
Colombia	0.05	0.04	-0.49 *	-0.55 *	0.11 *	0.09 [1]	0.02 *	0.02
			(0.24)	(0.33)	(0.06)	(0.08)	(0.02)	(0.02)
Dominican Rep.	0.14	0.20			0.10 *	0.18	0.17 *	0.22
					(0.07)	(0.11)	(0.10)	(0.14)
Ecuador	0.06	0.07			0.20 *	0.25	-0.01	-0.01
					(0.10)	(0.16)	(0.02)	(0.03)
El Salvador	0.11	0.14			0.24 *	0.29 *	0.04 *	0.06
					(0.09)	(0.13)	(0.03)	(0.04)
Guatemala	0.12	0.20	-0.13 *	-0.23 *	0.18 *	0.25 *	0.08 *	0.16 *
			(0.05)	(0.11)	(0.06)	(0.11)	(0.03)	(0.08)
Honduras	0.08	0.15			0.18 *	0.33 *	0.02	0.04
					(0.10)	(0.19)	(0.02)	(0.03)
Mexico	-0.01	0.00	-0.47 *	-0.60 *	0.01	0.01	-0.01	0.00
			(0.22)	(0.31)	(0.04)	(0.05)	(0.02)	(0.02)
Panama	0.09	0.13			0.09 *	0.15 *	0.09 *	0.12 *
					(0.05)	(0.09)	(0.04)	(0.06)
Peru	0.05	0.10	-0.19 *	-0.11	0.09 *	0.17 *	0.00	0.03
			(0.08)	(0.11)	(0.04)	(0.09)	(0.02)	(0.03)
Uruguay	0.04	0.05	-0.03	0.08	0.13 *	0.18	0.00	-0.01
			(0.03)	(0.05)	(0.08)	(0.11)	(0.03)	(0.05)

Notes: full responses assume that full convergence is achieved 19 months after the shock, standard errors of the coefficients are in parentheses

* Statistically different from zero at the 90% level

1 Other forecast periods are statistically significant.

Transmission from international to domestic prices depends on the reaction of exchange rates. Inflation targeters tend to have flexible exchange rates, which may appreciate and thus dampen increases in domestic prices. This is indeed observed in four of the six inflation targeters considered, with elasticities of the response of exchange rates to international food price changes of around -40 percent (the negative sign implying appreciation) in Colombia, Mexico, Brazil and

about half that level in Peru, assuming a six-month window after the price shocks; it should be noted, however, that the effect is not statistically significant in Brazil.[6] In the two other inflation targeters, Guatemala and Uruguay, the effect is much smaller (and not significant in the latter). Among some non-inflation targeters, six-month exchange rate responses are also high. In the other LAC countries no discernible effect is found. Full responses (after 18 months) are somewhat larger in most of the countries mentioned, except in Peru, where appreciation declines over time, and in Uruguay, where it eventually turns into a slight (though not significant) depreciation.

The impact of international food prices on domestic food prices six months after a shock is quite different across countries, ranging from around 20 percent in some of the poorer countries (Bolivia, Ecuador, El Salvador, Guatemala, Honduras) to less than 10 percent in Bahamas, Brazil, Mexico, Panama and Peru, and in some of the latter countries that effect is not significant. In Mexico the impact is negligible. As would be expected, full responses are somewhat larger in most countries.

International food prices affect non-food prices significantly in many countries, and therefore should not be dismissed when assessing the total CPI effects of international price shocks. The six-month elasticity is greatest in the Dominican Republic (17 percent) and also important in Central American countries. The full-impact elasticities are larger in most countries, but tend to become insignificant except in Guatemala and Panama. The reaction of exchange rates may be one of the factors behind these non-food price elasticities. Countries where no appreciation takes place after the shocks are more prone to having larger non-food price increases. However, several countries do not fit this pattern. For instance, while Guatemala is an inflation targeter that allows its exchange rate to appreciate after food shocks, there is a response in non-food prices, which suggests that wage indexation or other factors may be at work.

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[6] Please note that as a robustness test we expanded the model to include central bank reserves, a stock market index and an interest rate for the inflation-targeting countries, where we found significant exchange rate reactions, as we were concerned those reactions could be picking up the effect of strong capital inflows concurrent with the food crisis preceding the global financial crisis (we could not include capital inflows directly, as these are generally not available on a monthly basis). We found that the results described above were robust to these extensions of the model.

4. Impacts on 2011 Inflation Rates

The main objective of this note is to raise awareness about the potential *future* inflationary impacts of recent international food prices. Assuming that international prices remain at their level of February 2011, if the domestic policy and market responses are the same as those observed in the past, inflation rate *increases* in 2011 of more than 5 percentage points should be expected in Bolivia, the Dominican Republic, Guatemala and Honduras, and increases of between 2 and 5 percentage points in Bahamas, Panama and Peru (Table 3). Price increases can continue for several months beyond December 2011, leading to higher total CPI increases in almost every country. Brazil, Colombia and Mexico are the most salient exceptions to these patterns, with inflation increases of no more than an additional one percentage point in 2011 or beyond. It should be stressed that these estimates should be interpreted as *increases* in inflation rates beyond and above what would have been observed in the absence of the rise in food prices.

As explained above, CPI calculations are computed from the estimates of the food and non-food CPI, using the corresponding weights by country. Table 3 presents these estimates. Food price increases of 10 percent or more in 2011 should be expected in Bahamas, Bolivia and Honduras. Considering a longer window, domestic food price increases would be bigger in most countries, although higher than 10 percent (with respect to December 2010) in the countries mentioned immediately above.

Non-food price increases should also be a source of concern in several countries, especially the Dominican Republic and Guatemala, where the non-food inflation rate could jump by more than 5 percentage points in 2011.

Table 3. Projected response of CPI, exchange rates, food and non-food prices to the international food price shock
(percent point increase with respect to December 2010)

	Response of total CPI		Response of nominal exchange rate		Response of domestic food prices		Response of non-food prices	
	Dec-11	Total Effect *	Dec-11	Total Effect *	Dec-11	Total Effect *	Dec-11	Total Effect *
Bahamas	4.7	5.6			10.4	13.0	3.8	4.4
Bolivia	5.0	5.2			10.6	11.0	-0.4	-0.4
Brazil	0.7	0.7	-13.9	-14.1	3.2	3.2	0.0	0.0
Colombia	1.0	1.0	-14.6	-14.9	2.5	2.5	0.4	0.4
Dominican Rep.	6.7	6.9			5.9	6.2	7.5	7.5
Ecuador	1.9	1.9			6.2	6.3	-0.2	-0.2
El Salvador	3.7	3.7			7.5	7.7	1.7	1.8
Guatemala	7.0	7.4	-7.7	-8.2	8.3	8.7	6.2	6.6
Honduras	5.7	6.1			11.6	12.3	2.0	2.1
Mexico	0.1	0.1	-15.9	-16.0	0.2	0.2	0.0	0.0
Panama	4.1	4.2			5.0	5.2	3.7	3.8
Peru	3.3	3.7	-0.5	0.2	5.0	5.6	1.6	1.8
Uruguay	1.8	1.9			5.4	5.7	0.3	0.3

(*) With respect to December 2010, assuming responses converge 19 months after the shock.

5. The Impact of the Oil Price Shock

Like food prices, the price of oil[7] has also been subject to major increases—from $42 per barrel at its trough in December 2008 to around $114 in March 2011—which could have significant effects on inflation in the Latin American and Caribbean economies. Tables 4 and 5 present the results of applying to the oil price shocks the same methodology used to assess the effects of the food price shock. The major conclusion that arises is that the impact is restricted to a small number of countries. In fact, the only country in the sample where we find significant effects is the Dominican Republic.

Surprisingly, oil price rises appear to have a negligible or even a negative effect on inflation in some countries. These countries do, however, display a strong reaction in terms of exchange rate appreciations. This is particularly true in the oil-producing countries, such as Brazil, Colombia and Mexico, but also in some oil importers, such as Guatemala. The effect of oil price shocks on domestic food prices is negative and significant in the six-month window only in Colombia and Mexico.

[7] Crude Oil (petroleum) is Brent, light blend 38 API, fob U.K.

Non-food prices are affected in a variety of ways, depending on the country. Significantly lower non-food prices are observed in Colombia, Ecuador and Mexico, while significantly higher non-food price inflation takes place in the Dominican Republic, Honduras and Panama. The range of responses suggests that multiple transmission channels and local policies affect the results. In many countries fuel and energy prices are controlled by the government, and therefore most of the effect of the shock in domestic prices takes place through the exchange rate channel, which is deflationary in several countries. However, some countries that face severe energy constraints, such as the Dominican Republic, do pass higher oil prices onto domestic energy prices, leading to higher non-food prices on the one hand, and to lower food prices on the other (the latter probably due to the decline in demand, as higher energy prices operate as a tax).

Table 4. Elasticities of response of CPI, exchange rates, food and non-food prices to international oil price

	Elasticity of total CPI to oil prices		Elasticity of nominal exchange rate to oil price		Elasticity of domestic food prices to oil prices		Elasticity of non-food prices to oil prices	
	6 months after the shock	Full response	6 months after the shock	Full response	6 months after the shock	Full response	6 months after the shock	Full response
Bahamas	0.00	-0.01			0.01	-0.01	0.00	-0.01
					(0.03)	(0.07)	(0.01)	(0.03)
Bolivia	-0.02	-0.03			-0.03	-0.04	-0.02 *	-0.02
					(0.06)	(0.08)	(0.01)	(0.01)
Brazil	-0.01	-0.01	-0.27 *	-0.28	-0.02	-0.02	0.00	0.00
			(0.16)	(0.18)	(0.03)	(0.03)	(0.01)	(0.01)
Colombia	-0.04	-0.04	-0.15	-0.16	-0.08 *	-0.09 *	-0.02 *	-0.02 *
			(0.14)	(0.16)	(0.04)	(0.04)	(0.01)	(0.01)
Dominican Rep.	0.04	0.02			-0.04	-0.06	0.12 *	0.10
					(0.04)	(0.05)	(0.05)	(0.06)
Ecuador	-0.03	-0.05			-0.08	-0.12	-0.01 *	-0.02
					(0.06)	(0.09)	(0.01)	(0.02)
El Salvador	-0.01	-0.01			-0.01	-0.01	-0.01	-0.01
					(0.05)	(0.06)	(0.01)	(0.02)
Guatemala	-0.01	-0.02	-0.05 *	-0.04	-0.04	-0.05	0.01	-0.01
			(0.03)	(0.05)	(0.03)	(0.05)	(0.02)	(0.04)
Honduras	0.00	-0.01			-0.03	-0.05	0.03 *	0.02 *
					(0.05)	(0.08)	(0.01)	(0.01)
Mexico	-0.03	-0.03	-0.23 *	-0.20	-0.06 *	-0.06 *	-0.02 *	-0.02 *
			(0.12)	(0.14)	(0.02)	(0.02)	(0.01)	(0.01)
Panama	0.01	0.00			-0.04	-0.05 [1]	0.03 *	0.03 [1]
					(0.03)	(0.04)	(0.02)	(0.03)
Peru	0.01	0.02	0.01	0.03	0.01	0.02	0.01	0.02
			(0.05)	(0.05)	(0.02)	(0.04)	(0.01)	(0.01)
Uruguay	0.01	0.02	0.04	0.14	-0.02	0.00	0.02	0.03 [1]
			(0.14)	(0.21)	(0.04)	(0.05)	(0.02)	(0.02)

Notes: full responses assume that full convergence is achieved 19 months after the shock, standard errors of the coefficients are in parentheses.

* Significantly different from zero with 95% of confidence.

1 Other forecast periods are statistically significant.

Table 5. Projected response of CPI, exchange rates, food and non-food prices to the international oil price shock
(percent point increase with respect to December 2010)

	Response of total CPI		Response of nominal exchange rate		Response of domestic food prices		Response of non-food prices	
	Dec-11	Total Effect *	Dec-11	Total Effect *	Dec-11	Total Effect *	Dec-11	Total Effect *
Bahamas	-0.3	-0.4			-0.3	-0.7	-0.3	-0.4
Bolivia	-0.6	-0.7			-0.9	-1.0	-0.3	-0.3
Brazil	-0.3	-0.3	-3.4	-3.4	-0.8	-0.9	-0.1	-0.1
Colombia	-1.2	-1.2	-3.7	-3.5	-2.6	-2.6	-0.7	-0.7
Dominican Rep.	0.0	-0.1			-1.4	-1.5	1.4	1.4
Ecuador	-1.5	-1.6				-3.6	-0.6	-0.6
El Salvador	-0.4	-0.4			-0.3	-0.3	-0.4	-0.4
Guatemala	-0.6	-0.7	-0.5	-0.4	-1.1	-1.1	-0.3	-0.4
Honduras	-0.3	-0.4			-1.2	-1.4	0.3	0.3
Mexico	-0.5	-0.5	-2.6	-2.6	-1.3	-1.3	-0.3	-0.3
Panama	-0.1	-0.2			-1.1	-1.2	0.3	0.3
Peru	0.5	0.6	1.1	1.0	0.6	0.6	0.5	0.5
Uruguay	0.6	0.6	5.7	5.9	0.3	0.4	0.7	0.7

(*) With respect to December 2010, assuming responses converge 19 months after the shock.

6. Discussion and Policy Issues

The speed and magnitude of transmission from international food prices to domestic prices differs widely from country to country. Factors affecting the transmission of international to domestic prices include the flexibility of the exchange rate, particular characteristics of monetary policy, whether the country is a net food importer or exporter and the importance of imported food in domestic consumption. Brazil, Colombia, Mexico and Uruguay are largely isolated from the inflationary impact of international food prices, but only as long as they are prepared to accept appreciation in their nominal exchange rates, which may affect the competitiveness of the tradable sectors in their economies. While this presents a serious policy dilemma, the situation is more critical in those countries where foodstuffs are largely tradable and have a large weight in the CPI, and where there is limited or no exchange rate flexibility. Bolivia, the Dominican Republic, and Honduras possess characteristics that lead to very significant pass-through of international food to domestic prices. Guatemala is also a case for concern since its exchange rate flexibility does not appear to prevent international food prices from passing through to domestic food prices and general inflation.

The loss of competitiveness is clearly a risk for Brazil, Colombia and Mexico, which appear to absorb international commodity price shocks through large, and permanent, exchange rate appreciations. In countries that are net food exporters, the appreciation is a response not only to the direct impact of the food price increases but also to the internal demand pressures that arise from improvement in the terms of trade. Countries must then trade off different objectives, in particular protecting domestic prices from international price shocks versus protecting the competitiveness of their other tradable sectors from exchange rate appreciation. Note, however, that unless accompanied by other measures, preventing the *nominal* exchange rate from appreciating in the short term does not prevent the *real* exchange rate from appreciating in the medium term. Therefore, the real challenge for net commodity exporters is how to make good use of the inflow of external resources to buttress the medium-term competitiveness of the other tradable sectors.

Countries that are net food importers face somewhat different dilemmas. In the Caribbean and much of the Central American region, countries fix or have only very limited exchange rate flexibility. Here we find some of the fastest and most significant pass-through elasticities of international food to domestic prices. The extent to which food prices affect more general inflation, however, will depend on the importance of tradable foods in the domestic consumption basket and the importance of food in overall consumption. In the poorer countries of Central America food has one of the highest weights in the overall consumption basket, and the urban poor who have no access to enhanced income from self-grown products are most at risk from the food price shock. It is therefore necessary to increase aid to these groups and improve its targeting, perhaps through reformed conditional cash transfer schemes, to compensate for the effect of the food price surge.

Another factor that conditions the choice of policies is the credibility of the monetary authorities. Central banks that enjoy credibility may choose to accommodate a once-and-for-all price increase due to an international shock rather than engineer a recession to prevent a higher inflation rate, as the latter would imply a double blow to the population, especially the poor. However, central banks lacking credibility may not really have a choice, because allowing a higher inflation rate will feed back into higher inflation expectations, which may in turn reduce

the effectiveness of monetary policy in the future and thus leave the population more exposed to not only higher food prices but also faster inflation in general.

Many countries choose to intervene in food markets. However, price freezes, rationing and export bans tend to have only temporary and highly distortionary effects. In fact, such interventions are frequently self-defeating. Freezing prices, for example, simply lowers supply and hence the good becomes unavailable or rebranded and sold at higher prices anyway. However, not all food market interventions are wrong or undesirable. Food markets function differently in each country, as suggested by the fact the speed of response of domestic to external prices differs widely across countries. Some policies may help reduce the speed of reaction of domestic to external prices, which may allow families and governments time to adjust and smooth out the impact, especially when the shock is transitory. Mexico was quite successful in this respect during the past price surge. However, the aim should be to smooth rather than alter the fundamental price signals provided by the market.

More recently, Mexico also quite successfully hedged some of its food import costs using international derivative markets. Countries that are net food importers could take long positions in futures contracts and roll them over in such a way that, if prices rise, increasing food import costs, profits will be made on those futures' positions to offset higher food import costs. However, while this sounds easy, some institutional infrastructure and excellent access to credit for margin payments are required; trading in any derivative market additionally requires safeguards to avoid fraud or abuse. Moreover, if food prices fall, a futures strategy will entail losses that may be difficult for government officials and politicians to explain. These strategies may not then be advisable for all countries. An alternative approach is to buy out-of-the-money call options on food products so that these positions would tend to make profits if food prices rise. If traditional US-style options are purchased this strategy does not need such fluid access to credit as does a futures-based strategy, and the country cannot lose more than the original cost of the option.[8] This may therefore be simpler to put into practice and to explain politically. A final

[8] Note that US-style options still call for premium payments to be made upfront and therefore without subsequent margining. Options purchased in most other markets, notably London, are paid for through the life of the option

possibility would be to buy an over-the-counter tailor-made contract from an investment bank that would then presumably hedge its risk on the exchanges; this introduces counterparty risks but again may simplify the process. An international organization might engage in such strategies on behalf of member countries, especially poorer countries that lack the necessary infrastructure, advising the country on an appropriate strategy and perhaps subsidizing certain costs, or lending money on concessional terms to purchase out-of-the money call options. Arguably, however, these ideas may be more relevant for the next food price surge, as food prices have already increased so dramatically. The focus of the international community today may be best placed on seeking efficient compensation policies rather than hedging.

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through a margining system which simplifies option pricing but implies that traders must have essentially the same infrastructure as that for futures trading.