The Impact of Global Commodity Prices on Inflation in Malaysia[1]

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The broad-based commodity price shocks in the 2000s – a main source of inflation worldwide – underpin the importance for policymakers to understand the relationship between commodity prices and inflation. This paper studies the empirical relationship in Malaysia during the rapid rise and large swings in global commodity prices using data from 2000 to 2012. The contribution of this paper is twofold. First we ask, what is the connection between global commodity prices and headline inflation? Our results indicate that global commodity prices, especially food, have a positive pass-through to inflation. We find that global prices Granger-cause domestic inflation and the size of the pass-through is relatively small. This raises the second question, what is the impact of commodity price shocks on the dynamics of inflation? Our results suggest that the increase in prices did not lead to second-round effects on inflation. Specifically, we find headline reverting to core inflation while the converse does not hold. However, the relationship between global commodity prices and inflation was not evident in the 1990s, suggesting that the relationship is perhaps not an empirical regularity and may change in different sample periods.

Key Words: Headline and core inflation, pass-through, inflation dynamics, second-round effects

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1 Introduction

Policymakers are concerned about the dynamics of commodity prices, given their significant impact on inflation. Specifically, these supply-side shocks may be persistent and it is important to detect the risk of second-round effects on inflation on a timely basis to allow pre-emptive and gradual policy responses. In this paper, we investigate the pass-through of global commodity prices to Malaysia's domestic inflation and the subsequent risk of second-round effects.

2 Data

We employ a monthly data set between 1992 and 2012 using two measures of global prices and two measures of domestic prices. For global commodity prices, we use the All Primary Commodity Price Index ($globalcommodity$) and the Food Price Index ($global-food$), both published by the International Monetary Fund (IMF). Of interest, we re-weighted the sub-components in the All Primary Commodity Price Index using the relative share in the production of domestic consumer goods and services in Malaysia. Re-weighting makes sense because the adjusted index is a closer reflection of the commodities' relative importance in the CPI basket for Malaysia. The domestic prices are measured using headline inflation ($head$) and core inflation ($core$). To infer the second-round effects, we consider two measures of core inflation that are obtained by excluding prices of selected CPI items from headline inflation. The main variable, core ex-admin and volatile, is derived by excluding prices that are administered by the Government or volatile while core ex-food and energy, a common measure in the literature, is used as a robustness check.

3 Empirical Results

We discuss the results focussing on the 2000s for the measure based on core ex-admin and volatile. For the measure of core ex-food and energy, the robust results are reported but are not discussed here. We start by quantifying the relationship between global commodity prices and headline inflation using the pass-through regression in equation (1).[1]

$$\pi_t^{head} = \alpha + \sum_{i=1}^{12} \theta_i \, \pi_{t-i}^{head} + \sum_{i=1}^{12} \kappa_i \, \pi_{t-i}^{global-commodity} + \varepsilon_t \tag{1}$$

The results in Table 1 show that global commodity prices have some positive impact on domestic inflation in the 2000s (column (1) in Table 1). Specifically, the sum of the coeffi-

[1]This is a standard specification in the literature. See for example Cecchetti and Moessner (2008) and Rigobon (2010). We keep the specification parsimonious by excluding the other variables in an augmented Phillips curve, like the output gap and exchange rates. The lags in inflation would presumably account for some of these omitted variables. We estimate all the equations in this paper using OLS and report the heteroskedasticity and autocorrelation consistent (HAC) standard errors using the Stata command Newey.

cients on the lags of global commodity prices, estimated at 0.019, has the expected positive sign and is statistically significant at the 1 percent level. After a full year, a 10 percentage point increase in world commodity prices would increase headline inflation by 0.19 percentage point.[2] Furthermore, global commodity prices Granger-cause current inflation as the coefficients are jointly different from zero.

We move on to global food prices in equation (2) given that it has the largest pass-through to domestic prices.[3] This could be due to the fact that food accounts for one third of the CPI basket in Malaysia, making it the single largest component.

$$\pi_t^{head} = \alpha + \sum_{i=1}^{12} \theta_i \, \pi_{t-i}^{head} + \sum_{i=1}^{12} \kappa_i \, \pi_{t-i}^{global-food} + \varepsilon_t \tag{2}$$

During the 2000s, the results in Table 1 highlight that the sum of the coefficients on the lags of global food prices (0.014) is positive and is statistically significantly at the 1 percent level (column (4) in Table 1). The pass-through last at least one year and the size of the pass-through is small relative to other studies in the literature.[4] Similarly, global food prices Granger-cause current inflation given that the coefficients are jointly different from zero.[5]

The above analysis indicates that movements in global commodity prices are eventually transmitted into higher domestic inflation with the pass-through potentially lasting up to at least one year. The second part of this study follows Cecchetti and Moessner (2008) to analyse the impact of global commodity prices on inflation dynamics based on equations (3) and (4).

Equation (3) examines the question: is headline reverting to core inflation?

$$\pi_t^{head} - \pi_{t-12}^{head} = \alpha + \beta(\pi_{t-12}^{head} - \pi_{t-12}^{core}) + \varepsilon_t \tag{3}$$

We test if $\beta = 0$, which means that headline is not reverting to core (H_0: $\beta = 0$). Headline reverting quickly to core provides an assuring signal that the increase in commodity prices did not lead to a persistent rise in headline inflation. Presumably, the commodity price shocks are transitory and there is limited concern on second-round effects. Table 2 (column (1)) shows that headline is indeed reverting to core inflation in the 2000s, in line

[2]The size of the pass-through is small relative to the sum of the coefficient on the lags of inflation (0.843), which is significantly different from zero.

[3]For the other sub-components in the All Primary Commodity Price Index (beverages, metals, raw agriculture and energy), a positive and significant relationship was not evident in the 2000s.

[4]For instance, Gelos and Ustyugova (2012) estimate that the pass-through is 0.02 for the advanced countries while the results for the developing countries are usually four times larger.

[5]Based on rolling regressions for equations (1) and (2) with 5-year windows, we plot the size of the pass-through over time. This is now shown here in the interest of space.

with the general results in Cecchetti and Moessner (2008) and Gelos and Ustyugova (2012). The null is rejected and the estimated coefficient is negative and statistically significant at the 1 percent level. Using the rolling regressions for equation (3), the results suggest that $\widehat{\beta}$ is shifting to more negative values over time, in line with Cecchetti and Moessner (2008).[6]

Equation (4) examines the question: is core reverting to headline inflation?

$$\pi_t^{core} - \pi_{t-12}^{core} = \alpha + \delta(\pi_{t-12}^{core} - \pi_{t-12}^{head}) + \varepsilon_t \tag{4}$$

We test if $\delta = 0$, which implies that core is not reverting to headline inflation (H_0: $\delta = 0$). Core reverting to headline provides a signal that the surge in commodity prices may create second-round effects. One concern is the supply-side shocks raising inflation expectations and creating an upward spiral for wages and prices such that core catches up with headline.

Table 2 (column (1)) presents some evidence that core is not reverting to headline in the 2000s. This is line with Cecchetti and Moessner (2008) although the evidence is more mixed in Gelos and Ustyugova (2012).[7] For core ex-admin and volatile, we fail to reject the null as the coefficient $\widehat{\delta}$ is not significantly different from zero. Rolling regressions with 5-year windows point out that $\widehat{\delta}$ tends to be close to zero with a very low incidence of being negative.[8]

4 Concluding Remarks

For the questions posed in this study, we weigh in on the evidence to conclude that the surge in global commodity prices have yet to bring about a sustained and prolonged increase in domestic prices. This could be partly due to the administered price mechanism that is implemented in Malaysia. In addition, country-specific factors may change the impact of commodity shocks on the dynamics of inflation, as argued in Gelos and Ustyugova (2012). For instance, the impact of commodity price shocks on domestic inflation can be affected by initial inflation; weight of food in CPI; and institutional quality. Despite the results presented here not being an empirical regularity, central banks should remain vigilant in their surveillance on global commodity prices as the dynamics of inflation may change over time.

[6]The rolling regressions are not reported here. In addition, we follow Cecchetti and Moessner (2008) to check if these results provide evidence that headline is definitely reverting to core by testing the following two hypotheses: (i) headline fully reverts to core (H_0: $\beta = -1$); and (ii) headline fully reverts to core within one year ($H_0 : \alpha = 0$ and $\beta = -1$). For both tests, we fail to reject the null hypothesis.

[7]Gelos and Ustyugova (2012) find some evidence of second-round effect in their sample of 92 economies.

[8]In addition, we follow Cecchetti and Moessner (2008) to test the following two hypotheses: (i) core does not revert fully to headline (H_0: $\delta = 0$ and $\alpha = 0$); and (ii) core fully reverts to headline within a year (H_0: $\delta = -1$ and $\alpha = 0$). For the former, we fail to reject the null, suggesting that core is not fully reverting to headline, but for the latter we reject the null at the 1 percent level, suggesting that core is not fully reverting to headline within a year, consistent with Cecchetti and Moessner (2008).

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Table 1: Global Commodity Prices and Headline Inflation
Pass-through Regression Results for Equations (1) and (2)

	Global Commodity Prices			Global Food Prices		
	2000s	1990s	Full sample	2000s	1990s	Full sample
	(1)	(2)	(3)	(4)	(5)	(6)
$\sum_{i=1}^{12} \kappa_i$	0.019**	-0.015**	0.004	0.014**	-0.014**	0.002
	(0.007)	(0.007)	(0.005)	(0.007)	(0.006)	(0.005)
N	156	72	229	155	84	239
$H_0 : \kappa_i = 0 \ \forall i$						
F-statistics	2.28	1.18	2.03	2.30	3.27	2.53
p-value	0.012	0.323	0.023	0.011	0.001	0.004

Notes: The significance of the coefficient, based on the t-test, is reported using the asterisk at the 10%(**), 5%(**) and 1%(***) significance level, respectively. HAC standard errors are reported in the parentheses. The sample period for the 2000s cover 2000:2012 and 1990s cover 1991:1999.

Table 2: Is Headline Reverting to Core? Is Core Reverting to Headline? Results for Equations (3) and (4)

	Is Headline Reverting to Core?					
	Core Inflation ex-Admin and Volatile			Core Inflation ex-Food-Energy		
	2000s	1990s	Full sample	2000s	1990s	Full sample
	(1)	(2)	(3)	(4)	(5)	(6)
β	-1.78***	-0.93	-1.44***	- 1.73***	-0.60	-1.40***
	(0.55)	(0.61)	(0.49)	(0.29)	(0.42)	(0.35)
α	0.71	-0.30	0.20	1.26***	0.04	0.75**
	(0.42)	(0.37)	(0.30)	(0.41)	(0.39)	(0.36)
R^2	0.34	0.06	0.23	0.60	0.11	0.44
N	156	96	253	156	96	253
$H_0 : \beta = -1$						
F-statistic	1.89	0.32	0.82	5.01	0.51	2.19
p-value	0.16	0.73	0.37	0.01	0.61	0.11
$H_0 : \beta = -1$ and $\alpha = 0$						
F-statistic	1.99	0.01	0.64	6.24	0.90	1.31
p-value	0.16	0.91	0.53	0.01	0.35	0.25
	Is Core Reverting to Headline?					
δ	0.57	-0.56	0.34	0.44***	-0.32	0.23
	(0.37)	(0.65)	(0.34)	(0.15)	(0.45)	(0.23)
α	0.22	-0.13	-0.02	0.29	-0.38	0.01
	(0.32)	(0.39)	(0.25)	(0.20)	(0.35)	(0.25)
R^2	0.09	0.02	0.03	0.25	0.04	0.04
N	156	96	253	156	96	253
$H_0 : \delta = 0$ and $\alpha = 0$						
F-statistic	1.22	0.43	0.54	4.60	0.66	0.97
p-value	0.30	0.65	0.58	0.01	0.52	0.38
$H_0 : \delta = -1$ and $\alpha = 0$						
F-statistic	9.59	0.28	8.25	62.78	2.82	30.29
p-value	0.00	0.76	0.00	0.00	0.06	0.00

Notes: The significance of the coefficient, based on the t-test, is reported using the asterisk at the 10%(**), 5%(**) and 1%(***) significance level, respectively. HAC standard errors are reported in the parentheses. The sample period for the 2000s cover 2000:2012 and 1990s cover 1991:1999.