Improving forecasting accuracy of the Phillips Curve in OECD Countries: The role of commodity prices

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Abstract

We investigate the power of commodity prices to improve inflation forecast performance in 21 OECD countries, within the framework of commodity prices-augmented Phillips curve model. Using monthly data spanning over 57 years, we use single and multi-factor predictor models, and Westerlund and Narayan (2012, 2015) estimator to address inherent issues of heteroscedasticity, persistence and endogeneity, which present empirical challenges to erstwhile attempts to forecast inflation. Contrary to Stock and Watson (1999) findings, our results overwhelmingly show that commodity prices significantly improve the power of Phillips curve-based inflation forecasts in OECD countries. These findings hold for both core and headline measures of inflation, and within extensive in-sample and various out-of-sample forecast horizons. In addition, we find differential degrees of commodity prices-inflation pass-through, with agricultural and energy commodity prices exerting the highest pass-through to inflation. We further evaluate and compare the forecast performance of our augmented inflation forecast models with that of conventional random walk model as a benchmark. Our results overwhelmingly confirm that commodity prices-augmented versions of inflation forecast models outperformed popular random walk models in all forecast horizons.

JEL: *C53,* E31, E37, F33, Q02,

Keywords: OECD countries, Commodity prices, Phillips curve, Inflation forecasts, Monetary arrangement.

1.0 Introduction

Evidently, general price level changes tend to emanate from a confluence of both market-specific conditions and monetary developments in the economy. Therefore, it has been argued that, to understand trends in commodity prices, it is vital to identify the effect of 'monetary' as well as 'real disturbances' in the economy (Mundell, 2003). Following from this point, we argue that, to render comprehensive and rigorous analyses of monetary or real disturbances in the economy, it is important to embrace the effect of commodity prices. Conventional monetarists tend to contextualize inflation-money supply relationship as 'inflation always and everywhere' being a monetary phenomenon (based on the quantity theory of money), and that changes in money supply produce equal concomitant changes in inflation and nominal interest rate (De Grauwe and Polan, 2005- restating Friedman, 1963).[1] This viewpoint generally ignores the effect of monetary policy that is intended to promote price stability; which is 'best guided by an index of prices set in real markets' (Webb, 1988, p.1), and which inevitably led to mixed conclusions, in a plethora of commodity prices-inflation research. Consequently, the literature on the role of commodity prices in the predicting of inflation is somehow bifurcated. On the one hand, are studies which conclude that commodity prices are vital to predicting inflation (Klein, 1986; Garner, 1989; Awokuse and Yang, 2003; Browne and Cronin, 2010; Wei, 2015; Gelos and Ustyugova, 2017; Lucey, 2017; Salisu et al., 2018); while others, on the other hand, conclude that commodity prices make little or no improvement to inflation forecasting (Webb, 1988; McCallum, 1989; Blomberg and Harris, 1995; Garner, 1995; Cecchetti, 2000). We argue that the existential contrast in empirical findings on this topic could be attributed to the greater emphasis placed on in-sample evaluations of inflation forecasts, involving commodity prices; in conjunction with the tendency to ignore inherent time series properties of the predictors, such as heteroscedasticity, persistence and endogeneity (Westerlund and Narayan , 2012, 2015; Salisu and Isah, 2017).

Rather surprising, the literature on inflation forecasts, involving commodity prices, largely focus on in-sample forecasts (impact assessments), and often stop short of out-of-

[1] Inflation-interest rate nexus in the Fisher Effect posits 'one-for-one relation between the inflation rate and the nominal interest rate' (Mankiw, 2012)

sample evaluation of the role that commodity prices play in improving inflation forecasts. Two notable exceptions in the literature are Stock and Watson (1999) and Chen *et al.* (2014), both of which used in-sample and out-of-sample forecast evaluations of commodity prices. However, both studies differ in theorizing the predictive models underlying inflation forecasts. Stock and Watson (1999) used a theoretical framework based on the Phillips curve, while Chen et al. (2014) only relied on commodity prices, as sole drivers of inflation. In other words, Chen et al. (2014) has no clear cut theoretical basis for the inflation, but that should not mask the shortcomings of theoretical approaches that are based on the Phillips curve and its augmentations. For example Atkeson and Ohanian (2001) laments that the Phillips curve's overwhelming failure to outperform niave models has made inflation forecasting difficult over the past two decades. They suggest that Philips curve-based inflation forecasts should be 'abandoned' due to 'weak theoretical and empirical underpinnings (Atkeson and Ohanian, 2001, p.10). This conclusion may have motivated researchers to examine the problem using alternative approaches (see for example Forni, et al., 2003; Clements and Galvão, 2013; Garcia, et al. 2017).

Notwithstanding it shortcomings, the Phillips curve model has been a workhorse for inflation forecasting in post-WW2 period. The Phillips curve model is theoretically intuitive, largely eschews abstract assumptions, and is empirically easy to estimate. In addition, its evident focus on variables of prime interest to policymakers further underpins the continued popularity of the Phillips curve (Blinder, 1997). Consequently, in this paper, we intend to subject the traditional Phillips curve to the three methodological and empirical challenges, in an attempt to settle contrasting views, relating to the role commodity prices play in forecasting inflation in OECD countries: Firstly, we augment the traditional Phillips curve model with commodity prices as predictors and test whether the augmented model outperforms the traditional version, in terms of both in-sample and out-of-sample predictability of inflation in OECD countries. Secondly, we demonstrate the need to account for the inherent statistical features of the predictors, such as persistence, endogeneity, conditional heteroscedasticity effects, when forecasting inflation. And, thirdly, we compare the in-sample and out-of-sample forecast performance of the commodity prices- augmented Phillips curve model with the random walk model, both for in-sample and out-of-sample

forecasts comparability. For the purpose of robustness, multiple data samples and forecast horizons, as well as alternative proxies for commodity prices and inflation are considered.

Further motivation to the use of commodity prices in improving inflation forecast can be traced to the historical evolution of modern-day monetary system. Earlier debates on synchronous links between commodity prices and macroeconomic cycles date back to the Great Depression (see extant works by Graham, 1937). Leading economists at the time posited the consideration of commodity prices as instrument in the stabilization of protracted sluggishness in the world economy, experienced during the Great Depression (Keynes, 1938; Kaldor, 1939). Stubborn and painful stickiness in prices and wages, witnessed under the Gold Standard, subsequently elevated the debate to formal proposals for an alternative monetary system involving commodity-indexation, or a commodity-reserve currency (see Hayek, 1942; Keynes, 1942). However, the post-WW2 international monetary arrangement largely eschewed commodity-indexation in favour of US dollars-gold pegged under the Bretton Woods System (Bayoumi and Eichengreen, 1994, Mundell, 2003). Nonetheless, the ensuing literature never lost sight of putative links between commodity prices and macroeconomic/ monetary shocks and inflation build-up in modern-day economics (see for example Phelps, 1978; Blejer and Hillman, 1982; Boughton and Branson, 1988; Baillie, 1989; Boughton, et al, 1989; Hua, 1998; Sussman and Zeira, 2003; Kyrtsou and Labys, 2006; Browne, and Cronin, 2010).

We offer further evidence on the role of commodity prices in predicting inflation among the Organization for Economic Cooperation and Development (OECD, hereafter) member countries for two principal reasons. We intend to challenge Stock and Watson (1999, 2008) findings that inflation is hard to forecast in the US and other OECD economies, using time-series models and/or the Phillips Curve (including commodity-augmented version) with a more comprehensive and detailed analyses following Salisu and Isah (2018) and Salisu et al. (2018) recent and narrower study, which show that oil price matters significantly in predicting US inflation rates, irrespective of the measures of inflation, data frequencies, multiple in-sample periods and forecast horizons. We use recent time series data spanning over 57 years, and the Westerlund and Narayan (2012, 2015) estimator to address issues relating to heteroscedasticity, persistence and endogeneity inherent the predictors.

The rest of this paper is structured as follows: section 2 outlines the methodological setup and rationale for augmenting the traditional Phillips curve with commodity price supply-side factors. This section further outline the framework for addressing typical empirical issues relating to heteroscedasticity, persistence and endogeneity in the predictors. Section 3 describes the data and supplies detailed preliminary analyses including tests for stationarity, heteroscedasticity, persistence and endogeneity. The results of the paper are presented and discussed in section 4 using a style which puts the leading research questions at center stage. And, finally, section 5 offers concluding statements.

2.0 Methodology

The relationship between commodity prices and inflation is viewed from the perspective of the augmented Phillips curve model, where the traditional variant is extended to account for the role of commodity prices (see also Stock and Watson, 1999, 2008). Meanwhile, we begin our analysis by specifying a bivariate single predictive regression model for inflation as given below:

$$\pi_t = \alpha + \beta y_{t-1} + \varepsilon_{\pi,t} \qquad (1)$$

where π_t denotes inflation and is computed as $\log\left(p_t / p_{t-1}\right)$; p_t is the consumer price index; and y_t is the log of industrial production index. The underlying null hypothesis of no predictability is that $\beta = 0$ and equation (1) can be described as the baseline model, since it excludes the role of commodity prices. In the extended model as in equation (2), different commodity price indexes namely, energy, agriculture, industrial metals, precious metals and non-energy, are used, and each is singly captured in the equation:

$$\pi_t = \alpha + \beta y_{t-1} + \delta z_t + \varepsilon_{\pi,t} \qquad (2)$$

where z_t is the log of commodity price index. Like equation (1), the underlying null hypothesis of no predictability of commodity prices in the inflation model is that $\delta = 0$. Although, equations (1) and (2) are traditionally estimated with the Ordinary Least Squares (OLS) method, however recent studies on Phillips curve-based inflation forecasting (see Salisu et al., 2018; Salisu and Isah, 2018) have suggested the need to account for conditional

heteroscedasticity, endogeneity and persistence effects when forecasting inflation. In doing so, they employ the Westerlund and Narayan (2012, 2015)[2] [henceforth; WN] estimator, which accounts for same in the estimation process. Thus, equation (1) is re-specified in line with the WN predictive model as follows:

$$\pi_t = \alpha + \beta y_{t-1} + \psi\left(y_t - \rho y_{t-1}\right) + \varepsilon_{\pi,t} \tag{3}$$

where π_t and y_t remain as earlier defined, while ρ is the first order autocorrelation coefficient, where the inclusion of the second term for instance $\left(y_t - \rho y_{t-1}\right)$ is meant to capture any potential persistent effect in the predictive model (see Lewellen, 2004); and the endogeneity effect is subsumed in ψ .[3] Thus, estimating equation (3), using the OLS method, is expected to correct for possible endogeneity bias, and therefore, yields a bias-adjusted OLS estimator for β (Lewellen, 2004). This is described as $\hat{\beta}_{adj} = \hat{\beta} - \hat{\psi}\left(\hat{\rho} - \rho\right)$. However, to account for conditional heteroscedasticity effect in a predictive model, WN (2012, 2015) suggest pre-weighting the series in equation (3) with $1/\hat{\sigma}_{\varepsilon}$ and estimate the resulting equation with OLS. This augmented OLS approach is what WN (2012, 2015) term as Feasible Quasi Generalized Least Squares estimator.

Thus, equation (3) is the estimable model for the traditional Phillips curve. The same procedure is followed for equation (2) in order to account for the same statistical effects in the augmented Phillips curve model. For completeness, the univariate time series model is estimated and its forecast outcome is also compared with equation theory-based inflation model. This has become a standard approach of validating theory-based models, given a somewhat consensus of opinion in favour of univariate models, including random walk, when forecasting inflation (see Atkeson and Ohanian, 2001; Stock and Watson, 2003, 2007, Canova, 2007, Ang et al., 2007).

[2] The first attempt was made by Lewellen (2004) whose work motivates the need to account for endogeneity and persistence effects in the predictability of stock returns. Thereafter, WN (2012, 2014) extend the Lewellen approach to account for conditional heteroscedasticity.

[3] The underlying motivation and computational details for persistence and endogeneity effects in equation (2) are documented in Lewellen (2004) and Westerlund and Narayan (2012, 2015).

The evaluation of the forecast performance is carried out using 75% coverage of the total sample periods, as well as the Pre-GFC and Post-GFC sample periods, for robustness purpose. Also, a recursive window approach, which accounts for the time-varying behaviour in the commodity-inflation model, is employed (see also Canova, 2007). The forecast evaluation is implemented for both the in-sample and out-of-sample periods. For forecast evaluation, a pairwise forecast measure, Clark and West [hereafter, CW] (2007) test, is employed, given its appropriateness in cases where the models to be compared are nested. It is used to determine whether the forecast error difference, of any pair of contending models, is statistically different from zero. For the forecast series from any two contending models, the CW procedure is given as:

$$\hat{f}_{t+h} = \left(r_{t+h} - \hat{r}_{1t,t+h}\right)^2 - \left[\left(r_{t+h} - \hat{r}_{2t,t+h}\right)^2 - \left(\hat{r}_{1t,t+h} - \hat{r}_{2t,t+h}\right)^2\right] \qquad (4)$$

where h represents the forecast period, $\left(r_{t+h} - \hat{r}_{1t,t+h}\right)^2$ and $\left(r_{t+h} - \hat{r}_{2t,t+h}\right)^2$ represent the squared error for the restricted model (the random walk model and traditional Phillips curve model, as the case may be) and the unrestricted models (the augmented Phillips Curve models), while the adjusted squared error, $\left(\hat{r}_{1t,t+h} - \hat{r}_{2t,t+h}\right)^2$, is introduced by the CW test as a correction for any noise associated with the larger model's forecast. Thus, the sample average of $\hat{f}_{t+h}$ can be expressed as $MSE_1 - \left(MSE_2 - adj.\right)$, with each item defined as follow: $MSE_1 = P^{-1}\sum\left(r_{t+h} - \hat{r}_{1t,t+h}\right)^2$, $MSE_2 = P^{-1}\sum\left(r_{t+h} - \hat{r}_{2t,t+h}\right)^2$, and $adj. = P^{-1}\sum\left(\hat{r}_{1t,t+h} - \hat{r}_{2t,t+h}\right)^2$, and P indicating the number of predictions used to compute the averages. The equality of forecast performance of the model pairs (restricted and unrestricted models) is subsequently tested by regressing $\hat{f}_{t+h}$ on a constant, such that the obtained t-statistic, associated with the constant, is compared with the conventional critical values to ascertain whether the coefficient is statistically different from zero.

3.0 Data and Preliminary Analyses

3.1 Data Source and Description

To this end, we limit our scope to 21 OECD countries due to data availability constraints. We compute 12-month inflation rates (headline and core) from monthly data on headline and core consumer price indices, obtained from the OECD statistical database. Monthly data on

industrial production index were also obtained from the same source. We further employed price indices in relation to four most traded commodities in the world, namely, agricultural price index, crude oil price index, energy price index and industrial metal price index, upon which data were sourced from the World Bank Database. Generally, the data on these variables are available for the period between January 1960 and October 2017, with some variations in data scope across countries, and for forecast purpose, we capture 75% of the full sample (see Table 1 below).

-Insert Table 1 here-

3.2 Preliminary Analysis Results

3.2.1 Graphical Representation

To show the direction of co-movement between commodity prices and inflation rates (headline and core), we present the trends of the two series in separate graphs for the 21 OECD countries (see Figure 1 below). Generally across board, we observe that both commodity prices and the two measures of inflation rates co-move in an inverse direction over the entire period specific to each country. Particularly, commodity prices trended upwards even until recently, with slight declines observed in the wake of the 2008-09 global financial crisis propagated majorly by the burst in the housing market bubble in the United States. However, irrespective of measures, inflation rates have declined in recent times trending downwards from all-time peaks recorded between 1960s and 1990s across the 21 OECD countries.

We might attribute the recent low inflation rates to the policy on inflation targeting that have taken a centre-stage in the monetary policy goals in most of the OECD countries. This policy has helped in reducing the degree of pass-through of movements in world commodity prices to domestic inflation of these countries. Fluctuations in commodity prices, therefore, have implications for the policy responses of monetary authorities across the world, in their bid to achieve the primary objective of stabilizing prices. The argument in the literature is that given that commodity prices constitute a sub-set of asset prices, the monetary authorities should respond to fluctuations in world commodity prices to the extent that the prices reflect inflation expectations that might likely undermine the effectiveness of monetary policy. Several reasons have been cited, including the difficulty of determining whether a change in an asset price is reflecting fundamentals (majorly demand and/or supply shocks) or is a

speculative bubble (Chen et al, 2014). This in turn calls for an empirical investigation into the possible role of commodity prices in predicting inflation rates, which we later pursue in this paper.

Insert Figure 1 here-

3.2.2 *Descriptive Statistics*

Table 2 reports the summary statistics for the four global commodity price indices, and inflation rates (headline and core) and industrial production index across the 21 OECD countries considered in this paper, over the full sample period. We observe that among the commodity prices, agricultural price index has the highest mean with crude oil price index having the lowest mean. With respect to headline and core inflation rates, all countries except Mexico have single-digit average inflation rates. Two-third of the countries, that is fourteen (14), have average inflation rates within the range of 2.62% and 4.83%, with Israel and Germany being the highest and lowest inflation rate countries, respectively, in the group; whereas, approximately one-third of the countries, that is six (6), have average inflation rates within the range of 5.17% and 9.38%, with Hungary and United Kingdom constituting the highest and lowest inflation rate countries, respectively, in the group. The country with the most volatile inflation rates (headline and core) is Mexico, while the country with the least volatile inflation rates (headline and core) is Germany. In respect of industrial production index, Greece has the highest average, while Finland has the lowest average. Also, in terms of standard deviation, volatility is lowest for industrial production index, among other variables, across countries.

Moreover, results are mixed with respect to other statistical features, such as skewness, kurtosis, and Jarque-Bera statistic across the three variables (commodity prices, inflation rates and industrial production index). Commodity prices and industrial production index are largely platykurtic (kurtosis value being less than 3.0), whereas both headline and core inflation rates are consistently leptokurtic (kurtosis value being less greater than 3.0) across countries. In terms of skewness, the two measures of inflation rates are positively skewed across countries; industrial production index is positively skewed for all countries except Belgium and Spain; all commodity prices except industrial metal price index are negatively

skewed. In addition, Jarque-Bera statistics show that all variables (commodity prices, inflation rates and industrial production index) do not follow normal distribution, as can be inferred from their kurtosis and skewness reported earlier.

3.2.3 Autocorrelation and conditional heteroscedasticity test results

Here, we conduct autocorrelation and heteroscedasticity tests using Ljung-Box test Q-statistics and Autoregressive conditional heteroscedasticity Lagrangian multiplier (ARCH-LM) test F-statistics, respectively, (see Table 2 below) over the full sample period. We consider three different lag lengths (k) of 4, 8, and 12 for robustness. Our results show the presence of serial correlation in commodity prices, irrespective of lags. We also find the presence of serial correlation in inflation rates and industrial production index consistently at higher lags across countries. In terms of conditional heteroscedasticity, we observe the significant presence of ARCH effects in all commodity prices except energy price index. We also establish that conditional heteroscedasticity effects are consistently present at higher lags across countries.

-Insert Table 2 here-

3.2.4 The unit root test result

The result of ADF unit root test reported in Table 3 below shows that all commodity prices except industrial metal price index are stationary at first difference, hence, they are said to be integrated of order one. Test for non-stationarity is however mixed for other variables (inflation rates and industrial production index): all countries, but Austria, Canada, France, Germany, Italy, Luxembourg, Norway and United States, have stationary inflation series (headline and core); all but Finland, Germany, Greece, Italy, Japan, and Portugal have non-stationary industrial production index. We do not report the first differences of series that are stationary at levels. Unit root tests based on the three ADF test regressions, including models with intercept and trend, intercept only, and none are reported.

-Insert Table 3 here-

3.2.5 Persistence and endogeneity test results

Premised on the fact that the rejection of the null hypothesis of a unit root for the predictors, which are commodity prices and industrial production index in our own case, is not a sufficient condition to assume the absence of persistence, we further test for persistence and endogeneity in the predictors (see Table 4 below), over the full sample period. The persistence test has the null hypothesis of no persistence effect in the predictors. The coefficient of the AR(1) process was estimated for each predictor using OLS estimator and the results were found to be close or equal to one, which is often the features of series with higher order of integration, thus, suggesting that the predictors (commodity prices and industrial production index) contain persistent effects, irrespectively of measures of inflation (headline and core), across the 21 countries. In terms of endogeneity, we observe that commodity prices are consistently endogenous for all countries except Netherlands and Spain, with industrial metal prices being predominantly endogenous among predictors and across countries. This, therefore, motivates our choice of estimator, which addresses the problem of any potential endogeneity bias that may arise from persistence and/or endogeneity of the predictors (commodity prices and industrial production index).

-Insert Table 4 here-

4.0 Discussion of Results

In line with Chen et al (2014) and Salisu and Isah (2017), we explore in-sample predictability of the theoretical model, which in this case is the commodity prices based inflation model. The in-sample forecast is conducted using 75% of the full sample. The out-of-sample forecast, on the other hand, is based on three forecast horizons, namely, 6 months, 12 months, and 18 months. As against Chen et al (2014) but in line with Salisu and Isah (2017), we further explore in-sample predictability of the two theoretical models, which are the traditional and commodity prices-augmented Phillips Curves. We first compare the forecast performance of the commodity prices-based inflation model with that of the benchmark model (the random walk model) using Clark and West (2007) [CW] test, which is mostly appropriate for comparing models that are nested. We also challenge the findings of Stock and Watson (1999,

2008) to re-examine whether, or not, commodity prices improve the forecast performance of the Phillips Curve in predicting inflation rates among the OECD countries. Unlike Arratibel et al (2009) that examined only out-of-sample forecast, we evaluate the forecast performance of our theoretical models using in-sample and out-of-sample periods.

Moreover, the CW test is performed for in-sample and out-of-sample periods. In order to test the significance of the forecast error differences of contending models, the CW test is adopted, given that the random walk model is embedded/nested in the commodity price – inflation model, as well as the commodity prices-augmented Phillips curve model. The CW test statistic ascertains whether the paired differences of the forecast error from contending models – the unrestricted model (commodity prices-based inflation model and commodity prices-augmented Phillips Curve) and the restricted model (the random walk model and the traditional Phillips Curve), is significantly different from zero, at the conventional levels of significance (1%, 5%, and 10%). A significant CW test statistic implies that our theoretical models (that is, commodity prices based inflation model and commodity prices-augmented Phillips Curve) significantly outperforms the random walk model and traditional Phillips Curve, respectively, in predicting inflation rates. The reverse is however the case if we have a negative and significant CW test statistic. In addition, in order to save space, predictability graphs for headline inflation rates only are presented in this paper. The predictability graphs in relation to core inflation rates are presented under the supplementary results (see Figures A1 and A2).

4.1 Do commodity prices matter in inflation?

4.1.1 In-sample Predictability Results

The predictability power of a potential economic predictor hinges on the statistical significance of the first-order autoregressive coefficient in the theoretical (predictive) model at the conventional levels of significance, namely; 1%, 5%, and 10%. It can be observed that irrespective of measures of inflation used (headline and core) and the choice of commodity prices, the null hypothesis of no predictability is rejected at 1% level of significance (see Table 5). We, therefore, conclude that commodity prices play significant role in predicting the behaviour of inflation rates, across the 21 OECD countries, in contrast to the findings of Stock

and Watson (1999, 2008). Also, our result confirms the findings of Ciner (2011), Chen et al (2014), Gelos and Ustyugova (2016), Salisu and Isah (2017), and Sekine and Tsuruga (2017), which all reported that commodity prices are good predictors of inflation rates (headline and core). The degree of pass-through of commodity prices to inflation rates (headline and core) is predominantly positive but differs across countries, with agricultural and industrial metal price indices exerting the highest pass-through effects, across countries depending on the share of traded commodities in the consumption baskets of countries. In other words, the extent of pass-through of world commodity prices to domestic inflation depends on whether a country is a net importer or net exporter of a particular commodity in the global market, and on pre-existing inflation levels (Gelos and Ustyugova, 2016). We validate this proposition in the cases of Hungary, Israel, and Mexico, which have higher pass-through effects due to their high inflation rates (headline and core) as reported earlier.

-Insert Table 5 here-

4.1.2 Forecast Evaluation: Commodity prices-based inflation versus Random Walk

We further compare the in-sample and out-of-sample forecast performance of our commodity prices-based inflation model with the random walk model using the CW tests (see Tables 6 and 7). From Table 6, we observe predominantly positive and statistically significant CW test statistics, at all conventional levels of 1%, 5% and 10%, across the different commodity prices, regardless of the choice of inflation measure (headline or core). This in turn implies that our commodity prices-based inflation model outperforms the random walk model in predicting the behaviour of inflation rates in the in-sample period, and irrespective of the choice of inflation measures used (headline or core). The same conclusion can be drawn in the case of out-of-sample forecast irrespective of forecast horizons of 6, 12, and 18 months (see Table 7). The CW test statistic is also predominantly positive and statistically significant at all conventional levels of 1%, 5% and 10%, irrespective of the measures of inflation, the choice of commodity prices and forecast horizons (Refer to Supplementary Tables A1 and A2 for out-of-sample forecast for core inflation). Furthermore, we can infer these conclusions from the forecast graphs of random walk model and commodity prices-based inflation model for headline inflation as presented in Figure 2 below (Refer to Figure

A1 in the Supplementary results for the predictability graphs in relation to core inflation). We therefore establish the overwhelming performance of our commodity prices-based inflation model, in predicting both headline and core inflation rates, over the random walk model for the majority of OECD countries in-sample and out-of-sample. To further strengthen our results, we consider the Phillips Curve-based inflation models in the next section.

-Insert Tables 6 & 7 here consecutively-

-Insert Figure 2 here-

4.2 Do commodity prices improve the forecast of Phillips curve based inflation model?

4.2.1 In-sample Predictability Results

Here, we offer new evidence on the in-sample predictability of inflation rates based on the traditional Phillips Curve and our commodity prices-augmented Phillips Curve for the OECD countries. The traditional Phillips Curve is a bi-variate inflation model, capturing only the effect of the demand side, which we measure using industrial production index. We also incorporate the role of the four world commodity prices, considered in this paper, so as to account for the supply-side effects; hence four versions of the commodity prices-augmented Phillips Curve are reported. We report the in-sample predictability of headline and core inflation rates using two predictors, namely, industrial production index and commodity prices in Tables 8 and 9. Considering a single-factor Phillips Curve model (that is, the traditional Phillips Curve), we observe that industrial production index significantly predicts headline inflation rates in the OECD countries except in Canada, Finland, Greece, Italy, Netherlands and Portugal; we however find an exception for the first four countries when core inflation rate is considered.

By augmenting the Phillips Curve with commodity prices, we further strengthen the conclusion that industrial production index plays a significant role in predicting both headline and core inflation rates, across the 21 OECD countries. Our result is robust to the choice of inflation measures and commodity prices. In all four cases considered, we observe that the degree of pass-through of changes in commodity prices to inflation is not only

predominantly positive, but also is higher compared to a single factor commodity prices-based model reported in the previous section. We therefore conclude that commodity prices constitute an important factor when modeling the behaviour of inflation rates for the OECD countries. Our results are robust to different inflation measures, commodity prices and across the 21 OECD countries captured in this paper. In addition, our results lend empirical support to the findings of Arratibel et al (2009), Gelos and Ustyugova (2016) and Salisu and Isah (2017), but are in stark contrast to the findings of Stock and Watson (1999, 2008).

-Insert Table 8 here-

-Insert Table 9 here-

4.2.2 *Forecast Evaluation: Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve*

To strengthen our finding of significant predictability of inflation rates by augmenting the Phillips Curve using world commodity price indices, we further investigate whether accounting for commodity prices improves the forecast performance of the Phillips Curve. We therefore evaluate whether, or not, our commodity prices-augmented Phillips Curve outperforms the traditional Phillips Curve in predicting inflation rates in-sample and out-of-sample with the aid of CW test (see Tables 10 & 11). The CW statistic is predominantly positive and statistically significant at the conventional levels of 1%, 5%, and 10%, for both in-sample (see Table 10, for both headline and core inflation) and out-of-sample (see Table 11, for headline inflation only) forecast periods (Refer to Supplementary Tables A2 for out-of-sample forecast for core inflation). We therefore conclude that our commodity prices-augmented Phillips Curve significantly outperforms the traditional Phillips Curve in predicting inflation rates. Our results are robust to in-sample and out-of-sample forecast periods, choice of inflation measures (headline and core), choice of commodity prices, and the choice of countries included in the sample set. Our findings also lend empirical support to the findings of Arratibel et al (2009) that commodity prices-augmented Phillips Curve performs better in predicting inflation than random walk model out-of-sample, and to the findings of Salisu and Isah (2017) that oil price improves the forecast performance of the Phillips Curve-based inflation model for the United States, both in-sample and out-of-

sample. We can possibly infer the superior forecast performance of our commodity prices-augmented Phillips Curve over the traditional Phillips Curve in predicting headline inflation pictorially as shown in Figure 3 below (Refer to Figure A2 in the Supplementary results for the predictability graphs in relation to core inflation).

-Insert Tables 10 - 11 here consecutively-

-Insert Figure 3 here-

4.3 Robustness Check

On further robustness checks, with respect to the sample period considered, we sub-divide the full sample into two periods using the global financial crisis. Therefore, we have the pre-GFC period and the Post-GFC period. With the sub-sample periods, we conduct the predictability analysis and examine the pairwise forecast performances using the CW test statistics, as with the 75% of full sample in the main estimation procedure. The robustness results presented in Supplementary Tables B1 to B9 correspond to the Pre-GFC sample period, while the analysis results for the Post-GFC sample period are presented in Supplementary Tables C1 to C9. In both sub-samples, we find similar stance of predictability of the commodity prices for inflation, as was observed when the 75% of full sample was used, with the degree of pass-through being predominantly positive and significant, and higher with respect to the incorporation of agricultural and industrial metal price indices, regardless of the inflation measures (headline or core) considered (see Tables B1 and C1). Similar to the stance in the main estimation, the commodity-prices augmented model consistently outperform the random walk model in both Pre- and Post-GFC sample period. The reported CW test statistic for in-sample forecast of headline and core inflation in the Pre-GFC (Supplementary Table B2) and Post- GFC (Supplementary Table C2) period were predominantly positive and statistically significant at all conventional levels of 1%, 5% and 10%. A similar stance was observed for the out-of-sample forecast of the headline inflation (see Supplementary Tables B3 and C3 for the Pre-GFC and Post-GFC periods, respectively) and core inflation (see Supplementary Tables B4 and C4 for the Pre-GFC and Post-GFC periods, respectively). The consistency of the outperformance of the commodity prices-inflation model over the random walk model across different sample periods suggest that

our estimates are not sensitive to the choice of data sample. The predictability of the commodity prices for both measures of inflation (headline and core) in both Pre-GFC and Post-GFC periods are not altered (see Supplementary Tables B5 & B6 and C5 & C6, respectively for Pre- and Post- GFC periods). This is consistent with the stance when 75% of the full sample was adopted in the main estimation. Furthermore, augmenting the traditional Phillips Curve with commodity prices appears to improve the inflation forecast in both sub-sample periods, as shown by the predominantly positive and statistically significant CW tests at all conventional levels of significance – 1%, 5% and 10%, for the Pre-GFC period (see Supplementary Tables B7 – B9) and for the Post-GFC period (see Supplementary Tables C7 - C9). The results appear to be similar to those of the main estimation, across inflation measures and choice of commodity prices incorporated. Evidently, our results are found to be robust to the choice of data sample, inflation measures and commodity price proxies, with our commodity prices-augmented Phillips Curve model outperforming the traditional variant and the conventional random walk model.

5.0 Conclusion

The synchrony between commodity price movements and macroeconomic fluctuations has been widely recognized in the literature. Historical links of commodities to evolution of modern-day monetary systems goes back to the Great Depression. However, research on the extent and power commodity prices hold in forecasting inflation remains unsettled at the empirical front. This paper compares inflation forecasting power commodity-prices augmented Phillips curve (to account for supply-side cost-push inflation) against the traditional Phillips curve, in 21 OECD countries using monthly data from January 1960 to October 2017, and addressing inherent statistical issues often ignored in the literature. The motivation for the study stems from evident contrast that we have observed between Stock and Watson (1999) findings that inflation forecast cannot be improved by commodity prices, and Salisu and Isah (2017) recent findings (albeit based a single country and one commodity), that oil price plays a significant role in forecasting US inflation, which rather narrower in scope. Consequently, this paper extends the analyses to broader indices of four commodities and 21 OECD countries, using recent data for completeness.

Preliminary analyses confirm the presence of common time series such as unit root, ARCH effect, heteroscedasticity in the predictors, as well as persistence and endogeneity, which are common statistical problems that affect empirical estimate of forecasts and forecast performance that are often overlooked. Therefore, we used the WN (2012, 2015) estimator to address methodological challenges with the data. For robustness purposes, we used two leading measures of inflation namely; core inflation and headline inflation. The results based on both single and multi-factor traditional and commodity-prices augmented Phillips Curve predictor models overwhelmingly show that commodity prices play significant role in improving inflation forecast in OECD countries, for in-sample and out-of-sample forecast horizons. These findings hold for core and headline measures of inflation. Moreover, the results reveal differential degrees of inflation pass-through among commodity groups, with agricultural and industrial metal commodities exerting the largest pass-through on inflation. A comprehensive evaluation and comparison of in-sample and out-of-sample forecasting performances of commodity prices-augmented models against traditional Phillips Curve and random walk benchmark models, using the Clark and West tests, show that commodity prices-augmented versions of the models outperformed the benchmark models.

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Tables

Table 1: Data Description and Scope

Variables	Start Period	End Period	No. of observations	75% of full sample
Commodity prices	January, 1960	October, 2017	694	520
Headline and core consumer price indices; Industrial production index				
Austria	January, 1966	October, 2017	622	466
Belgium	June, 1976	October, 2017	497	372
Canada	January, 1961	October, 2017	682	511
Finland	January, 1960	October, 2017	694	520
France	January, 1970	October, 2017	574	430
Germany	January, 1962	October, 2017	670	502
Greece	January, 1970	October, 2017	574	430
Hungary	January, 1990	October, 2017	670	502
Israel	January, 1970	October, 2017	574	430
Italy	January, 1960	October, 2017	694	520
Japan	January, 1960	October, 2017	694	520
Korea	January, 1990	October, 2017	334	250
Luxembourg	January, 1967	October, 2017	610	457
Mexico	January, 1980	October, 2017	454	340
Netherlands	April, 1960	October, 2017	691	518
Norway	January, 1979	October, 2017	466	349
Portugal	January, 1970	October, 2017	574	430
Spain	January, 1976	October, 2017	502	376
Sweden	January, 1970	October, 2017	574	430
United Kingdom	January, 1970	October, 2017	574	430
United States	January, 1960	October, 2017	694	520

Note: Data on commodity price indices were obtained from the World Bank Database, while the data on consumer price indices (headline and core) and industrial production index were sourced from the Organization for Economic Cooperation and Development (OECD) Statistical Database. Commodity prices include agricultural price index, crude oil price index, energy price index, and industrial metal price index.

Table 2: Preliminary Analysis

		Summary Statistics for the Variables					Autocorrelation Test			Heteroscedasticity Test		
		Mean	Std.	Skw	Kurt	J-B stat	k=4	k=8	k=12	K=4	K=8	K=12
Full Sample: Commodity prices												
CR		2.696	1.386	-0.631	2.257	60.98***	32.48***	39.44***	45.48***	3.597***	1.794*	1.187
AG		3.948	0.479	-0.458	2.429	33.08***	153.4***	154.9***	159.2***	29.78***	17.08***	11.68***
EN		3.007	1.348	-0.668	2.278	65.56***	34.15***	39.36***	48.39***	1.882	0.937	0.626
ME		3.576	0.605	0.139	2.333	14.87***	79.79***	89.77***	95.05***	36.47***	19.16***	12.86***
Full Sample: Inflation rates (Headline and core); Industrial production index												
Austria	π_t^h	3.375	2.167	1.325	4.586	242.36***	4.297	17.311**	111.57***	0.552	2.594***	5.825***
	π_t^c	3.229	2.046	1.028	3.579	116.04***	4.378	10.573	106.09***	0.328	0.529	13.342***
	IPI	4.031	0.475	-0.077	1.880	32.488***	124.6***	153.87***	188.49***	32.516***	16.512***	12.651***
Belgium	π_t^h	2.879	2.084	1.049	3.612	96.647***	33.538***	38.11***	146.63***	10.746***	8.147***	8.158***
	π_t^c	2.948	1.864	1.204	3.516	122.51***	10.383**	16.707**	86.885***	1.206	0.618	4.042***
	IPI	4.262	0.263	0.309	1.686	42.635***	72.356***	84.798***	93.133***	17.949***	10.339***	7.459***
Canada	π_t^h	3.786	2.939	1.153	3.438	153.74***	3.746	7.887	147.23***	0.407	0.546	7.396***
	π_t^c	3.684	2.752	1.042	3.132	121.84***	28.476***	36.544***	192.17***	0.702	1.398	12.247***
	IPI	4.287	0.385	-0.661	2.485	56.176***	39.045***	61.624***	71.071***	4.277***	2.566***	2.992***
Finland	π_t^h	4.580	4.060	1.124	3.702	157.5***	33.332***	38.852***	166.08***	3.131**	2.500**	13.388***
	π_t^c	4.566	3.915	1.013	3.409	121.38***	26.975***	30.882***	147.47***	2.249*	4.868***	12.562***
	IPI	4.011	0.559	-0.573	2.219	54.675***	57.863***	63.59***	67.34***	33.617***	17.471***	11.638***
France	π_t^h	4.129	3.863	1.063	2.829	106.52***	125.81***	143.2***	239.2***	15.511***	7.732***	6.989***
	π_t^c	4.025	3.709	1.021	2.726	99.44***	152.93***	175.14***	225.18***	35.824***	18.081***	13.489***
	IPI	4.503	0.151	-0.373	2.215	27.429***	82.218***	104.87***	114.09***	5.974***	6.517***	4.363***
Germany	π_t^h	2.618	1.781	0.737	2.872	59.991***	2.368	14.699*	135.41***	6.517***	3.453***	8.203***
	π_t^c	2.628	1.685	0.856	2.592	84.993***	14.374***	24.427***	138.69***	4.544***	2.619***	9.064***
	IPI	4.292	0.288	-0.389	2.489	23.720***	76.336***	84.182***	85.338***	33.979***	17.055***	11.779***
Greece	π_t^h	9.166	7.509	0.443	2.086	37.942***	56.802***	74.881***	184.98***	44.132***	22.576***	25.867***
	π_t^c	9.042	7.551	0.372	1.971	37.779***	19.32***	22.509***	116.14***	7.993***	4.070***	11.955***
	IPI	4.578	0.182	-1.121	4.542	173.33***	121.78***	129.9***	155.66***	30.721***	15.129***	10.132***
Hungary	π_t^h	9.375	8.234	0.956	2.869	49.264***	52.834***	55.77***	79.431***	3.472***	3.06***	2.558***
	π_t^c	9.265	8.269	1.063	3.014	60.667***	42.114***	43.012***	65.512***	17.612***	9.399***	8.567***
	IPI	4.314	0.416	-0.517	1.818	33.08***	43.691***	48.975***	50.828***	7.096***	3.817***	2.459***
Israel	π_t^h	4.829	5.215	0.924	2.903	47.661***	379.63***	536.11***	638.92***	53.894***	35.152***	26.141***
	π_t^c	4.793	5.639	0.991	3.02	54.697***	453.9***	646.35***	724.26***	52.232***	37.142***	28.989***
	IPI	4.351	0.275	-0.409	2.201	18.232***	25.071***	27.825***	33.806***	0.617	1.099	1.01
Italy	π_t^h	5.744	5.138	1.296	3.729	206.13***	272.88***	305.98***	476.02***	38.563***	54.792***	46.864***
	π_t^c	5.823	5.088	1.264	3.59	191.4***	155.42***	167.34***	313.15***	13.259***	9.583***	25.536***
	IPI	4.429	0.309	-1.156	3.495	158.77***	61.099***	98.101***	101.77***	30.865***	16.374***	11.623***
Japan	π_t^h	2.991	3.982	2.009	8.837	1426.8***	14.909***	25.056***	167.15***	51.4***	27.644***	28.084***
	π_t^c	3.036	3.789	1.668	6.922	753.18***	17.985***	47.517***	167.7***	37.334***	22.969***	22.843***
	IPI	4.233	0.529	-1.415	3.983	255.11***	25.947***	33.722***	40.642***	8.24***	4.015***	2.73***
Korea	π_t^h	3.463	2.05	0.862	3.494	43.112***	31.698***	33.101***	132.36***	32.785***	16.161***	15.659***
	π_t^c	3.165	1.855	0.951	3.979	61.402***	34.678***	44.398***	112.62***	3.848***	2.008**	6.511***
	IPI	4.115	0.501	-0.351	1.739	27.939***	2.739	11.833	13.373	16.625***	8.183***	5.405***
Luxembourg	π_t^h	3.437	2.639	1.023	3.448	109.35***	16.183***	18.932**	107.17***	17.857***	14.178***	9.469***
	π_t^c	3.433	2.426	1.199	3.538	150.54***	10.668***	16.471***	85.712***	40.659***	37.574***	26.392***
	IPI	4.28	0.304	-0.021	1.644	45.868***	82.577***	91.993***	97.025***	31.295***	16.034***	11.565***
Mexico	π_t^h	20.118	23.188	1.629	4.79	254.72***	706.59***	853.82***	903.83***	93.447***	46.415***	34.603***
	π_t^c	19.913	23.335	1.634	4.875	261.43***	809.33***	972.48***	1022.7***	127.42***	69.589***	49.982***
	IPI	4.398	0.235	-0.349	1.675	41.305***	22.574***	30.447***	37.814***	26.037***	17.377***	13.562***
Netherlands	π_t^h	3.326	2.452	0.912	3.127	94.532***	20.145***	24,618***	187.24***	17.559***	9.119***	26.034***
	π_t^c	3.459	2.42	1.048	3.246	125.97***	35.649***	55.046***	243.12***	13.017***	7.515***	22.838***
	IPI	4.195	0.376	-1.062	3.336	130.76***	104.91***	118.97***	124.57***	38.792***	20.289***	18.604***
Norway	π_t^h	3.707	3.042	1.459	4.564	207.48***	27.343***	49.462***	136.44***	3.105**	1.772*	9.583***
	π_t^c	3.632	2.905	1.398	3.981	207.48***	14.633***	30.386***	70.173***	7.789***	4.605***	9.583***
	IPI	4.519	0.244	-0.967	2.789	71.551***	76.493***	80.47***	92.737***	43.025***	21.972***	14.578***
Portugal	π_t^h	8.723	7.902	0.912	3.114	78.227***	33.313***	70.072***	195.45***	67.117***	40.079***	31.918***
	π_t^c	8.904	7.468	0.721	2.964	48.689***	17.505***	52.322***	164.44***	40.022***	24.959***	21.654***
	IPI	4.478	0.319	-0.981	2.959	90.184***	93.899***	96.568***	103.19***	11.073***	7.927***	5.513***
Spain	π_t^h	5.672	5.209	1.399	4.613	213.14***	28.164***	30.757***	109.64***	178.9***	4.129***	6.246***
	π_t^c	5.797	5.551	1.463	4.636	229.41***	9.688**	17.934**	57.191***	208.07***	6.335***	3.244***
	IPI	4.558	0.152	0.158	2.025	21.463***	97.577***	107.32***	108.81***	20.273***	10.888***	7.394***
Sweden	π_t^h	4.374	3.881	0.541	2.119	45.645***	11.578**	29.177***	156.49***	2.288*	1.915*	17.711***
	π_t^c	4.124	3.794	0.432	2.028	39.555***	10.271**	28.981***	170.46***	0.306	0.482	12.729***
	IPI	4.339	0.263	-0.01	1.433	57.491***	71.422***	77.084***	80.916***	78.989***	43.361***	29.277***
United Kingdom	π_t^h	5.279	4.982	1.594	5.069	338.41***	180.89***	198.68***	271.52***	3.725***	2.885***	12.894***
	π_t^c	5.166	4.851	1.409	4.471	236.52***	115.91***	133.15***	224.47***	2.427**	3.197***	14.184***
	IPI	4.545	0.132	-0.543	2.054	48.586***	15.905***	27.254***	34.211***	34.278***	17.021***	11.67***
United States	π_t^h	3.715	2.717	1.441	5.124	364.07***	93.019***	101.49***	225.54***	14.422***	7.447***	15.509***
	π_t^c	3.704	2.456	1.466	4.807	337.15***	162.1***	203.87***	304.72***	24.773***	12.962***	18.104***
	IPI	4.183	0.418	-0.668	2.278	65.563***	223.39***	247.36***	257.5***	32.099***	16.556***	11.049***

π_t^h,π_t^c, and IPI are respectively, headline inflation, core inflation, and industrial production index. CR, AG, EN, and ME stand for crude oil price index, agricultural price index, energy price index, and industrial metal price index, respectively. Std is standard deviation, Skw is skewness, Kurt is Kurtosis, and J-B stands for Jarque-Bera. For autocorrelation and heteroscedasticity tests, the reported values are the Ljung-Box test Q-statistics for the former and the ARCH-LM test F-statistics in the case of the latter. We consider three different lag lengths (k) of 4, 8, and 12 for robustness. The null hypothesis for the autocorrelation test is that there is no serial correlation, while the null for the ARCH-LM test is that there is no conditional heteroscedasticity. ***, ** and * imply the rejection of the null hypothesis in both cases at 1%, 5% and 10% levels of significance, respectively.

Table 3: Result of ADF unit root test

Variable		Level			First Difference			I(d)
		A	B	C	A	B	C	
Commodity prices								
CR		-1.888	-1.357	0.496	-21.599***	-21.604***	-21.556***	I(1)
AG		-2.262	-1.557	1.042	-16.433***	-16.434***	-16.380***	I(1)
EN		-1.649	-1.364	0.776	-21.455***	-21.453***	-21.383***	I(1)
ME		-3.133*	-1.447	0.886	----------	----------	----------	I(0)
Inflation rates (Headline and core); Industrial production index								
Austria	π_t^h	-2.784	-2.035	-1.279	-24.909***	-24.930***	-24.948***	I(1)
	π_t^c	-2.989	-2.115	-1.377	-24.634***	-24.654***	-24.671***	I(1)
	IPI	-2.159	-1.744	6.225	-28.011***	-27.948***	-8.347***	I(1)
Belgium	π_t^h	-3.378*	-2.878**	-1.984**	----------	----------	----------	I(0)
	π_t^c	-2.699	-2.699*	-2.525**	----------	----------	----------	I(0)
	IPI	-2.606	0.169	3.057	-22.299***	-22.297***	-21.903***	I(1)
Canada	π_t^h	-2.817	-2.065	-1.167	-25.929***	-25.913***	-25.932***	I(1)
	π_t^c	-2.841	-1.954	-1.022	-17.509***	-17.479***	-17.490***	I(1)
	IPI	-2.785	-3.321**	2.949	-11.499***	-9.251***	-8.597***	I(1)
Finland	π_t^h	-3.635**	-2.547	-1.708*	----------	----------	----------	I(0)
	π_t^c	-3.726**	-2.530	-1.282	----------	----------	----------	I(0)
	IPI	-1.483	-3.213**	3.813	----------	----------	----------	I(0)
France	π_t^h	-2.444	-1.169	-1.077	-15.842***	-15.849***	-15.857***	I(1)
	π_t^c	-2.541	-1.034	-1.041	-11.257***	-11.252***	-11.250***	I(1)
	IPI	-2.167	-2.393	1.924	-13.304***	-13.195***	-13.006***	I(1)
Germany	π_t^h	-2.743	-2.231	-1.394	-25.032***	-25.051***	-25.069***	I(1)
	π_t^c	-2.515	-1.897	-1.264	-29.307***	-29.328***	-29.347***	I(1)
	IPI	-3.517**	-1.974	2.908	----------	----------	----------	I(0)
Greece	π_t^h	-3.918**	-1.967	-1.289	----------	----------	----------	I(0)
	π_t^c	-3.288*	-1.596	-1.131	----------	----------	----------	I(0)
	IPI	-3.204*	-5.087***	1.842	----------	----------	----------	I(0)
Hungary	π_t^h	-2.397	-2.169	-2.582***	----------	----------	----------	I(0)
	π_t^c	-3.320*	-2.991**	-3.210***	----------	----------	----------	I(0)
	IPI	-2.147	0.158	2.646	-25.687***	-25.680***	-9.409***	I(1)
Israel	π_t^h	-3.749**	-2.987**	-2.493**	----------	----------	----------	I(0)
	π_t^c	-3.565**	-2.813*	-2.348**	----------	----------	----------	I(0)
	IPI	-2.433	-2.209	3.423	-17.540***	-17.409***	-16.742	I(1)
Italy	π_t^h	-2.634	-1.980	-1.358	-11.819***	-11.801***	-11.809***	I(1)
	π_t^c	-2.387	-1.634	-1.168	-12.367***	-12.336***	-12.344***	I(1)
	IPI	-2.284	-4.159***	2.441	----------	----------	----------	I(0)
Japan	π_t^h	-3.259*	-2.315	-1.975**	----------	----------	----------	I(0)
	π_t^c	-3.725**	-1.791	-1.556	----------	----------	----------	I(0)
	IPI	-2.645	-4.449***	2.492	----------	----------	----------	I(0)
Korea	π_t^h	-4.692***	-3.715***	-2.462**	----------	----------	----------	I(0)
	π_t^c	-3.297*	-3.066**	-2.430**	----------	----------	----------	I(0)
	IPI	-1.518	-1.847	3.973	-19.084***	-18.974***	-18.027***	I(1)
Luxembourg	π_t^h	-2.638	-1.952	-1.148	-22.067***	-22.083***	-22.101***	I(1)
	π_t^c	-2.475	-1.569	-1.037	-24.369***	-24.384***	-24.402***	I(1)
	IPI	-2.455	-1.392	1.562	-25.750***	-25.759***	-12.884***	I(1)
Mexico	π_t^h	-3.748**	-2.416	-1.931*	----------	----------	----------	I(0)
	π_t^c	-4.249***	-2.721*	-2.171**	----------	----------	----------	I(0)
	IPI	-2.680	-1.019	2.626	-13.379***	-13.382***	-7.926***	I(1)
Netherlands	π_t^h	-4.289***	-2.997**	-1.634*	----------	----------	----------	I(0)
	π_t^c	-3.889**	-2.577*	-1.481	----------	----------	----------	I(0)
	IPI	-2.223	-4.529***	3.713	-18.154***	-26.409***	-25.796***	I(1)
Norway	π_t^h	-2.853	-2.140	-1.799	-17.021***	-17.038***	-17.042***	I(1)
	π_t^c	-1.831	-1.259	-1.275	-21.031***	-21.048***	-21.039***	I(1)
	IPI	-0.967	-2.844*	1.991	-17.680***	-17.281***	-17.078***	I(1)
Portugal	π_t^h	-4.716***	-2.375	-1.711*	----------	----------	----------	I(0)
	π_t^c	-5.587***	-1.754	-1.464	----------	----------	----------	I(0)
	IPI	-1.512	-3.942***	2.899	----------	----------	----------	I(0)
Spain	π_t^h	-2.236	-1.987	-2.238**	----------	----------	----------	I(0)
	π_t^c	-3.871**	-4.403***	-5.059***	----------	----------	----------	I(0)
	IPI	-1.321	-2.293	1.492	-35.115***	-34.966***	-34.879***	I(1)
Sweden	π_t^h	-2.957	-1.977	-1.715*	----------	----------	----------	I(0)
	π_t^c	-2.894	-2.007	-1.703*	----------	----------	----------	I(0)
	IPI	-1.613	-0.930	2.125	23.878***	-23.893***	-23.714***	I(1)
United Kingdom	π_t^h	-3.227*	-2.234	-1.718*	----------	----------	----------	I(0)
	π_t^c	-3.213*	-2.131	-1.672*	----------	----------	----------	I(0)
	IPI	-1.627	-1.816	1.232	-28.278***	-28.256***	-28.210***	I(1)
United States	π_t^h	-2.945	-2.557	-1.458	-18.516***	-18.517***	-18.531***	I(1)
	π_t^c	-2.859	-2.317	-1.171	-12.389***	-12.366***	-12.374***	I(1)
	IPI	-2.411	-2.199	3.212	-9.629***	-9.463***	-7.447***	I(1)

Note: ***, **,* indicate the rejection of the null hypothesis of a unit root at 1%, 5% and 10%, respectively; A, B and C denote models with intercept and trend, with intercept only and with none, respectively; I(d) implies the order of integration, where d is the number of differencing required for a series to become stationary; All variables except inflation rates (headline and core) are in their log forms. Series that are stationary at levels do not require reporting their first differences.

Table 4: Persistence and endogeneity test results for predictors

Country		Persistence					Endogeneity				
		CR	AG	EN	ME	IPI	CR	AG	EN	ME	IPI
Austria	π_t^h	0.994***	0.995***	0.995***	0.996***	0.998***	0.319	-0.028	0.643	-3.561***	-9.553***
	π_t^c	0.994***	0.995***	0.995***	0.996***	0.998***	-0.659	-1.659	-0.758	-2.629**	-8.957***
Belgium	π_t^h	0.991***	0.996***	0.992***	0.994***	0.998***	-0.716	-4.858*	-0.547	-4.745***	-7.334**
	π_t^c	0.991***	0.996***	0.992***	0.994***	0.998***	-1.543***	-3.396*	-2.001***	-1.202	-3.744
Canada	π_t^h	0.997***	0.997***	0.997***	0.996***	0.996***	0.097	-6.004**	0.633	-4.089**	-38.619***
	π_t^c	0.997***	0.997***	0.997***	0.996***	0.996***	-0.845	-6.177**	-0.672	-3.705*	-41.157***
Finland	π_t^h	0.997***	0.997***	0.997***	0.997***	0.996***	0.621	-8.253**	0.988	-6.048**	-9.727**
	π_t^c	0.997***	0.997***	0.997***	0.997***	0.996***	0.132	-8.052**	0.294	-4.995**	-9.191**
France	π_t^h	0.996***	0.997***	0.997***	0.996***	0.996***	1.357**	2.800	1.719**	-2.439**	12.412***
	π_t^c	0.996***	0.997***	0.997***	0.996***	0.996***	0.555	1.616	0.673	-2.162*	-12.339***
Germany	π_t^h	0.996***	0.997***	0.997***	0.996***	0.996***	1.357**	2.800	1.719**	-2.439**	-12.412***
	π_t^c	0.996***	0.997***	0.997***	0.996***	0.996***	0.555	1.616	0.673	-2.162*	-12.339***
Greece	π_t^h	0.989***	0.992***	0.990***	0.995***	0.979***	-1.892	-11.556*	-1.800	-7.545*	-18.669***
	π_t^c	0.989***	0.992***	0.990***	0.995***	0.979***	-3.256*	-16.197**	-3.592	-7.123	-18.897***
Hungary	π_t^h	0.992***	0.996***	0.993***	0.995***	0.999***	-3.481	-10.131	-3.686	-11.184***	-13.411**
	π_t^c	0.992***	0.996***	0.993***	0.995***	0.999***	-3.976	-19.106**	-4.616	-10.465**	-10.826*
Israel	π_t^h	0.989***	0.992***	0.990***	0.995***	0.992***	-32.158***	-153.02***	-36.727***	-56.409**	7.127
	π_t^c	0.989***	0.992***	0.990***	0.995***	0.992***	-33.082***	-151.02***	-38.186***	-54.818**	9.602
Italy	π_t^h	0.997***	0.997***	0.997***	0.997***	0.991***	-1.167	-7.717*	-0.789	-6.792*	-18.426**
	π_t^c	0.997***	0.997***	0.997***	0.997***	0.991***	-1.676	-9.304**	-1.532	-6.383*	-17.135**
Japan	π_t^h	0.997***	0.997***	0.997***	0.997***	0.993***	2.564**	1.832	3.529**	-4.962**	-27.237***
	π_t^c	0.997***	0.997***	0.997***	0.997***	0.993***	2.589**	1.813	3.363**	-3.413	-22.038***
Korea	π_t^h	0.992***	0.996***	0.993***	0.995***	0.996***	-2.906***	-3.621	-3.583***	-4.103***	-8.464**
	π_t^c	0.992***	0.996***	0.993***	0.995***	0.996***	-3.676***	-2.888	-4.428***	-5.163***	-6.409**
Luxembourg	π_t^h	0.994***	0.995***	0.994***	0.995***	0.990***	0.087	-1.479	0.507	-4.085**	-0.762
	π_t^c	0.994***	0.995***	0.994***	0.995***	0.990***	-0.597	-2.740	-0.595	-3.841**	-0.118
Mexico	π_t^h	0.992***	0.997***	0.994***	0.995***	0.998***	-8.272	51.297*	-10.951	36.804**	39.196
	π_t^c	0.992***	0.997***	0.994***	0.995***	0.998***	-8.809	54.009*	-11.577	37.745**	36.075
Netherlands	π_t^h	0.997***	0.997***	0.997***	0.997***	0.994***	1.199	-0.090	1.493	-2.119	-5.496
	π_t^c	0.997***	0.997***	0.997***	0.997***	0.994***	1.114	0.340	1.316	-1.265	-4.622*
Norway	π_t^h	0.991***	0.997***	0.993***	0.994***	0.981***	-1.595	-8.313**	-2.016	-2.245	3.929**
	π_t^c	0.991***	0.997***	0.993***	0.994***	0.981***	-1.753*	-6.245*	-2.352**	-2.414	4.725***
Portugal	π_t^h	0.989***	0.992***	0.990***	0.995***	0.990***	-2.267	-13.087**	-2.259	-8.899**	1.573
	π_t^c	0.989***	0.992***	0.990***	0.995***	0.990***	-2.149	-4.165	-2.339	-5.990*	2.953
Spain	π_t^h	0.991***	0.994***	0.992***	0.994***	0.989***	0.359	-4.267	1.173	-2.331	-3.073
	π_t^c	0.991***	0.994***	0.992***	0.994***	0.989***	-0.301	-0.527	0.137	-0.552	-1.403
Sweden	π_t^h	0.989***	0.992***	0.990***	0.995***	0.995***	-1.453*	-4.562	-1.441	-7.573***	-2.236
	π_t^c	0.989***	0.992***	0.990***	0.995***	0.995***	-2.161**	-4.743	-2.412**	-7.728***	-0.283
United Kingdom	π_t^h	0.989***	0.992***	0.990***	0.995***	0.992***	-0.138	-11.641***	0.297	-7.239***	-17.701*
	π_t^c	0.989***	0.992***	0.990***	0.995***	0.992***	-0.669	-11.216***	-0.449	-6.105**	-13.141
United States	π_t^h	0.997***	0.997***	0.997***	0.997***	0.998***	2.093**	-3.525	3.158***	-3.419*	-81.478***
	π_t^c	0.997***	0.997***	0.997***	0.997***	0.998***	-0.490	-9.826***	-0.232	-5.335***	-81.661***

Note: This table reports the endogeneity and persistence test results. Starting with the former, the test follows a three-step procedure: First, we run the following predictive regression model: $\pi_t = \alpha + \beta x_{t-1} + \varepsilon_{\pi,t}$ where π_t represents inflation rate and x_{t-1} is the predictor variable such as industrial production index and commodity prices. In the second step, we follow Westerlund and Narayan (2015) and model the predictor variable as follows: $x_t = \mu(1-\rho) + \rho x_{t-1} + \varepsilon_{\pi,t}$ and in the final step, the relationship between the error terms is captured using the following regression:$\varepsilon_{\pi,t} = \lambda \varepsilon_{x,t-1} + \eta_t$. If the coefficient λ is statistically different from zero at any of the conventional chosen levels of significance such as ***, ** and * for 1%, 5% and 10%, respectively; then, the predictor variable is endogenous. For the latter however, the persistence test is conducted by regressing a first order autoregressive process for the predictor, for example: $z_t = \omega + \rho z_{t-1} + \vartheta_t$using OLS estimator. The first order autocorrelation coefficient (ρ) captures the persistence effect and is reported for each of the predictors. The null is that there is presence of persistence effect if ρ is statistically significant and the closer the value to one the higher the degree of persistence.

Table 5: In-sample Predictability Results for inflation rates (Headline and Core) using Commodity prices-inflation model

Country	π_t^h				π_t^c			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	1.384***	4.558***	1.561***	5.239***	2.131***	5.112***	2.369***	4.648***
	(0.106)	(0.321)	(0.114)	(0.448)	(0.137)	(0.409)	(0.147)	(0.664)
Belgium	2.972***	-0.468	3.244***	-0.603	1.370***	-2.601***	1.513***	0.289
	(0.148)	(0.813)	(0.160)	(0.565)	(0.137)	(0.559)	(0.149)	(0.305)
Canada	3.861***	9.955***	4.159***	10.237***	3.733***	8.584***	4.002***	9.177***
	(0.121)	(0.514)	(0.127)	(0.626)	(0.118)	(0.500)	(0.123)	(0.619)
Finland	4.914***	11.861***	5.258***	13.022***	4.842***	10.576***	5.199***	11.892***
	(0.223)	(0.619)	(0.241)	(1.036)	(0.226)	(0.652)	(0.242)	(1.034)
France	3.250***	6.777***	3.418***	7.653***	2.919***	5.536***	3.122***	7.224***
	(0.149)	(0.769)	(0.158)	(0.503)	(0.126)	(0.649)	(0.131)	(0.439)
Germany	1.122***	4.482***	1.232***	4.657***	1.032***	3.558***	1.141***	4.449***
	(0.117)	(0.334)	(0.126)	(0.439)	(0.102)	(0.269)	(0.109)	(0.380)
Greece	4.684***	6.628***	5.674***	20.784***	4.403***	8.488***	5.423***	19.889***
	(0.348)	(1.265)	(0.379)	(1.186)	(0.369)	(1.225)	(0.401)	(1.271)
Hungary	6.926***	17.359***	7.828***	12.051***	4.879***	14.818***	5.520***	9.466***
	(0.562)	(1.287)	(0.576)	(0.827)	(0.588)	(1.304)	(0.607)	(0.944)
Israel	52.279***	-128.2***	51.175***	-3.875***	50.521***	-120.4***	48.361***	-1.420***
	(6.138)	(17.707)	(7.355)	(15.459)	(6.042)	(18.002)	(7.244)	(15.829)
Italy	5.867***	16.640***	6.195***	15.109***	6.164***	16.534***	6.548***	16.512***
	(0.218)	(0.659)	(0.232)	(0.988)	(0.171)	(0.620)	(0.181)	(0.870)
Japan	4.689***	17.747***	5.002***	13.879***	4.607***	15.429***	4.978***	16.438***
	(0.448)	(0.979)	(0.485)	(1.364)	(0.384)	(0.822)	(0.415)	(1.139)
Korea	3.458***	10.087***	3.898***	5.026***	4.642***	11.389***	5.185***	7.248***
	(0.294)	(0.863)	(0.309)	(0.489)	(0.249)	(0.825)	(0.251)	(0.449)
Luxembourg	2.654***	6.535***	2.805***	6.623***	2.602***	6.093***	2.806***	7.306***
	(0.191)	(0.689)	(0.202)	(0.856)	(0.134)	(0.488)	(0.141)	(0.743)
Mexico	-29.15***	-14.49***	-28.28***	49.99***	-25.66***	-13.65***	-29.83***	50.822***
	(3.654)	(10.422)	(4.035)	(3.688)	(3.652)	(10.691)	(4.025)	(3.606)
Netherlands	2.299***	8.152***	2.566***	7.502***	2.093***	7.069***	2.391***	6.577***
	(0.206)	(0.489)	(0.224)	(0.772)	(0.209)	(0.481)	(0.228)	(0.769)
Norway	2.554***	1.413***	2.823***	-0.251***	1.600***	-0.955	1.764***	-1.136***
	(0.200)	(0.697)	(0.228)	(0.506)	(0.191)	(0.614)	(0.217)	(0.422)
Portugal	5.364***	17.674***	6.197***	14.904***	4.122***	19.924***	4.784***	10.946***
	(0.596)	(1.981)	(0.613)	(1.730)	(0.690)	(2.046)	(0.721)	(1.887)
Spain	-2.550***	-11.13***	-3.107***	-5.049***	-2.972***	-6.689***	-3.675***	-4.991***
	(0.348)	(1.443)	(0.360)	(0.827)	(0.299)	(1.317)	(0.308)	(0.682)
Sweden	3.144***	4.313***	3.386***	7.816***	2.331***	2.529***	2.603***	6.017***
	(0.195)	(0.828)	(0.207)	(0.507)	(0.210)	(0.814)	(0.218)	(0.523)
United Kingdom	1.399***	-3.767***	1.909***	3.699***	2.031***	-1.817***	2.546***	3.858***
	(0.325)	(1.010)	(0.342)	(0.798)	(0.302)	(0.978)	(0.316)	(0.701)
United States	3.859***	11.512***	4.204***	11.894***	3.297***	9.534***	3.616***	10.469***
	(0.112)	(0.315)	(0.121)	(0.384)	(0.096)	(0.278)	(0.099)	(0.404)

Note: The in-sample predictability in a bivariate model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). We employ both the headline inflation rate (π_t^h) and the core inflation rate (π_t^c). *** implies the rejection of the null hypothesis of no predictability at 1% level of significance. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive model. Here, we consider 75% of the full sample data.

Table 6: In-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Headline and core inflation)

Country	π_t^h				π_t^c			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	7.806***	7.728***	7.805***	5.937***	9.575***	9.083***	9.601***	6.948***
	(0.534)	(0.562)	(0.527)	(0.491)	(0.720)	(0.745)	(0.710)	(0.626)
Belgium	4.028***	2.227***	4.014***	2.269***	2.088***	2.251***	2.137***	2.011***
	(0.432)	(0.404)	(0.428)	(0.368)	(0.275)	(0.258)	(0.273)	(0.280)
Canada	17.703***	17.573***	17.632***	15.474***	14.638***	14.337***	14.613***	13.163***
	(1.044)	(1.007)	(1.048)	(0.944)	(0.831)	(0.781)	(0.834)	(0.712)
Finland	34.733***	33.370***	34.450***	27.660***	30.095***	28.386***	29.846***	24.414***
	(2.151)	(2.184)	(2.125)	(1.902)	(1.798)	(1.799)	(1.779)	(1.556)
France	31.950***	30.219***	32.075***	28.314***	30.411***	29.137***	30.524***	27.592***
	(2.223)	(2.150)	(2.213)	(2.108)	(2.115)	(2.034)	(2.110)	(1.981)
Germany	3.707***	4.122***	3.726***	3.106***	3.083***	3.464***	3.094***	2.660***
	(0.305)	(0.342)	(0.303)	(0.298)	(0.262)	(0.294)	(0.261)	(0.260)
Greece	118.513***	115.654***	117.251***	101.419***	93.136***	90.956***	92.347***	77.866***
	(6.913)	(7.333)	(6.733)	(6.338)	(5.781)	(6.271)	(5.592)	(5.289)
Hungary	6.204***	14.823***	6.362***	13.149***	4.731***	11.540***	4.747***	8.664***
	(1.340)	(2.348)	(1.389)	(1.983)	(1.624)	(2.283)	(1.693)	(1.958)
Israel	4921.977***	4801.862***	4871.887***	3493.954***	4997.231***	4869.253***	4953.333***	3661.774***
	(413.916)	(397.445)	(409.668)	(339.120)	(416.541)	(396.380)	(412.179)	(338.304)
Italy	74.728***	70.207***	74.863***	61.241***	71.220***	67.600***	71.383***	58.361***
	(4.609)	(4.576)	(4.587)	(4.129)	(4.515)	(4.423)	(4.501)	(4.081)
Japan	42.682***	36.186***	42.405***	39.506***	38.751***	32.649***	38.470***	34.554***
	(3.729)	(4.004)	(3.699)	(3.765)	(3.019)	(3.233)	(2.992)	(3.125)
Korea	1.546***	3.411***	1.722***	2.263***	0.313	1.590***	0.497*	0.705**
	(0.218)	(0.326)	(0.223)	(0.240)	(0.303)	(0.276)	(0.300)	(0.300)
Luxembourg	15.883***	15.067***	15.943***	11.323***	13.981***	13.103***	14.052***	9.191***
	(0.946)	(0.951)	(0.935)	(0.793)	(0.903)	(0.906)	(0.894)	(0.749)
Mexico	1201.344***	1186.000***	1211.081***	1126.258***	1214.733***	1208.686***	1222.626***	1148.332***
	(108.288)	(116.666)	(107.454)	(123.832)	(109.950)	(118.158)	(109.096)	(126.156)
Netherlands	9.098***	10.301***	9.091***	6.324***	6.449***	7.902***	6.488***	3.584***
	(0.465)	(0.537)	(0.462)	(0.466)	(0.416)	(0.491)	(0.419)	(0.454)
Norway	13.589***	13.511***	13.668***	14.971***	10.490***	10.906***	10.579***	11.686***
	(1.196)	(1.207)	(1.189)	(1.192)	(0.938)	(0.946)	(0.931)	(0.931)
Portugal	147.906***	137.330***	147.198***	125.668***	107.000***	97.326***	106.362***	93.967***
	(7.364)	(8.004)	(7.248)	(6.963)	(5.463)	(6.175)	(5.357)	(5.032)
Spain	4.018***	5.141***	4.126***	5.321***	6.351***	6.755***	6.497***	6.808***
	(0.525)	(0.669)	(0.495)	(0.562)	(0.486)	(0.591)	(0.460)	(0.551)
Sweden	22.559***	19.387***	22.472***	20.912***	20.348***	18.210***	20.314***	19.566***
	(1.254)	(1.172)	(1.257)	(1.229)	(1.093)	(1.066)	(1.094)	(1.090)
United Kingdom	45.668***	43.179***	45.539***	42.607***	41.385***	38.916***	41.242***	40.057***
	(4.028)	(4.079)	(3.973)	(3.787)	(3.397)	(3.406)	(3.360)	(3.266)
United States	13.147***	14.501***	13.330***	13.408***	13.629***	14.007***	13.782***	13.073***
	(1.344)	(1.350)	(1.347)	(1.324)	(1.155)	(1.160)	(1.162)	(1.100)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (headline and core inflation rates) and the restricted model (the Random walk model). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for in-sample data covering 75% of the full sample. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for in-sample data covering 75% of the full sample.

Table 7: Out-of-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Headline Inflation)

Country	π_t^h											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	7.763***	7.768***	7.848***	7.695***	7.723***	7.834***	7.715***	7.763***	7.839***	5.871***	5.868***	5.842***
	(0.527)	(0.521)	(0.515)	(0.555)	(0.548)	(0.542)	(0.521)	(0.513)	(0.508)	(0.486)	(0.479)	(0.473)
Belgium	3.961***	3.929***	3.980***	2.286***	2.105***	1.701***	3.976***	3.918***	3.983***	2.260***	2.140***	1.676***
	(0.426)	(0.419)	(0.414)	(0.398)	(0.399)	(0.426)	(0.422)	(0.416)	(0.410)	(0.362)	(0.370)	(0.410)
Canada	17.799***	17.922***	17.930***	17.856***	18.128***	18.307***	17.635***	17.845***	17.853***	15.503***	15.798***	15.812***
	(1.033)	(1.022)	(1.010)	(1.002)	(0.997)	(0.989)	(1.036)	(1.026)	(1.014)	(0.933)	(0.928)	(0.918)
Finland	34.954***	35.241***	35.495***	33.892***	34.460***	34.973***	34.557***	34.946***	35.192***	27.847***	28.369***	28.467***
	(2.127)	(2.106)	(2.085)	(2.169)	(2.156)	(2.142)	(2.101)	(2.081)	(2.060)	(1.882)	(1.870)	(1.849)
France	31.554***	31.164***	30.836***	29.914***	29.604***	29.359***	31.656***	31.293***	30.974***	27.948***	27.494***	26.997***
	(2.197)	(2.172)	(2.146)	(2.123)	(2.097)	(2.070)	(2.188)	(2.162)	(2.136)	(2.083)	(2.062)	(2.043)
Germany	3.767***	3.785***	3.794***	4.185***	4.204***	4.223***	3.753***	3.802***	3.810***	3.140***	3.150***	3.138***
	(0.302)	(0.298)	(0.295)	(0.339)	(0.335)	(0.332)	(0.300)	(0.297)	(0.294)	(0.294)	(0.291)	(0.288)
Greece	118.528***	118.530***	118.924***	116.236***	116.863***	117.627***	117.411***	117.045***	117.369***	101.804***	97.060***	93.801***
	(6.815)	(6.719)	(6.628)	(7.232)	(7.135)	(7.043)	(6.638)	(6.545)	(6.455)	(6.250)	(6.300)	(6.352)
Hungary	6.137***	6.212***	5.901***	14.464***	14.111***	13.704***	6.211***	6.385***	6.056***	12.830***	12.572***	12.163***
	(1.307)	(1.277)	(1.258)	(2.294)	(2.243)	(2.196)	(1.356)	(1.324)	(1.305)	(1.938)	(1.894)	(1.857)
Israel	4848.834***	4776.702***	4710.200***	4767.068***	4734.654***	4719.486***	4811.577***	4729.838***	4665.690***	3453.282***	3382.674***	3328.475***
	(409.089)	(404.396)	(399.701)	(392.035)	(386.750)	(381.446)	(404.564)	(400.195)	(395.505)	(334.688)	(331.104)	(327.251)
Italy	74.469***	74.260***	73.994***	70.278***	70.317***	70.266***	74.446***	74.374***	74.091***	60.984***	61.105***	60.713***
	(4.556)	(4.503)	(4.453)	(4.522)	(4.470)	(4.418)	(4.536)	(4.483)	(4.433)	(4.082)	(4.034)	(3.991)
Japan	42.804***	42.942***	43.029***	36.469***	36.611***	36.724***	42.217***	42.635***	42.712***	39.352***	39.752***	39.626***
	(3.686)	(3.643)	(3.602)	(3.959)	(3.913)	(3.868)	(3.657)	(3.614)	(3.573)	(3.721)	(3.678)	(3.636)
Korea	1.520***	1.443***	1.424***	3.320***	3.270***	3.187***	1.689***	1.611***	1.590***	2.216***	2.145***	2.114***
	(0.213)	(0.211)	(0.207)	(0.320)	(0.313)	(0.308)	(0.218)	(0.216)	(0.213)	(0.235)	(0.232)	(0.228)
Luxembourg	15.861***	15.785***	15.687***	15.111***	15.101***	15.053***	15.803***	15.849***	15.751***	11.245***	11.202***	11.081***
	(0.934)	(0.922)	(0.911)	(0.938)	(0.926)	(0.914)	(0.924)	(0.911)	(0.900)	(0.783)	(0.773)	(0.764)
Mexico	1196.138***	1184.726***	1176.232***	1173.027***	1159.033***	1145.714***	1190.583***	1197.234***	1189.343***	1107.293***	1086.075***	1068.544***
	(106.349)	(104.562)	(102.795)	(114.676)	(112.781)	(110.944)	(105.835)	(103.729)	(101.969)	(121.833)	(119.998)	(118.117)
Netherlands	9.246***	9.444***	9.667***	10.548***	10.841***	11.162***	9.087***	9.445***	9.667***	6.353***	6.739***	6.899***
	(0.464)	(0.466)	(0.469)	(0.541)	(0.548)	(0.557)	(0.457)	(0.463)	(0.467)	(0.461)	(0.471)	(0.470)
Norway	13.348***	13.077***	12.938***	13.265***	12.965***	12.849***	13.429***	13.154***	13.013***	14.710***	14.273***	14.158***
	(1.179)	(1.164)	(1.146)	(1.190)	(1.177)	(1.158)	(1.172)	(1.158)	(1.140)	(1.176)	(1.173)	(1.155)
Portugal	147.855***	147.642***	147.831***	138.147***	138.428***	138.991***	147.026***	146.772***	146.935***	125.803***	123.940***	122.066***
	(7.259)	(7.158)	(7.060)	(7.896)	(7.787)	(7.682)	(7.145)	(7.046)	(6.949)	(6.864)	(6.799)	(6.749)
Spain	4.299***	4.126***	3.649***	5.415***	5.200***	4.593***	4.104***	4.263***	3.726***	5.280***	5.477***	4.905***
	(0.529)	(0.530)	(0.559)	(0.667)	(0.668)	(0.705)	(0.487)	(0.509)	(0.550)	(0.553)	(0.578)	(0.617)
Sweden	22.509***	22.384***	22.291***	19.580***	19.652***	19.699***	22.477***	22.292***	22.204***	20.938***	20.513***	20.167***
	(1.236)	(1.220)	(1.204)	(1.158)	(1.142)	(1.126)	(1.239)	(1.223)	(1.206)	(1.211)	(1.201)	(1.193)
United Kingdom	45.366***	45.062***	44.709***	42.958***	42.743***	42.469***	44.995***	44.910***	44.554***	42.105***	41.961***	41.547***
	(3.972)	(3.918)	(3.866)	(4.022)	(3.966)	(3.913)	(3.923)	(3.866)	(3.815)	(3.738)	(3.685)	(3.638)
United States	13.142***	13.159***	13.111***	14.621***	14.734***	14.742***	13.301***	13.334***	13.280***	13.378***	13.552***	13.452***
	(1.328)	(1.313)	(1.298)	(1.335)	(1.320)	(1.305)	(1.331)	(1.315)	(1.301)	(1.309)	(1.295)	(1.280)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (headline inflation rates) and the restricted model (the Random walk model). The negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table 8: In-sample Predictability Results for Inflation rates (Headline) using Traditional Phillips Curve and Commodity prices-augmented Phillips Curve

Country	$\pi_t^{tr\_pc\_h}$	$\pi_t^{aug\_pc\_h}$							
		CASE I		**CASE II**		**CASE III**		**CASE IV**	
	IPI	IPI	CR	IPI	AG	IPI	EN	IPI	ME
Austria	-2.152***	23.418***	0.782***	21.683***	2.299***	23.517***	0.822***	25.612***	1.494***
	(0.468)	(0.851)	(0.093)	(0.267)	(0.267)	(0.869)	(0.104)	(0.886)	(0.352)
Belgium	-11.498***	-4.247	3.360***	7.192**	3.285***	1.513	3.675***	16.461***	-2.773***
	(0.508)	(2.651)	(0.257)	(3.227)	(1.075)	(2.753)	(0.288)	(4.151)	(0.699)
Canada	0.739	20.749***	3.094***	18.555***	8.489***	20.125***	3.323***	21.427***	5.073***
	(0.613)	(0.557)	(0.100)	(1.156)	(0.508)	(0.562)	(0.109)	(1.507)	(0.786)
Finland	0.393	31.388***	3.446***	32.909***	6.438***	30.881***	3.669***	41.721***	1.051
	(0.653)	(1.187)	(1.814)	(1.611)	(0.754)	(1.236)	(0.274)	(1.887)	(1.330)
France	-8.628***	27.252***	3.069***	34.591***	6.333***	28.524***	3.228***	49.669***	1.706**
	(1.819)	(2.128)	(0.149)	(2.437)	(0.588)	(2.144)	(0.166)	(3.736)	(0.664)
Germany	-1.775***	21.698***	0.507***	18.698***	2.428***	21.653***	0.488***	21.769***	1.160***
	(0.637)	(1.053)	(0.108)	(1.150)	(0.338)	(1.071)	(0.119)	(1.188)	(1.790)
Greece	0.943	51.312***	2.957***	46.910***	4.338***	50.709***	3.493***	48.034***	10.938***
	(1.678)	(2.668)	(0.543)	(2.461)	(1.291)	(2.737)	(0.613)	(1.936)	(1.126)
Hungary	-21.508***	5.364*	3.681***	15.481***	22.629***	7.211***	2.976*	4.178**	10.878***
	(0.945)	(4.062)	(1.339)	(1.824)	(1.983)	(2.915)	(1.582)	(1.914)	(1.178)
Israel	-28.405***	18.048***	3.345***	13.209***	-2.007	17.785***	3.361***	17.751***	0.338
	(1.964)	(3.426)	(1.126)	(4.307)	(2.454)	(3.449)	(1.149)	(2.949)	(1.675)
Italy	-0.835	26.889***	5.116***	22.323***	17.344***	26.015***	5.543***	49.366***	-2.240*
	(1.321)	(0.998)	(0.214)	(1.123)	(0.629)	(1.042)	(0.249)	(2.363)	(1.165)
Japan	-3.147***	15.748***	2.861***	8.129***	14.440***	16.041***	2.692***	19.055***	1.526
	(0.862)	(0.939)	(0.351)	(0.849)	(0.793)	(0.978)	(0.395)	(1.214)	(1.369)
Korea	-3.984***	-26.168***	2.853***	-12.316***	6.770***	-25.681***	3.004***	-21.066***	4.928***
	(0.440)	(2.047)	(0.417)	(2.329)	(0.986)	(2.131)	(0.459)	(2.005)	(0.526)
Luxembourg	-9.199***	8.467***	3.191***	0.893	7.329***	8.683***	3.403***	-3.485**	5.231***
	(0.889)	(1.284)	(0.240)	(1.328)	(0.688)	(1.308)	(0.271)	(1.505)	(0.966)
Mexico	-190.59***	-416.99***	10.459**	-388.77***	-11.448	-411.69***	10.166**	-352.69***	-3.011
	(10.165)	(21.282)	(4.539)	(20.815)	(12.852)	(21.536)	(5.149)	(19.604)	(5.704)
Netherlands	0.8902	18.262***	0.576***	17.883***	1.849***	18.187***	0.578***	18.851***	-1.198**
	(0.5579)	(0.683)	(0.149)	(0.711)	(0.434)	(0.706)	(0.164)	(0.806)	(0.585)
Norway	-12.317***	0.243	2.767***	-8.913***	2.829***	1.324	3.252***	-8.979***	1.103
	(0.441)	(1.843)	(0.402)	(1.681)	(1.005)	(1.875)	(0.452)	(1.801)	(0.701)
Portugal	-1.385	14.318***	5.337***	24.159***	22.047***	13.391***	6.367***	34.347***	20.538***
	(1.466)	(3.915)	(0.799)	(3.882)	(1.953)	(3.799)	(0.847)	(4.058)	(2.581)
Spain	-45.054***	36.666***	-2.346***	39.256***	0.032	37.511***	-2.409***	48.251***	-5.015***
	(1.829)	(4.539)	(0.784)	(4.301)	(1.871)	(4.523)	(0.831)	(4.803)	(1.031)
Sweden	-15.356***	2.449	2.951***	-6.005**	4.686***	3.06	3.365***	4.232**	8.621***
	(1.009)	(2.189)	(0.327)	(2.359)	(0.941)	(2.194)	(0.359)	(2.128)	(0.696)
United Kingdom	-34.117***	7.944	3.354***	9.654	1.139	6.967	3.919***	-19.60***	8.654***
	(3.616)	(5.846)	(0.409)	(6.404)	(1.469)	(5.913)	(0.447)	(7.332)	(1.436)
United States	3.339***	28.14***	3.175***	22.241***	9.984***	27.123***	3.488***	22.647***	8.588***
	(0.631)	(0.927)	(0.099)	(0.987)	(0.275)	(0.919)	(0.107)	(1.608)	(0.535)

Note: The in-sample predictability in a single-factor model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for industrial production index in the traditional Phillips Curve equation. We also extend the traditional Phillips Curve to accommodate the role of commodity prices, so that we can have a multi-factor commodity prices-augmented Phillips Curve equation. In this case z comprises industrial production index and commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). Here, we employ the headline inflation rate (π_t^h). ***, **, and * imply the rejection of the null hypothesis of no predictability at 1%, 5%, and 10% levels of significance, respectively. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive models (Traditional and commodity prices-augmented Phillips Curve equations). We therefore consider four cases for each of the commodity prices. Here, we capture 75% of the full sample data for in-sample forecast.

Table 9: In-sample Predictability Results for Inflation rates (Core) using Traditional Phillips Curve and Commodity prices-augmented Phillips Curve

Country	$\pi_t^{tr\_pc\_c}$	$\pi_t^{aug\_pc\_c}$							
		CASE I		**CASE II**		**CASE III**		**CASE IV**	
	IPI	IPI	CR	IPI	AG	IPI	EN	IPI	ME
Austria	-2.044***	17.347***	1.874***	17.881***	4.274***	17.099***	2.063***	27.407***	1.605**
	(0.568)	(1.377)	(0.141)	(1.544)	(0.402)	(1.537)	(0.156)	(1.595)	(0.740)
Belgium	-11.498***	-11.899***	0.585***	3.948**	-0.736	-11.582***	0.654***	7.522***	-1.369***
	(0.508)	(1.908)	(0.217)	(1.735)	(0.836)	(1.891)	(0.233)	(2.054)	(0.465)
Canada	0.522	18.606***	2.849***	16.884***	8.489***	18.049***	3.038***	19.033***	5.359***
	(0.531)	(0.598)	(0.108)	(1.189)	(0.557)	(0.602)	(0.118)	(1.448)	(0.806)
Finland	-0.048	29.448***	3.586***	31.739***	7.45***	28.616***	3.866***	36.986***	2.889*
	(0.601)	(1.236)	(0.253)	(1.681)	(0.837)	(1.279)	(0.287)	(2.035)	(1.514)
France	-5.113***	16.567***	2.808***	26.717***	5.7486***	17.552***	3.033***	43.643***	1.959***
	(1.533)	(1.818)	(0.119)	(2.225)	(0.491)	(1.790)	(0.131)	(3.640)	(0.622)
Germany	-1.109**	17.002***	0.457***	15.806***	1.405***	16.887***	0.458***	16.905***	1.189***
	(0.479)	(0.920)	(0.099)	(0.953)	(0.287)	(0.935)	(0.111)	(1.035)	(0.368)
Greece	0.732	56.996***	1.761***	47.741***	3.787***	56.725***	2.139***	50.097***	9.155***
	(1.628)	(2.652)	(0.552)	(2.438)	(7.332)	(2.696)	(0.617)	(2.032)	(1.201)
Hungary	-22.674***	9.976***	0.655	12.846***	17.373***	10.372***	0.911	4.416**	8.603***
	(0.953)	(2.985)	(1.612)	(2.007)	(2.953)	(3.004)	(1.856)	(2.233)	(1.608)
Israel	-30.711***	14.253***	1.888	16.07***	-4.701*	13.671***	1.509	16.245***	-1.018
	(2.098)	(4.153)	(1.381)	(5.225)	(2.813)	(4.157)	(1.413)	(3.529)	(2.061)
Italy	-0.296	24.037***	5.138***	21.612***	17.247***	22.805***	5.649***	45.881***	-0.031
	(1.295)	(0.789)	(0.162)	(1.053)	(0.586)	(0.819)	(0.187)	(2.333)	(1.105)
Japan	-2.423***	14.273***	2.796***	7.745***	12.205***	14.462***	2.693***	15.967***	3.115***
	(0.724)	(0.678)	(0.278)	(0.653)	(0.634)	(0.709)	(0.314)	(0.969)	(1.203)
Korea	-5.527***	-20.916***	5.474***	5.423*	11.828***	-18.748***	5.808***	-14.639***	7.223***
	(0.499)	(1.578)	(0.375)	(2.971)	(1.060)	(1.656)	(0.386)	(2.187)	(0.585)
Luxembourg	-6.465***	8.482***	2.960***	2.214**	7.154***	8.736***	3.225***	-1.807	5.772***
	(0.846)	(1.015)	(0.168)	(1.054)	(3.321)	(1.009)	(0.183)	(1.380)	(0.859)
Mexico	-192.09***	-416.01***	9.126**	-391.15***	-17.656	-410.63***	8.738*	-353.55***	-3.133
	(10.137)	(21.943)	(4.611)	(21.176)	(12.607)	(22.175)	(5.206)	(20.325)	(5.820)
Netherlands	2.244***	18.256***	0.258**	18.738***	0.445	18.269***	0.222	19.182***	-2.615***
	(0.483)	(0.568)	(0.129)	(0.570)	(0.355)	(0.584)	(0.142)	(0.640)	(0.484)
Norway	-11.045***	-3.722*	0.703*	-7.409***	-0.767	-3.732*	0.718	-5.925***	-0.167
	(0.431)	(1.944)	(0.390)	(1.608)	(0.864)	(2.009)	(0.442)	(1.839)	(0.717)
Portugal	-6.256***	27.401***	3.964***	29.998***	22.043***	26.201***	4.906***	31.922***	18.836***
	(1.405)	(4.419)	(1.021)	(4.266)	(2.415)	(4.326)	(1.093)	(4.278)	(2.857)
Spain	-49.177***	43.549***	-2.808***	38.993***	2.149	44.342***	-2.988***	46.881***	-3.981***
	(1.713)	(3.672)	(0.459)	(3.758)	(1.508)	(3.667)	(0.502)	(4.229)	(0.874)
Sweden	-13.162***	-12.571***	0.932***	-21.009***	1.484*	-12.078***	1.098***	-11.326***	5.341***
	(0.939)	(2.219)	(0.314)	(2.158)	(0.857)	(2.239)	(0.340)	(2.156)	(0.737)
United Kingdom	-22.879***	30.258***	2.639***	33.494***	0.909	28.936***	3.032***	-2.044	6.823***
	(2.774)	(5.469)	(0.379)	(5.718)	(1.404)	(5.545)	(0.410)	(7.053)	(1.423)
United States	3.148***	24.807***	2.689***	19.034***	8.847***	24.442***	2.994***	19.181***	6.677***
	(0.519)	(1.020)	(0.100)	(1.059)	(0.319)	(0.965)	(0.104)	(1.879)	(0.625)

Note: The in-sample predictability in a single-factor model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for industrial production index in the traditional Phillips Curve equation. We also extend the traditional Phillips Curve to accommodate the role of commodity prices, so that we can have a multi-factor commodity prices-augmented Phillips Curve equation. In this case z comprises industrial production index and commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). Here, we employ the core inflation rate (π_t^c). ***, **, and * imply the rejection of the null hypothesis of no predictability at 1%, 5%, and 10% levels of significance, respectively. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive models (Traditional and commodity prices-augmented Phillips Curve equations). We therefore consider four cases for each of the commodity prices. Here, we capture 75% of the full sample data for in-sample forecast.

Table 10: In-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Headline and core inflation)

Country	$\pi_t^{aug\_pc\_h}$				$\pi_t^{aug\_pc\_c}$			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	9.136***	7.925***	9.151***	7.723***	13.214***	12.223***	13.130***	9.595***
	(0.434)	(0.379)	(0.435)	(0.405)	(0.677)	(0.559)	(0.685)	(0.529)
Belgium	4.114***	1.123***	4.572***	1.176***	0.420***	0.460***	0.457***	0.508***
	(0.229)	(0.166)	(0.255)	(0.161)	(0.043)	(0.133)	(0.046)	(0.137)
Canada	29.003***	28.002***	29.205***	18.906***	21.522***	21.550***	21.645***	13.903***
	(1.223)	(1.207)	(1.237)	(1.099)	(0.926)	(0.988)	(0.934)	(0.833)
Finland	51.712***	52.789***	51.640***	44.160***	39.219***	40.087***	39.146***	30.784***
	(2.627)	(2.712)	(2.662)	(2.551)	(1.971)	(2.119)	(1.994)	(1.869)
France	29.618***	24.832***	29.426***	20.561***	30.924***	27.978***	30.734***	22.501***
	(1.135)	(0.968)	(1.134)	(1.074)	(1.240)	(1.169)	(1.238)	(1.108)
Germany	5.985***	6.028***	5.969***	5.552***	3.787***	3.614***	3.777***	3.609***
	(0.322)	(0.319)	(0.321)	(0.317)	(0.240)	(0.226)	(0.239)	(0.240)
Greece	86.577***	68.468***	88.526***	83.132***	81.634***	63.388***	83.321***	77.132***
	(4.307)	(3.516)	(4.423)	(4.160)	(4.238)	(3.270)	(4.326)	(3.851)
Hungary	21.066***	38.793***	20.026***	43.813***	18.668***	30.848***	19.331***	38.284***
	(1.778)	(2.158)	(1.772)	(2.473)	(1.952)	(1.870)	(2.007)	(2.301)
Israel	8.020***	7.645***	7.992***	8.779***	9.402***	9.611***	9.476***	9.976***
	(1.185)	(1.081)	(1.173)	(1.243)	(1.287)	(1.226)	(1.273)	(1.349)
Italy	94.984***	112.838***	95.276***	67.331***	91.402***	105.733***	92.142***	65.413***
	(3.369)	(4.339)	(3.417)	(3.704)	(3.217)	(4.266)	(3.261)	(3.538)
Japan	86.455***	111.255***	84.751***	79.857***	62.526***	78.140***	61.542***	56.513***
	(5.563)	(6.175)	(5.497)	(5.321)	(4.398)	(4.654)	(4.351)	(4.139)
Korea	2.890***	2.334***	2.909***	2.728***	8.747***	6.700***	8.928***	9.170***
	(0.386)	(0.352)	(0.387)	(0.349)	(0.949)	(0.888)	(0.928)	(1.075)
Luxembourg	4.356***	2.406***	4.170***	0.038	4.948***	3.414***	4.945***	0.565**
	(0.501)	(0.471)	(0.497)	(0.258)	(0.449)	(0.405)	(0.453)	(0.253)
Mexico	492.494***	491.012***	492.938***	524.084***	482.516***	499.522***	482.566***	530.654***
	(52.171)	(43.930)	(51.365)	(42.340)	(50.918)	(45.137)	(50.179)	(43.186)
Netherlands	19.728***	20.870***	19.471***	18.391***	23.042***	24.530***	22.825***	21.580***
	(0.860)	(0.907)	(0.846)	(0.778)	(1.092)	(1.156)	(1.077)	(0.968)
Norway	0.448**	13.511***	0.502**	-0.087	0.228**	0.526***	0.233***	0.436***
	(0.197)	(1.207)	(0.204)	(0.070)	(0.091)	(0.105)	(0.090)	(0.089)
Portugal	139.077***	192.352***	142.136***	148.759***	57.986***	87.302***	59.905***	67.383***
	(8.047)	(11.456)	(8.109)	(10.942)	(3.442)	(5.662)	(3.486)	(4.699)
Spain	18.649***	21.562***	18.851***	23.775***	28.745***	27.084***	29.111***	29.250***
	(1.801)	(1.756)	(1.796)	(1.730)	(1.995)	(1.848)	(2.004)	(1.808)
Sweden	4.986***	1.405***	5.027***	3.684***	1.496***	1.261***	1.487***	2.435***
	(0.480)	(0.266)	(0.491)	(0.448)	(0.176)	(0.173)	(0.179)	(0.255)
United Kingdom	21.897***	8.840***	22.072***	14.306***	36.358***	29.402***	35.937***	31.563***
	(1.176)	(1.485)	(1.171)	(0.977)	(1.975)	(2.510)	(1.935)	(1.854)
United States	43.092***	43.029***	44.577***	40.643***	26.638***	29.049***	27.963***	23.794***
	(1.903)	(1.981)	(1.992)	(2.100)	(1.276)	(1.537)	(1.351)	(1.347)

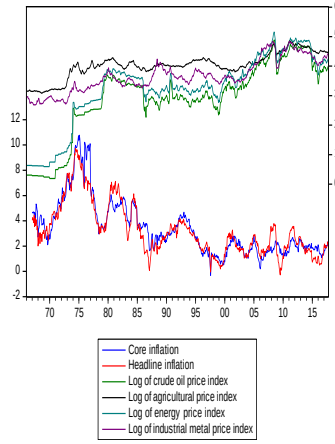
Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for headline and core inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting both headline and core inflation rates using in-sample data covering 75% of the full sample. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting both headline and core inflation rates using in-sample data covering 75% of the full sample.

Table 11: Out-of-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Headline inflation)

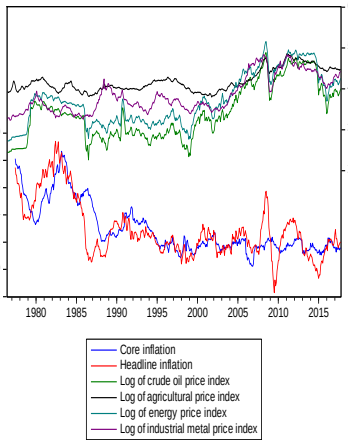
Country	$\pi_t^{aug\_pc\_h}$											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	9.055***	8.994***	8.955***	7.856***	7.803***	7.768***	9.042***	9.011***	8.971***	7.633***	7.574***	7.501***
	(0.430)	(0.425)	(0.420)	(0.375)	(0.371)	(0.367)	(0.432)	(0.426)	(0.421)	(0.402)	(0.397)	(0.393)
Belgium	4.326***	4.965***	5.990***	1.330***	1.921***	2.700***	4.722***	5.664***	6.924***	1.383***	1.496***	1.817***
	(0.242)	(0.355)	(0.546)	(0.185)	(0.305)	(0.439)	(0.261)	(0.431)	(0.667)	(0.183)	(0.190)	(0.230)
Canada	29.596***	30.263***	30.722***	28.848***	29.677***	30.343***	29.524***	30.474***	30.942***	19.348***	20.226***	20.716***
	(1.233)	(1.249)	(1.248)	(1.242)	(1.274)	(1.289)	(1.230)	(1.263)	(1.263)	(1.101)	(1.140)	(1.144)
Finland	53.337***	55.108***	56.789***	54.814***	57.014***	59.002***	52.940***	55.061***	56.762***	45.547***	47.618***	49.334***
	(2.680)	(2.745)	(2.799)	(2.805)	(2.913)	(2.992)	(2.684)	(2.780)	(2.834)	(2.584)	(2.681)	(2.741)
France	29.705***	29.752***	29.955***	25.158***	25.394***	25.764***	29.357***	29.573***	29.796***	20.618***	20.959***	21.205***
	(1.120)	(1.105)	(1.093)	(0.965)	(0.957)	(0.956)	(1.119)	(1.104)	(1.093)	(1.060)	(1.052)	(1.042)
Germany	6.122***	6.182***	6.231***	6.177***	6.238***	6.298***	6.021***	6.165***	6.214***	5.609***	5.736***	5.779***
	(0.323)	(0.321)	(0.318)	(0.321)	(0.319)	(0.316)	(0.318)	(0.319)	(0.316)	(0.314)	(0.315)	(0.312)
Greece	88.406***	90.136***	92.380***	70.424***	72.385***	74.494***	89.883***	91.991***	94.225***	84.565***	84.697***	85.134***
	(4.311)	(4.309)	(4.347)	(3.557)	(3.596)	(3.650)	(4.395)	(4.413)	(4.446)	(4.142)	(4.076)	(4.025)
Hungary	20.717***	20.538***	19.998***	37.834***	36.826***	35.916***	19.574***	19.621***	19.092***	42.774***	42.031***	40.964***
	(1.741)	(1.702)	(1.678)	(2.140)	(2.128)	(2.110)	(1.738)	(1.694)	(1.671)	(2.448)	(2.408)	(2.392)
Israel	7.678***	7.688***	7.836***	7.080***	6.495***	6.388***	8.373***	7.530***	7.629***	9.136***	7.529***	7.363***
	(1.156)	(1.124)	(1.095)	(1.072)	(1.068)	(1.039)	(1.152)	(1.115)	(1.085)	(1.218)	(1.222)	(1.189)
Italy	96.946***	98.905***	100.879***	115.828***	118.660***	121.379***	96.316***	99.174***	101.094***	68.699***	72.665***	75.716***
	(3.425)	(3.478)	(3.531)	(4.459)	(4.555)	(4.638)	(3.405)	(3.520)	(3.566)	(3.704)	(3.928)	(4.077)
Japan	89.875***	92.006***	94.609***	114.961***	116.884***	119.455***	86.607***	90.301***	92.920***	81.771***	85.794***	88.548***
	(5.692)	(5.713)	(5.763)	(6.311)	(6.309)	(6.346)	(5.507)	(5.650)	(5.703)	(5.339)	(5.519)	(5.587)
Korea	3.052***	3.368***	3.625***	2.727***	3.084***	3.272***	3.157***	3.341***	3.577***	2.981***	3.254***	3.409***
	(0.385)	(0.399)	(0.407)	(0.382)	(0.400)	(0.403)	(0.398)	(0.394)	(0.400)	(0.364)	(0.373)	(0.371)
Luxembourg	4.367***	4.570***	4.721***	2.344***	2.353***	2.352***	4.393***	4.373***	4.519***	0.316	0.253	0.481*
	(0.495)	(0.496)	(0.494)	(0.466)	(0.460)	(0.454)	(0.499)	(0.492)	(0.490)	(0.279)	(0.260)	(0.274)
Mexico	550.248***	605.940***	654.895***	512.886***	545.186***	581.875***	550.235***	606.087***	654.067***	580.820***	566.197***	607.284***
	(56.437)	(60.206)	(62.503)	(44.044)	(45.224)	(46.869)	(55.584)	(59.498)	(61.718)	(47.577)	(43.029)	(45.487)
Netherlands	20.340***	21.034***	21.785***	21.537***	22.308***	23.104***	19.563***	20.756***	21.490***	18.496***	19.569***	20.245***
	(0.886)	(0.920)	(0.959)	(0.937)	(0.978)	(1.019)	(0.836)	(0.905)	(0.943)	(0.770)	(0.833)	(0.868)
Norway	0.456**	0.395**	0.350*	-0.126	-0.120	-0.122	0.555***	0.443**	0.392*	-0.023	-0.053	-0.075
	(0.194)	(0.196)	(0.193)	(0.085)	(0.085)	(0.084)	(0.201)	(0.203)	(0.200)	(0.074)	(0.074)	(0.074)
Portugal	143.752***	148.100***	152.713***	200.684***	207.893***	215.027***	145.920***	150.632***	155.128***	152.448***	158.957***	161.894***
	(8.156)	(8.234)	(8.337)	(11.792)	(11.995)	(12.181)	(8.142)	(8.247)	(8.338)	(10.891)	(11.059)	(10.972)
Spain	18.340***	17.587***	15.751***	22.125***	22.416***	21.782***	20.459***(	17.922***	16.128***	25.302***	23.100***	21.471***
	(1.777)	(1.775)	(1.909)	(1.744)	(1.721)	(1.728)	1.885)	(1.764)	(1.893)	(1.813)	(1.690)	(1.801)
Sweden	5.053***	5.228***	5.493***	1.389***	1.395***	1.447***	5.011***	5.297***	5.578***	3.687***	4.233***	4.905***
	(0.474)	(0.473)	(0.479)	(0.263)	(0.259)	(0.257)	(0.484)	(0.485)	(0.492)	(0.441)	(0.472)	(0.542)
United Kingdom	21.890***	21.757***	21.368***	8.976***	9.003***	8.803***	21.770***	21.922***	21.531***	14.114***	14.154***	13.927***
	(1.160)	(1.146)	(1.142)	(1.465)	(1.445)	(1.428)	(1.161)	(1.141)	(1.137)	(0.966)	(0.951)	(0.943)
United States	44.340***	45.609***	46.677***	44.571***	46.022***	47.218***	45.458***	47.186***	48.290***	41.571***	43.659***	44.666***
	(1.948)	(1.993)	(2.019)	(2.056)	(2.116)	(2.148)	(2.002)	(2.085)	(2.110)	(2.109)	(2.225)	(2.238)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for headline inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting headline inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting headline inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Austria



Belgium



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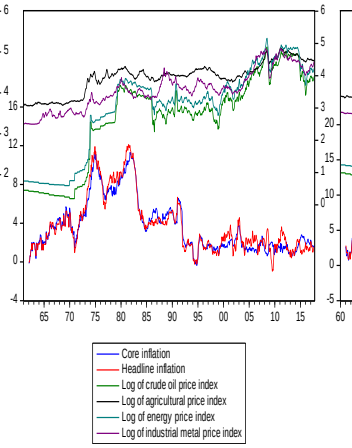

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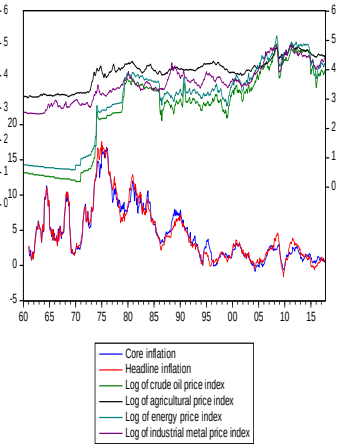

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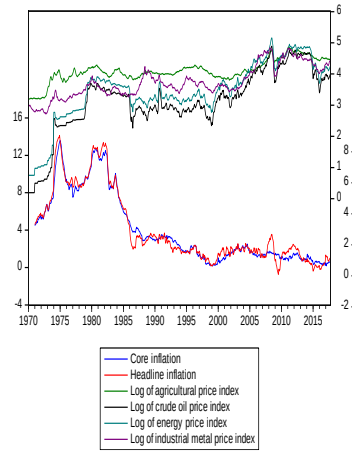

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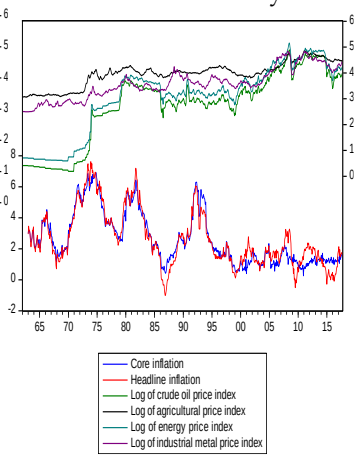

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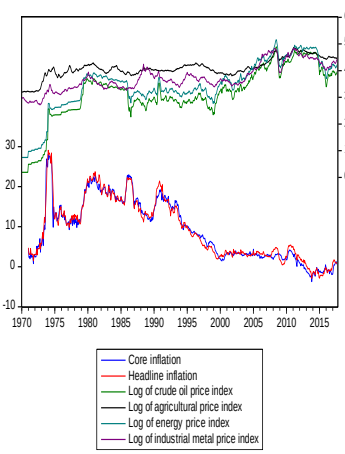

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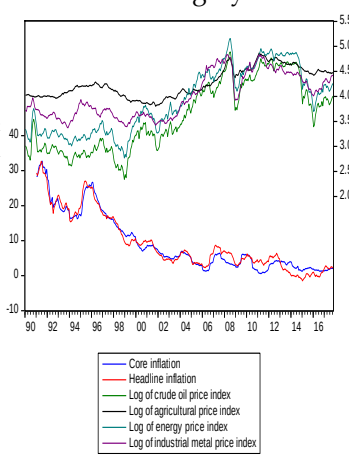

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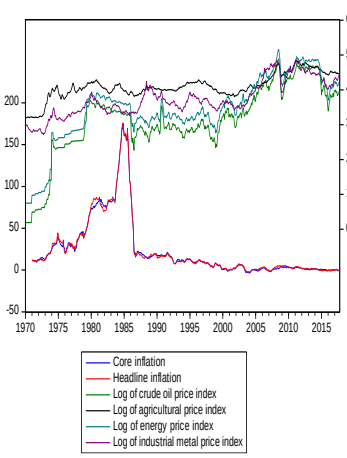

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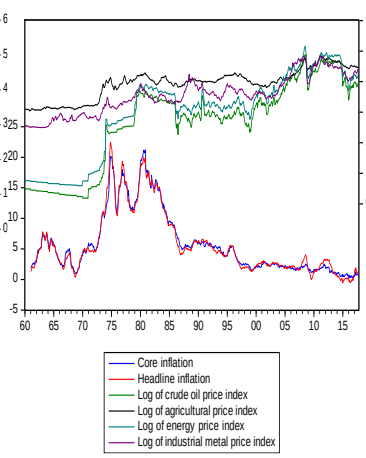

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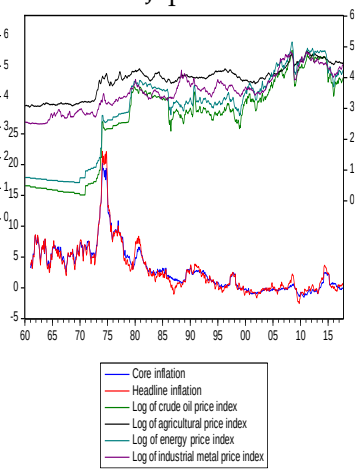

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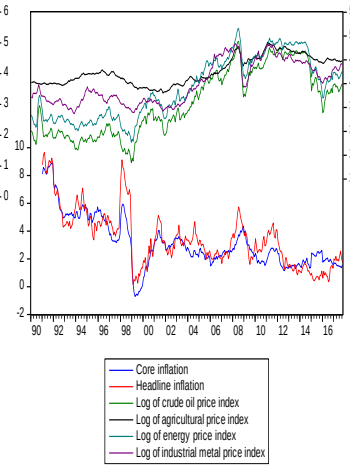

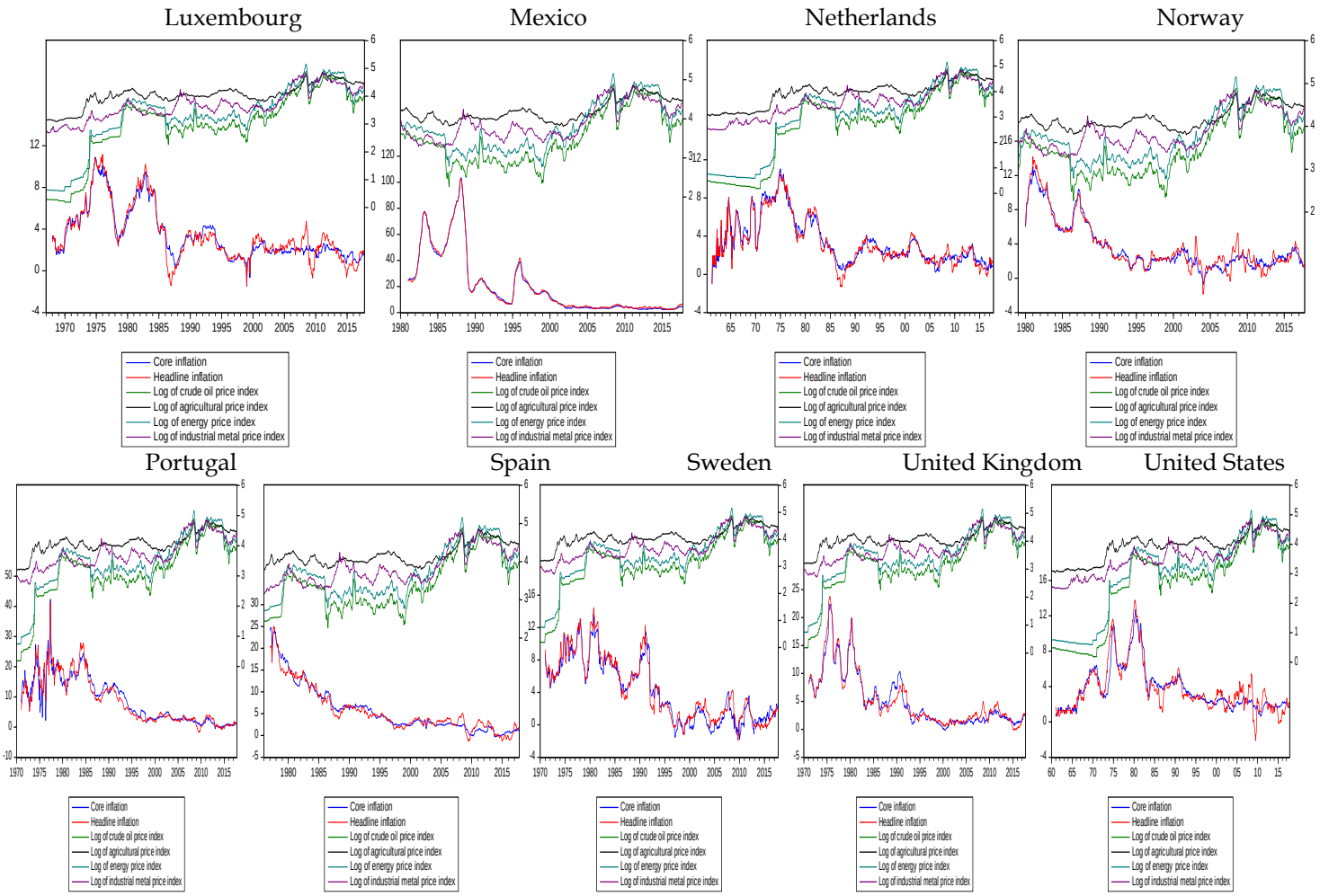

Figure 1: Trends in Inflation rates (Headline and Core) and Commodity prices

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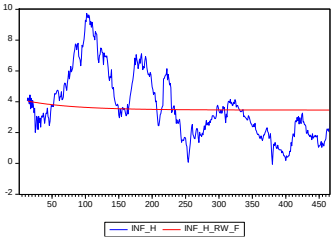

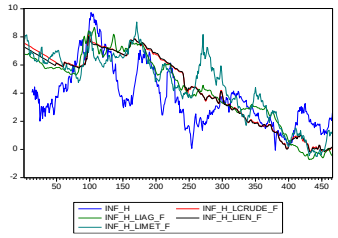

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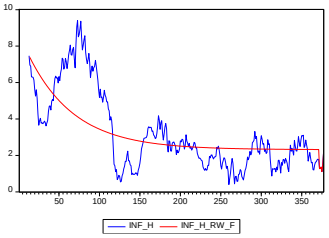
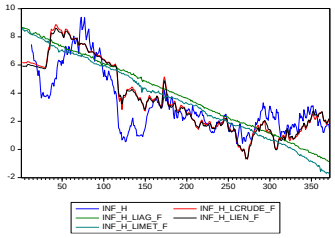
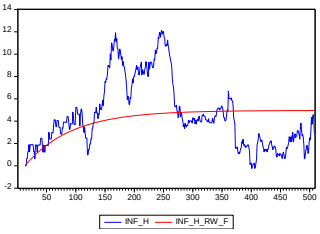
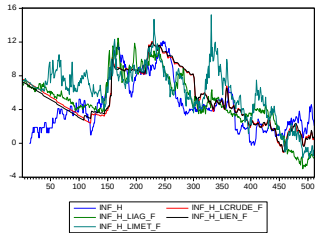




Canada





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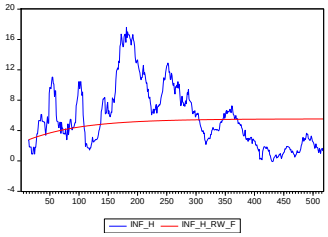

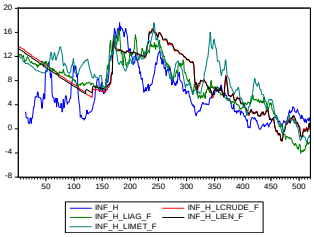

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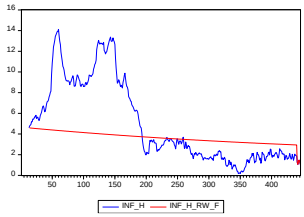

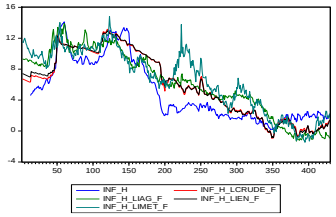

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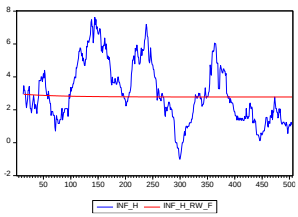
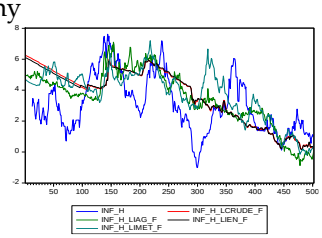
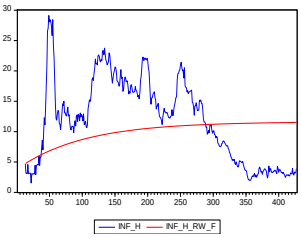
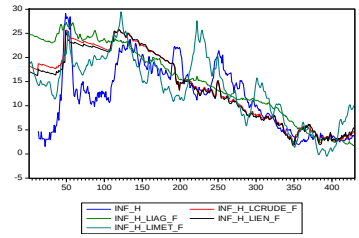




Greece





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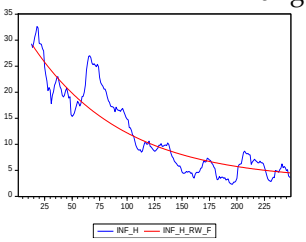

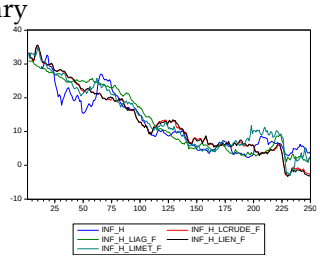

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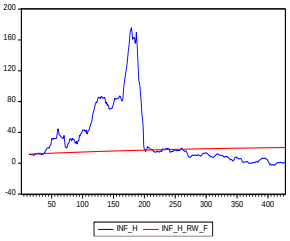

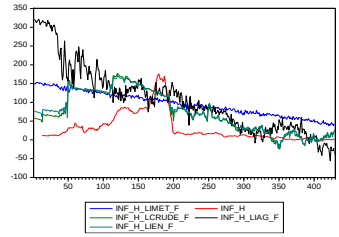

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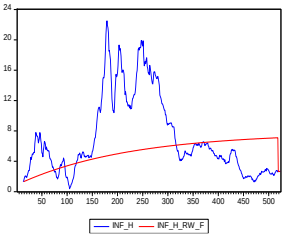
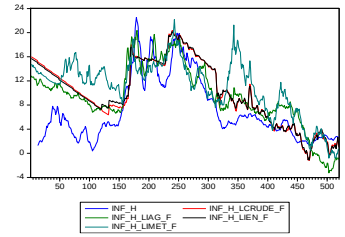
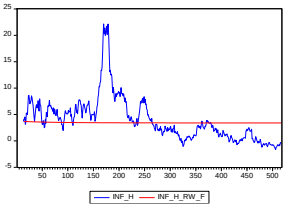
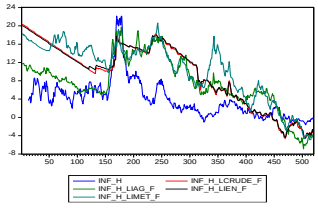


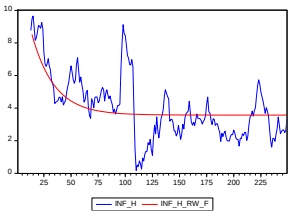


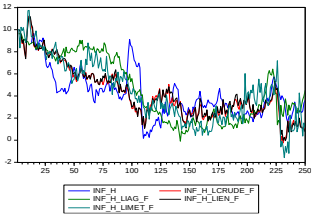
Japan



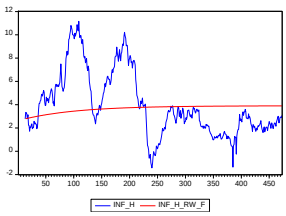


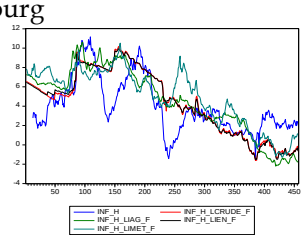
Korea





Luxembourg





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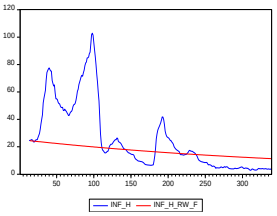
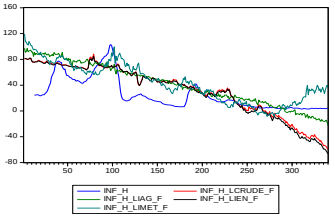




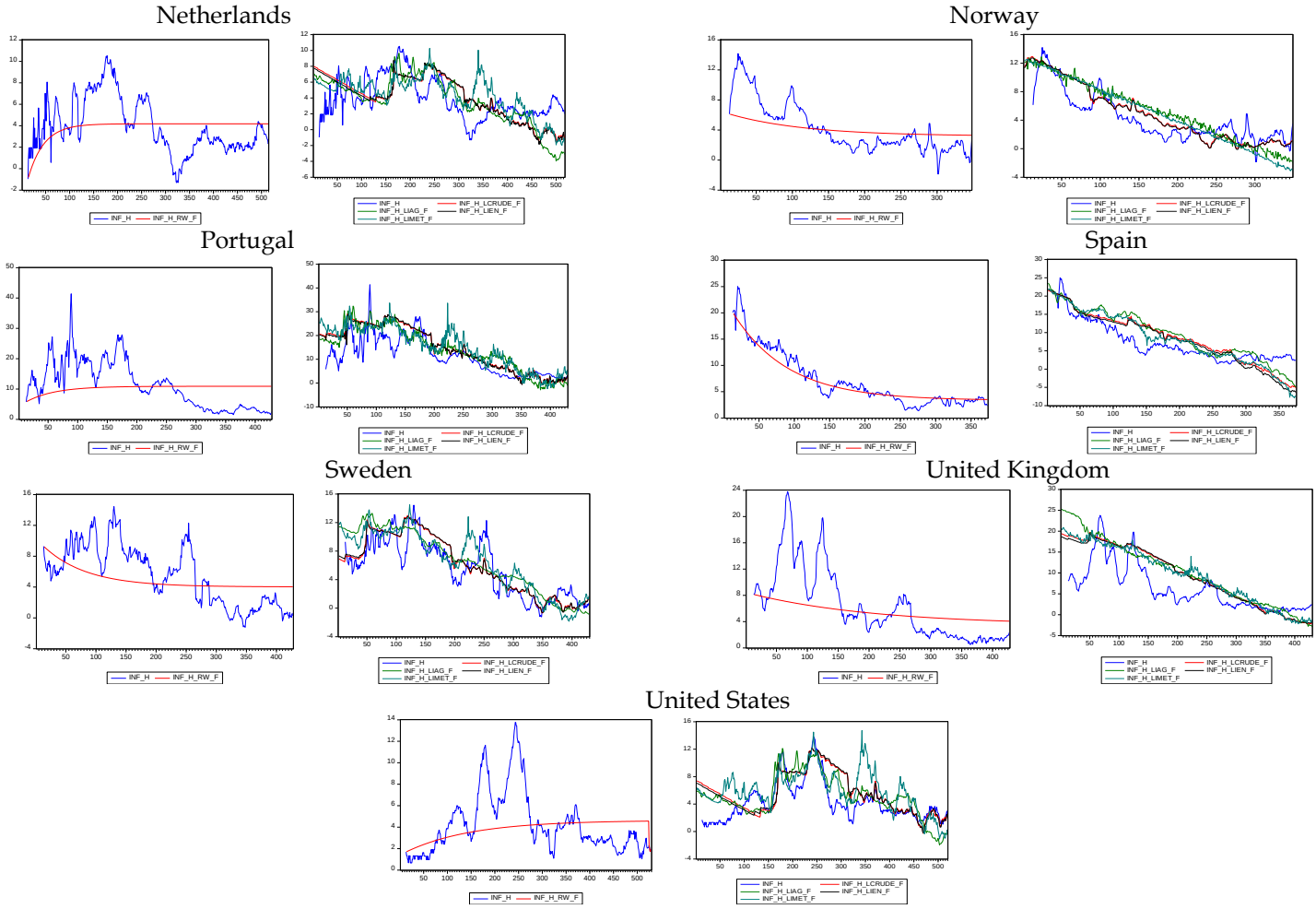
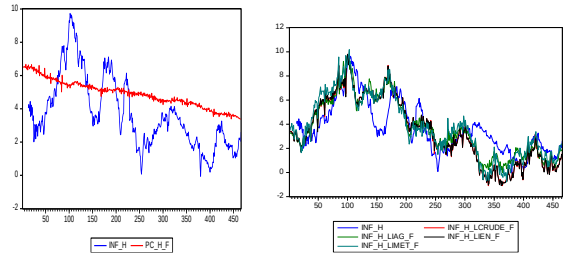
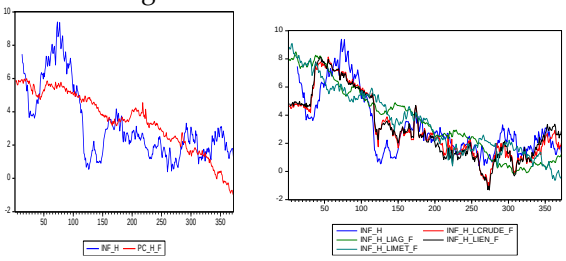


Figure 2: Forecast graphs of Random Walk model versus Commodity prices-based models (headline inflation)

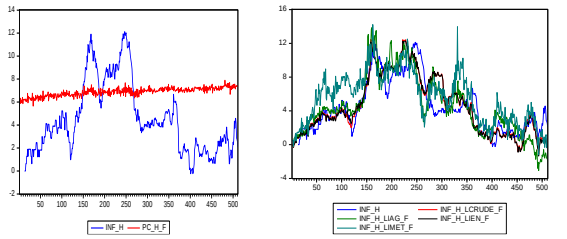
Austria



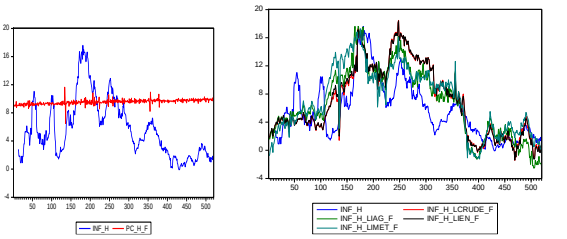
Belgium



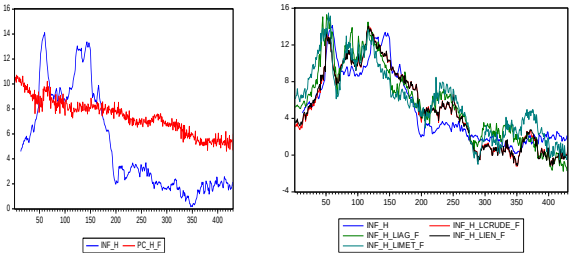
Canada



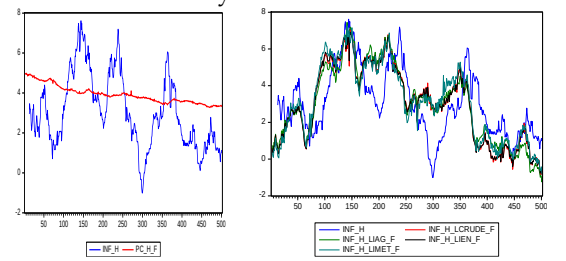
Finland



France



Germany



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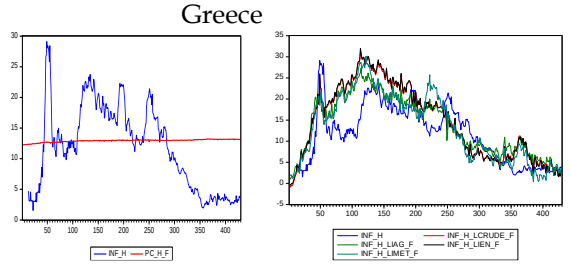
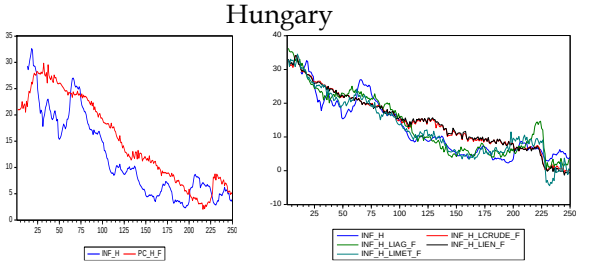
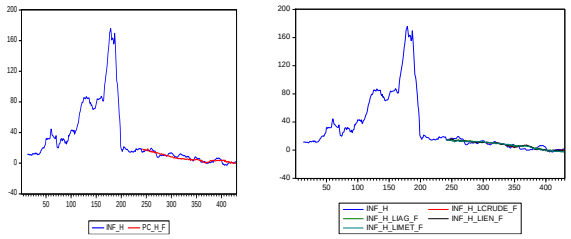


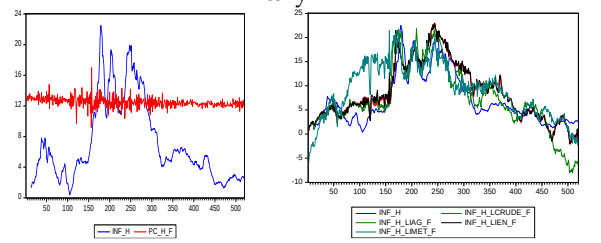
Hungary



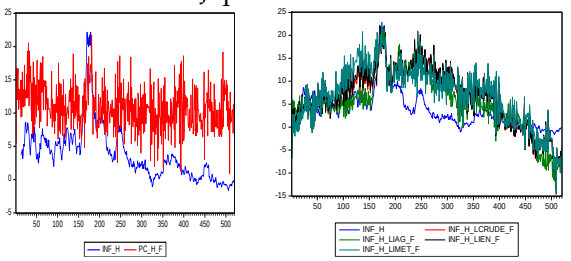
Israel



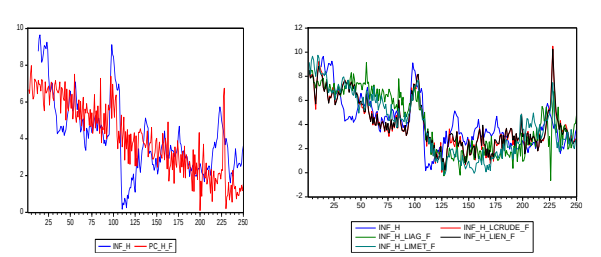
Italy



Japan



Korea



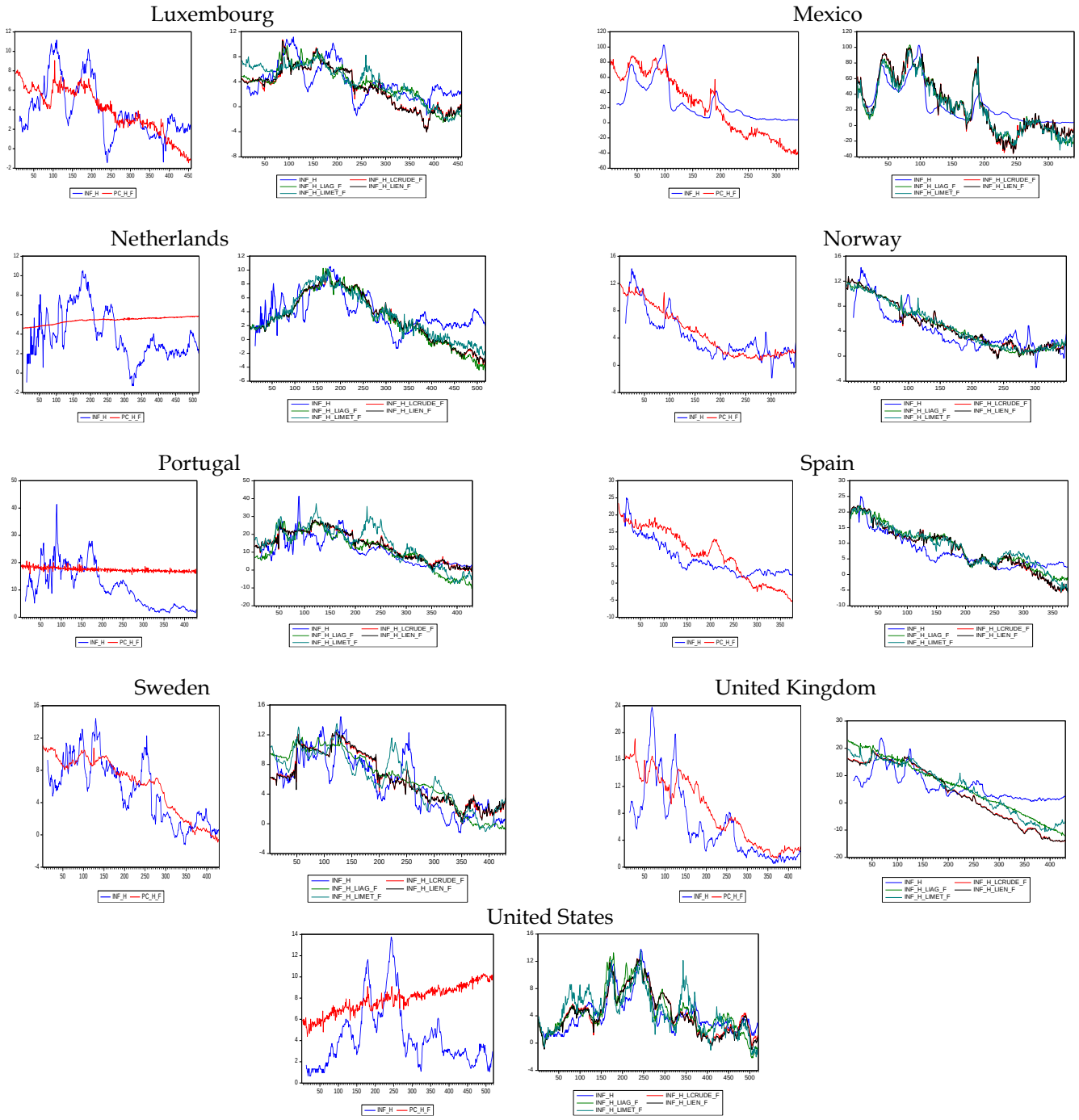


Figure 3: Forecast Graphs of Traditional versus Commodity prices-augmented Phillips Curve Equations (headline inflation)

Supplementary Tables

A: 75% of full Sample (Core Inflation)

Table A1: Out-of-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Core Inflation)

Country	π_t^c											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	9.547***	9.568***	9.653***	9.087***	9.172***	9.334***	9.518***	9.587***	9.666***	6.900***	6.911***	6.895***
	(0.710)	(0.701)	(0.693)	(0.735)	(0.727)	(0.721)	(0.701)	(0.692)	(0.684)	(0.618)	(0.610)	(0.602)
Belgium	2.079***	2.064***	2.035***	2.270***	2.291***	2.277***	2.113***	2.113***	2.084***	1.990***	2.035***	2.018***
	(0.270)	(0.266)	(0.262)	(0.253)	(0.250)	(0.246)	(0.269)	(0.264)	(0.260)	(0.276)	(0.271)	(0.267)
Canada	14.762***	14.896***	14.982***	14.619***	14.869***	15.138***	14.663***	14.864***	14.950***	13.230***	13.498***	13.583***
	(0.823)	(0.815)	(0.806)	(0.780)	(0.778)	(0.777)	(0.825)	(0.818)	(0.809)	(0.704)	(0.703)	(0.696)
Finland	30.350***	30.674***	30.971***	28.899***	29.464***	30.004***	30.046***	30.412***	30.700***	24.678***	25.135***	25.273***
	(1.780)	(1.765)	(1.749)	(1.791)	(1.785)	(1.778)	(1.760)	(1.746)	(1.730)	(1.542)	(1.535)	(1.519)
France	30.002***	29.604***	29.226***	28.788***	28.445***	28.111***	30.106***	29.716***	29.340***	27.216***	26.765***	26.325***
	(2.091)	(2.068)	(2.045)	(2.010)	(1.987)	(1.964)	(2.086)	(2.063)	(2.040)	(1.958)	(1.939)	(1.921)
Germany	3.113***	3.113***	3.110***	3.496***	3.497***	3.504***	3.137***	3.121***	3.117***	2.708***	2.656***	2.628***
	(0.259)	(0.256)	(0.253)	(0.291)	(0.288)	(0.284)	(0.258)	(0.255)	(0.252)	(0.258)	(0.254)	(0.252)
Greece	93.800***	94.461***	95.294***	92.072***	93.197***	94.173***	93.340***	93.394***	94.143***	79.065***	74.074***	71.203***
	(5.705)	(5.631)	(5.563)	(6.198)	(6.128)	(6.056)	(5.527)	(5.443)	(5.376)	(5.237)	(5.276)	(5.332)
Hungary	5.080***	5.506***	5.423***	11.288***	11.058***	10.792***	4.764***	5.599***	5.517***	8.584***	8.559***	8.362***
	(1.591)	(1.562)	(1.530)	(2.229)	(2.177)	(2.128)	(1.651)	(1.629)	(1.597)	(1.910)	(1.864)	(1.823)
Israel	4923.024***	4850.106***	4782.364***	4827.592***	4788.713***	4764.002***	4890.178***	4809.754***	4744.401***	3617.026***	3544.661***	3487.244***
	(411.701)	(406.988)	(402.285)	(391.093)	(385.919)	(380.705)	(407.106)	(402.667)	(397.969)	(333.971)	(330.478)	(326.726)
Italy	70.944***	70.733***	70.439***	67.609***	67.603***	67.486***	70.995***	70.867***	70.555***	58.126***	58.201***	57.755***
	(4.463)	(4.412)	(4.363)	(4.371)	(4.321)	(4.271)	(4.451)	(4.399)	(4.350)	(4.034)	(3.987)	(3.945)
Japan	38.783***	38.822***	38.836***	32.828***	32.886***	32.938***	38.325***	38.512***	38.514***	34.456***	34.614***	34.365***
	(2.983)	(2.949)	(2.915)	(3.196)	(3.159)	(3.123)	(2.957)	(2.922)	(2.889)	(3.089)	(3.054)	(3.020)
Korea	0.397	0.365	0.362	1.500***	1.477***	1.440***	0.505*	0.544*	0.538*	0.708**	0.702**	0.692**
	(0.298)	(0.291)	(0.285)	(0.272)	(0.266)	(0.260)	(0.293)	(0.289)	(0.283)	(0.293)	(0.286)	(0.280)
Luxembourg	13.955***	13.912***	13.852***	13.151***	13.203***	13.220***	13.964***	13.978***	13.918***	9.168***	9.011***	8.852***
	(0.891)	(0.880)	(0.869)	(0.894)	(0.883)	(0.871)	(0.883)	(0.871)	(0.860)	(0.739)	(0.731)	(0.724)
Mexico	1208.879***	1196.737***	1186.950***	1194.748***	1179.940***	1165.474***	1201.832***	1207.378***	1198.139***	1128.880***	1106.749***	1088.488***
	(107.987)	(106.183)	(104.404)	(116.157)	(114.251)	(112.409)	(107.452)	(105.327)	(103.556)	(124.123)	(122.266)	(120.359)
Netherlands	6.543***	6.659***	6.762***	8.092***	8.303***	8.491***	6.537***	6.710***	6.812***	3.667***	3.804***	3.832***
	(0.413)	(0.410)	(0.408)	(0.491)	(0.493)	(0.493)	(0.415)	(0.414)	(0.412)	(0.450)	(0.448)	(0.443)
Norway	10.348***	10.198***	10.026***	10.820***	10.672***	10.490***	10.405***	10.284***	10.110***	11.493***	11.462***	11.266***
	(0.924)	(0.910)	(0.897)	(0.930)	(0.916)	(0.903)	(0.917)	(0.902)	(0.890)	(0.918)	(0.902)	(0.890)
Portugal	107.775***	108.424***	109.381***	98.581***	99.313***	100.169***	106.980***	107.643***	108.576***	94.762***	94.187***	93.564***
	(5.394)	(5.325)	(5.267)	(6.109)	(6.031)	(5.958)	(5.286)	(5.219)	(5.162)	(4.971)	(4.903)	(4.842)
Spain	6.578***	6.915***	7.278***	6.900***	7.139***	7.455***	6.426***	7.157***	7.581***	6.732***	7.480***	7.878***
	(0.487)	(0.498)	(0.512)	(0.584)	(0.583)	(0.588)	(0.453)	(0.485)	(0.508)	(0.543)	(0.567)	(0.582)
Sweden	20.387***	20.359***	20.290***	18.427***	18.553***	18.578***	20.397***	20.302***	20.231***	19.660***	19.342***	19.080***
	(1.077)	(1.062)	(1.048)	(1.055)	(1.041)	(1.027)	(1.079)	(1.063)	(1.049)	(1.076)	(1.064)	(1.054)
United Kingdom	41.189***	41.061***	40.913***	38.846***	38.880***	38.859***	40.834***	40.883***	40.726***	39.667***	39.686***	39.420***
	(3.350)	(3.303)	(3.258)	(3.357)	(3.310)	(3.264)	(3.316)	(3.267)	(3.223)	(3.223)	(3.176)	(3.133)
United States	13.613***	13.615***	13.561***	14.119***	14.236***	14.254***	13.822***	13.762***	13.705***	13.121***	13.180***	13.059***
	(1.141)	(1.128)	(1.115)	(1.148)	(1.136)	(1.123)	(1.149)	(1.135)	(1.122)	(1.088)	(1.076)	(1.065)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (core inflation rates) and the restricted model (the Random walk model). The negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table A2: Out-of-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Core inflation)

Country	$\pi_t^{aug\_pc\_c}$											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	13.237***	13.273***	13.339***	12.280***	12.365***	12.484***	13.103***	13.196***	13.256***	9.614***	9.456***	9.330***
	(0.668)	(0.660)	(0.652)	(0.552)	(0.547)	(0.542)	(0.676)	(0.668)	(0.660)	(0.522)	(0.517)	(0.513)
Belgium	0.419***	0.433***	0.450***	0.631***	0.870***	1.016***	0.721***	0.475***	0.495***	0.771***	0.831***	0.995***
	(0.042)	(0.042)	(0.043)	(0.148)	(0.176)	(0.184)	(0.116)	(0.045)	(0.046)	(0.172)	(0.164)	(0.175)
Canada	21.999***	22.528***	22.991***	22.274***	22.968***	23.669***	21.910***	22.653***	23.125***	14.260***	14.934***	15.394***
	(0.935)	(0.949)	(0.957)	(1.021)	(1.048)	(1.075)	(0.930)	(0.957)	(0.966)	(0.837)	(0.867)	(0.877)
Finland	40.494***	41.901***	43.237***	41.797***	43.646***	45.374***	40.220***	41.843***	43.188***	31.956***	33.444***	34.735***
	(2.017)	(2.074)	(2.121)	(2.207)	(2.308)	(2.387)	(2.019)	(2.096)	(2.144)	(1.908)	(1.978)	(2.025)
France	31.279***	31.600***	31.994***	28.660***	29.245***	29.856***	31.000***	31.398***	31.800***	22.884***	23.364***	23.753***
	(1.232)	(1.222)	(1.216)	(1.190)	(1.198)	(1.208)	(1.228)	(1.220)	(1.214)	(1.106)	(1.107)	(1.103)
Germany	3.905***	3.964***	4.017***	3.730***	3.780***	3.836***	3.909***	3.953***	4.007***	3.743***	3.779***	3.827***
	(0.242)	(0.241)	(0.239)	(0.229)	(0.227)	(0.225)	(0.242)	(0.239)	(0.237)	(0.244)	(0.241)	(0.239)
Greece	83.827***	85.981***	88.289***	65.260***	67.111***	68.898***	84.905***	87.586***	89.871***	78.804***	79.062***	79.632***
	(4.272)	(4.303)	(4.348)	(3.313)	(3.353)	(3.388)	(4.313)	(4.379)	(4.420)	(3.857)	(3.790)	(3.746)
Hungary	19.214***	20.136***	20.241***	30.295***	29.651***	29.074***	19.287***	20.761***	20.855***	37.772***	38.134***	37.713***
	(1.921)	(1.913)	(1.872)	(1.843)	(1.818)	(1.791)	(1.959)	(1.961)	(1.919)	(2.256)	(2.196)	(2.153)
Israel	8.978***	8.837***	8.988***	9.063***	8.397***	8.347***	9.925***	8.614***	8.641***	10.409***	8.481***	8.200***
	(1.259)	(1.224)	(1.192)	(1.209)	(1.207)	(1.176)	(1.261)	(1.224)	(1.190)	(1.332)	(1.338)	(1.304)
Italy	93.345***	95.351***	97.275***	108.814***	111.834***	114.617***	93.292***	96.011***	97.862***	66.877***	70.860***	73.786***
	(3.276)	(3.339)	(3.393)	(4.399)	(4.518)	(4.608)	(3.257)	(3.372)	(3.417)	(3.547)	(3.791)	(3.932)
Japan	65.348***	67.227***	69.468***	81.121***	82.820***	84.998***	63.356***	66.244***	68.501***	58.386***	61.448***	63.717***
	(4.508)	(4.534)	(4.585)	(4.772)	(4.781)	(4.823)	(4.379)	(4.490)	(4.544)	(4.178)	(4.314)	(4.374)
Korea	9.390***	10.418***	11.355***	7.834***	9.091***	9.874***	9.489***	10.453***	11.297***	9.726***	11.302***	12.130***
	(0.966)	(1.031)	(1.079)	(0.988)	(1.090)	(1.114)	(0.938)	(0.994)	(1.032)	(1.076)	(1.199)	(1.220)
Luxembourg	4.888***	4.874***	4.853***	3.338***	3.265***	3.184***	4.894***	4.872***	4.851***	0.573**	0.587**	0.637***
	(0.444)	(0.438)	(0.433)	(0.401)	(0.396)	(0.393)	(0.448)	(0.442)	(0.437)	(0.250)	(0.247)	(0.245)
Mexico	535.012***	586.116***	631.077***	515.568***	544.079***	576.888***	534.525***	585.683***	629.852***	581.746***	570.276***	608.898***
	(54.438)	(57.667)	(59.623)	(44.803)	(45.524)	(46.677)	(53.633)	(56.973)	(58.874)	(47.247)	(43.568)	(45.626)
Netherlands	23.869***	24.736***	25.614***	25.405***	26.362***	27.286***	23.147***	24.500***	25.363***	21.917***	23.007***	23.800***
	(1.131)	(1.172)	(1.212)	(1.197)	(1.245)	(1.287)	(1.073)	(1.156)	(1.196)	(0.967)	(1.031)	(1.069)
Norway	0.239***	0.235***	0.228***	0.537***	0.524***	0.512***	0.233***	0.241***	0.234***	0.433***	0.441***	0.431***
	(0.089)	(0.088)	(0.087)	(0.103)	(0.102)	(0.101)	(0.088)	(0.087)	(0.085)	(0.087)	(0.086)	(0.085)
Portugal	61.131***	64.097***	66.990***	91.873***	95.901***	99.362***	61.946***	65.653***	68.439***	69.318***	71.987***	72.735***
	(3.631)	(3.788)	(3.920)	(5.895)	(6.058)	(6.143)	(3.544)	(3.778)	(3.898)	(4.706)	(4.794)	(4.738)
Spain	28.888***	28.549***	27.164***	28.095***	28.865***	28.575***	31.113***	29.055***	27.692***	31.250***	29.220***	28.048***
	(1.966)	(1.939)	(1.998)	(1.867)	(1.864)	(1.856)	(2.136)	(1.948)	(2.003)	(1.958)	(1.756)	(1.800)
Sweden	1.475***	1.454***	1.436***	1.276***	1.250***	1.154***	1.479***	1.443***	1.430***	2.414***	2.363***	2.473***
	(0.174)	(0.172)	(0.170)	(0.171)	(0.169)	(0.172)	(0.176)	(0.174)	(0.172)	(0.252)	(0.249)	(0.251)
United Kingdom	37.548***	38.823***	39.943***	30.990***	32.701***	34.173***	35.912***	38.305***	39.391***	31.601***	32.980***	33.405***
	(2.006)	(2.045)	(2.068)	(2.557)	(2.615)	(2.648)	(1.908)	(1.999)	(2.020)	(1.827)	(1.848)	(1.830)
United States	27.662***	28.724***	29.655***	30.446***	31.844***	32.965***	29.054***	30.132***	31.104***	24.934***	26.140***	26.951***
	(1.328)	(1.382)	(1.417)	(1.622)	(1.701)	(1.743)	(1.407)	(1.459)	(1.495)	(1.410)	(1.477)	(1.497)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for core inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting core inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting core inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

B: Pre-GFC Results

Table B1: In-sample Predictability Results for inflation rates (Headline and Core) using Commodity prices-inflation model

Country	π_t^h				π_t^c			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	1.484***	4.895***	1.659***	4.232***	2.137***	5.628***	2.369***	3.538***
	(0.100)	(0.297)	(0.107)	(0.336)	(0.126)	(0.373)	(0.136)	(0.534)
Belgium	2.920***	1.364*	3.223***	2.824***	1.357***	-2.125***	1.507***	1.317***
	(0.146)	(0.744)	(0.157)	(0.402)	(0.137)	(0.527)	(0.149)	(0.255)
Canada	4.006***	10.648***	4.322***	10.143***	3.819***	8.981***	4.115***	8.314***
	(0.110)	(0.452)	(0.115)	(0.556)	(0.110)	(0.436)	(0.114)	(0.544)
Finland	4.700***	11.966***	5.065***	12.166***	4.552***	10.836***	4.931***	10.636***
	(0.211)	(0.567)	(0.228)	(0.921)	(0.213)	(0.588)	(0.229)	(0.899)
France	3.280***	7.994***	3.501***	6.186***	3.001***	7.047***	3.262***	6.082***
	(0.133)	(0.670)	(0.140)	(0.440)	(0.109)	(0.530)	(0.114)	(0.406)
Germany	1.197***	4.655***	1.312***	4.360***	1.090***	3.816***	1.202***	4.202***
	(0.107)	(0.306)	(0.115)	(0.383)	(0.092)	(0.243)	(0.099)	(0.344)
Greece	6.295***	16.525***	7.193***	19.310***	6.150***	15.991***	7.057***	17.720***
	(0.314)	(0.926)	(0.342)	(1.058)	(0.330)	(0.916)	(0.358)	(1.104)
Hungary	6.805***	16.700***	7.683***	10.777***	4.375***	13.739***	5.066***	8.117***
	(0.567)	(1.337)	(0.586)	(0.841)	(0.553)	(1.315)	(0.574)	(0.946)
Israel	17.861***	-24.776*	24.510***	5.117	16.265***	-15.536	22.679***	8.538
	(6.407)	(14.071)	(6.804)	(14.488)	(6.272)	(13.984)	(6.658)	(14.848)
Italy	5.877***	16.956***	6.299***	15.262***	6.177***	16.136***	6.635***	15.758***
	(0.202)	(0.566)	(0.213)	(0.901)	(0.166)	(0.547)	(0.174)	(0.813)
Japan	4.552***	17.825***	4.907***	11.239***	4.291***	15.568***	4.695***	12.820***
	(0.418)	(0.927)	(0.452)	(1.122)	(0.361)	(0.785)	(0.388)	(0.970)
Korea	3.430***	11.351***	3.862***	4.748***	4.482***	12.020***	5.024***	7.057***
	(0.309)	(1.108)	(0.325)	(0.530)	(0.248)	(0.976)	(0.251)	(0.505)
Luxembourg	2.776***	7.023***	2.936***	5.246***	2.732***	6.917***	2.939***	5.927***
	(0.174)	(0.634)	(0.183)	(0.699)	(0.120)	(0.431)	(0.125)	(0.670)
Mexico	-22.808***	-10.934	-25.483***	49.833***	-24.363***	-9.597	-27.132***	50.692***
	(3.564)	(9.988)	(3.891)	(3.608)	(3.567)	(10.203)	(3.888)	(3.528)
Netherlands	2.336***	7.644***	2.588***	6.942***	2.165***	7.086***	2.453***	6.520***
	(0.187)	(0.440)	(0.203)	(0.698)	(0.190)	(0.418)	(0.207)	(0.705)
Norway	2.605***	2.170***	2.877***	1.786***	1.672***	-0.550	1.828***	-0.341
	(0.203)	(0.663)	(0.228)	(0.455)	(0.195)	(0.595)	(0.219)	(0.406)
Portugal	5.930***	20.700***	6.811***	13.824***	4.562***	19.921***	5.276***	10.524***
	(0.502)	(1.547)	(0.524)	(1.634)	(0.562)	(1.610)	(0.597)	(1.752)
Spain	-2.511***	-8.346***	-2.922***	-1.591**	-3.013***	-4.642***	-3.663***	-3.821***
	(0.332)	(1.321)	(0.351)	(0.788)	(0.286)	(1.174)	(0.299)	(0.675)
Sweden	3.169***	5.894***	3.423***	7.318***	2.460***	4.526***	2.734***	5.698***
	(0.177)	(0.763)	(0.186)	(0.445)	(0.184)	(0.714)	(0.192)	(0.445)
United Kingdom	1.677***	-2.212**	2.112***	2.926***	2.476***	0.781	2.929***	3.465***
	(0.305)	(0.974)	(0.324)	(0.695)	(0.274)	(0.920)	(0.290)	(0.656)
United States	4.111***	11.995***	4.465***	11.654***	3.680***	10.032***	4.018***	10.095***
	(0.103)	(0.287)	(0.110)	(0.379)	(0.095)	(0.263)	(0.099)	(0.414)

Note: The in-sample predictability in a bivariate model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). We employ both the headline inflation rate (π_t^h) and the core inflation rate (π_t^c). *** implies the rejection of the null hypothesis of no predictability at 1% level of significance. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive model. Here, we consider the Pre-GFC sample data.

Table B2: In-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Headline and core inflation)

Country	π_t^h				π_t^c			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	7.660***	7.583***	7.657***	6.325***	9.723***	9.186***	9.755***	7.562***
	(0.524)	(0.556)	(0.518)	(0.501)	(0.663)	(0.701)	(0.655)	(0.621)
Belgium	4.241***	2.084***	4.272***	1.751***	2.077***	2.246***	2.132***	1.667***
	(0.406)	(0.395)	(0.405)	(0.352)	(0.257)	(0.244)	(0.257)	(0.267)
Canada	17.793***	17.351***	17.730***	14.100***	15.966***	15.675***	15.931***	12.414***
	(1.079)	(1.060)	(1.081)	(0.981)	(0.857)	(0.826)	(0.859)	(0.730)
Finland	34.326***	33.107***	34.061***	25.860***	30.967***	29.857***	30.725***	23.314***
	(1.899)	(2.021)	(1.874)	(1.759)	(1.595)	(1.697)	(1.575)	(1.434)
France	29.817***	28.173***	29.881***	27.885***	27.607***	26.305***	27.651***	25.740***
	(2.174)	(2.121)	(2.165)	(2.069)	(1.950)	(1.908)	(1.944)	(1.860)
Germany	3.670***	4.089***	3.688***	3.049***	3.084***	3.593***	3.085***	2.292***
	(0.282)	(0.321)	(0.281)	(0.277)	(0.243)	(0.282)	(0.243)	(0.253)
Greece	118.224***	119.951***	116.154***	85.343***	94.700***	96.659***	92.950***	59.296***
	(6.650)	(7.108)	(6.516)	(6.288)	(5.143)	(5.777)	(5.006)	(4.944)
Hungary	5.889***	15.045***	6.078***	13.326***	6.570***	12.664***	6.642***	10.168***
	(1.395)	(2.512)	(1.453)	(2.030)	(1.644)	(2.386)	(1.715)	(1.991)
Israel	4350.298***	4102.084***	4307.774***	3007.553***	4335.257***	4065.896***	4290.931***	3008.645***
	(365.196)	(353.967)	(363.347)	(314.381)	(360.261)	(347.486)	(358.446)	(309.725)
Italy	74.438***	71.783***	74.465***	57.452***	71.729***	70.392***	71.789***	55.174***
	(4.469)	(4.566)	(4.452)	(4.079)	(4.400)	(4.411)	(4.390)	(4.037)
Japan	42.935***	35.069***	42.635***	41.432***	38.842***	31.475***	38.444***	35.683***
	(3.368)	(3.639)	(3.346)	(3.488)	(2.697)	(2.929)	(2.676)	(2.898)
Korea	1.371***	3.764***	1.515***	2.160***	1.792***	2.799***	1.843***	2.084***
	(0.231)	(0.349)	(0.234)	(0.228)	(0.389)	(0.324)	(0.391)	(0.351)
Luxembourg	14.894***	14.048***	14.968***	11.679***	13.330***	12.375***	13.427***	8.960***
	(0.955)	(0.952)	(0.943)	(0.819)	(0.840)	(0.853)	(0.831)	(0.721)
Mexico	1188.817***	1149.878***	1195.739***	1071.561***	1198.954***	1172.057***	1204.212***	1094.937***
	(103.465)	(111.876)	(102.511)	(119.483)	(105.408)	(113.750)	(104.415)	(122.155)
Netherlands	9.459***	9.960***	9.423***	6.928***	7.551***	8.681***	7.534***	3.986***
	(0.458)	(0.530)	(0.454)	(0.464)	(0.425)	(0.518)	(0.424)	(0.508)
Norway	13.026***	12.696***	13.107***	12.961***	10.190***	10.547***	10.305***	11.030***
	(1.184)	(1.190)	(1.179)	(1.148)	(0.903)	(0.914)	(0.897)	(0.890)
Portugal	147.906***	136.226***	146.946***	125.509***	110.985***	101.162***	109.950***	95.558***
	(7.344)	(8.202)	(7.247)	(7.351)	(5.186)	(6.080)	(5.084)	(5.014)
Spain	3.337***	4.385***	3.267***	4.389***	7.108***	6.976***	7.280***	7.298***
	(0.573)	(0.683)	(0.570)	(0.592)	(0.486)	(0.558)	(0.476)	(0.543)
Sweden	21.532***	19.010***	21.484***	19.785***	19.668***	18.137***	19.612***	18.914***
	(1.188)	(1.116)	(1.191)	(1.192)	(1.047)	(1.017)	(1.049)	(1.073)
United Kingdom	43.199***	40.505***	43.111***	41.249***	39.203***	37.151***	39.074***	38.788***
	(3.627)	(3.666)	(3.589)	(3.600)	(3.151)	(3.131)	(3.123)	(3.128)
United States	14.102***	15.051***	14.276***	14.416***	13.692***	14.390***	13.832***	12.172***
	(1.413)	(1.414)	(1.414)	(1.328)	(1.116)	(1.123)	(1.120)	(1.032)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (headline and core inflation rates) and the restricted model (the Random walk model). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for in-sample data covering Pre-GFC sample. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for in-sample data covering Pre-GFC sample.

Table B3: Out-of-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Headline Inflation)

Country	π_t^h											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	7.797***	7.938***	7.968***	7.642***	7.714***	7.710***	7.715***	7.942***	7.974***	6.400***	6.515***	6.480***
	(0.521)	(0.519)	(0.513)	(0.550)	(0.545)	(0.538)	(0.513)	(0.513)	(0.507)	(0.497)	(0.493)	(0.488)
Belgium	4.277***	4.311***	4.271***	2.228***	2.505***	2.563***	4.364***	4.355***	4.316***	1.883***	1.985***	1.987***
	(0.401)	(0.395)	(0.389)	(0.395)	(0.406)	(0.401)	(0.405)	(0.394)	(0.389)	(0.356)	(0.350)	(0.345)
Canada	17.908***	17.968***	17.934***	17.379***	17.383***	17.314***	17.846***	17.951***	17.934***	14.255***	14.093***	13.796***
	(1.069)	(1.058)	(1.048)	(1.049)	(1.038)	(1.027)	(1.072)	(1.061)	(1.050)	(0.974)	(0.965)	(0.963)
Finland	34.542***	34.826***	34.951***	33.161***	33.295***	33.304***	34.121***	34.637***	34.797***	26.005***	25.804***	25.382***
	(1.881)	(1.866)	(1.848)	(2.001)	(1.981)	(1.961)	(1.856)	(1.844)	(1.826)	(1.743)	(1.726)	(1.717)
France	29.614***	29.374***	29.046***	27.891***	27.597***	27.267***	29.608***	29.468***	29.145***	27.638***	27.492***	27.151***
	(2.147)	(2.122)	(2.099)	(2.096)	(2.073)	(2.051)	(2.140)	(2.113)	(2.090)	(2.045)	(2.020)	(1.999)
Germany	3.751***	3.839***	3.882***	4.109***	4.142***	4.151***	3.752***	3.861***	3.907***	3.119***	3.099***	3.058***
	(0.281)	(0.280)	(0.278)	(0.318)	(0.315)	(0.312)	(0.280)	(0.280)	(0.277)	(0.276)	(0.272)	(0.270)
Greece	118.762***	118.851***	118.445***	119.518***	118.951***	118.112***	116.831***	116.828***	116.443***	86.421***	84.201***	82.402***
	(6.567)	(6.483)	(6.403)	(7.018)	(6.932)	(6.852)	(6.438)	(6.353)	(6.275)	(6.222)	(6.152)	(6.118)
Hungary	6.227***	5.846***	5.254***	14.821***	14.347***	13.797***	5.997***	6.006***	5.383***	13.048***	12.953***	12.378***
	(1.366)	(1.339)	(1.327)	(2.445)	(2.388)	(2.337)	(1.414)	(1.394)	(1.382)	(1.978)	(1.938)	(1.903)
Israel	4310.967***	4269.879***	4230.510***	4074.058***	4043.947***	4014.063***	4259.491***	4226.964***	4186.877***	2976.192***	2915.948***	2869.419***
	(360.792)	(356.542)	(352.378)	(349.554)	(345.283)	(341.118)	(359.148)	(354.752)	(350.626)	(310.546)	(307.410)	(304.098)
Italy	74.395***	74.234***	73.971***	71.369***	70.904***	70.391***	74.274***	74.329***	74.109***	57.437***	56.602***	55.590***
	(4.423)	(4.379)	(4.336)	(4.522)	(4.480)	(4.439)	(4.407)	(4.361)	(4.318)	(4.037)	(4.007)	(3.988)
Japan	43.129***	43.484***	43.632***	34.849***	34.659***	34.439***	42.477***	43.229***	43.397***	41.286***	41.524***	41.219***
	(3.335)	(3.304)	(3.271)	(3.602)	(3.566)	(3.531)	(3.312)	(3.283)	(3.250)	(3.453)	(3.418)	(3.386)
Korea	1.414***	1.571***	1.642***	3.653***	3.573***	3.500***	1.512***	1.731***	1.802***	2.139***	2.459***	2.485***
	(0.232)	(0.235)	(0.232)	(0.343)	(0.336)	(0.328)	(0.229)	(0.241)	(0.237)	(0.223)	(0.255)	(0.251)
Luxembourg	15.122***	15.257***	15.223***	14.170***	14.254***	14.204***	15.047***	15.367***	15.343***	11.797***	11.969***	11.888***
	(0.948)	(0.939)	(0.928)	(0.942)	(0.932)	(0.921)	(0.933)	(0.929)	(0.918)	(0.812)	(0.806)	(0.797)
Mexico	1181.821***	1180.292***	1179.961***	1137.658***	1128.561***	1120.731***	1176.473***	1188.163***	1188.424***	1054.479***	1040.026***	1021.818***
	(101.683)	(99.927)	(98.227)	(110.017)	(108.175)	(106.381)	(101.007)	(99.000)	(97.316)	(117.581)	(115.700)	(113.972)
Netherlands	9.567***	9.745***	9.891***	10.017***	10.139***	10.235***	9.417***	9.732***	9.892***	6.948***	7.100***	7.049***
	(0.455)	(0.457)	(0.456)	(0.525)	(0.522)	(0.518)	(0.449)	(0.454)	(0.454)	(0.460)	(0.458)	(0.454)
Norway	12.870***	12.838***	12.678***	12.554***	12.600***	12.464***	12.895***	12.927***	12.767***	12.752***	12.900***	12.756***
	(1.166)	(1.147)	(1.130)	(1.171)	(1.153)	(1.136)	(1.162)	(1.142)	(1.126)	(1.131)	(1.112)	(1.096)
Portugal	149.381***	150.355***	150.834***	136.297***	136.040***	135.475***	147.908***	149.430***	149.936***	126.750***	127.559***	126.708***
	(7.274)	(7.192)	(7.103)	(8.096)	(7.994)	(7.896)	(7.165)	(7.098)	(7.011)	(7.274)	(7.200)	(7.122)
Spain	4.264***	5.374***	5.912***	5.328***	6.411***	6.926***	3.570***	5.465***	6.050***	4.675***	5.942***	6.362***
	(0.686)	(0.817)	(0.835)	(0.781)	(0.889)	(0.902)	(0.577)	(0.849)	(0.870)	(0.597)	(0.733)	(0.743)
Sweden	21.725***	21.944***	21.969***	19.131***	19.350***	19.396***	21.599***	21.942***	21.984***	19.922***	20.214***	20.077***
	(1.176)	(1.164)	(1.150)	(1.103)	(1.093)	(1.079)	(1.178)	(1.169)	(1.154)	(1.180)	(1.170)	(1.157)
United Kingdom	43.032***	43.009***	42.657***	40.397***	40.477***	40.184***	42.630***	42.924***	42.572***	40.792***	41.082***	40.721***
	(3.581)	(3.535)	(3.493)	(3.619)	(3.573)	(3.530)	(3.548)	(3.498)	(3.457)	(3.558)	(3.508)	(3.467)
United States	14.138***	14.054***	13.931***	14.930***	14.771***	14.615***	14.530***	14.266***	14.153***	14.669***	14.221***	13.931***
	(1.399)	(1.385)	(1.372)	(1.400)	(1.387)	(1.375)	(1.404)	(1.386)	(1.373)	(1.319)	(1.305)	(1.298)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (headline inflation rates) and the restricted model (the Random walk model). The negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table B4: Out-of-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Core Inflation)

Country	π_t^c											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	9.732***	9.771***	9.820***	9.153***	9.145***	9.144***	9.681***	9.813***	9.867***	7.514***	7.602***	7.594***
	(0.655)	(0.648)	(0.641)	(0.693)	(0.685)	(0.677)	(0.648)	(0.640)	(0.633)	(0.614)	(0.607)	(0.600)
Belgium	2.054***	2.057***	2.081***	2.224***	2.254***	2.330***	2.100***	2.113***	2.138***	1.642***	1.655***	1.687***
	(0.253)	(0.249)	(0.245)	(0.241)	(0.237)	(0.236)	(0.253)	(0.249)	(0.245)	(0.263)	(0.259)	(0.255)
Canada	16.015***	16.026***	16.047***	15.657***	15.629***	15.606***	15.889***	16.017***	16.056***	12.409***	12.367***	12.147***
	(0.848)	(0.839)	(0.830)	(0.818)	(0.809)	(0.801)	(0.850)	(0.841)	(0.833)	(0.723)	(0.717)	(0.715)
Finland	31.153***	31.390***	31.496***	29.891***	29.992***	29.992***	30.758***	31.215***	31.351***	23.423***	23.302***	22.978***
	(1.581)	(1.568)	(1.553)	(1.680)	(1.663)	(1.646)	(1.559)	(1.549)	(1.535)	(1.420)	(1.407)	(1.399)
France	27.301***	26.999***	26.710***	25.989***	25.679***	25.380***	27.301***	27.048***	26.765***	25.415***	25.161***	24.837***
	(1.928)	(1.908)	(1.887)	(1.887)	(1.867)	(1.847)	(1.923)	(1.901)	(1.881)	(1.840)	(1.819)	(1.801)
Germany	3.096***	3.101***	3.115***	3.575***	3.557***	3.546***	3.095***	3.104***	3.118***	2.311***	2.243***	2.162***
	(0.241)	(0.238)	(0.236)	(0.279)	(0.276)	(0.273)	(0.241)	(0.238)	(0.236)	(0.251)	(0.249)	(0.248)
Greece	95.546***	96.134***	96.515***	96.671***	96.618***	96.442***	93.579***	94.434***	94.831***	60.363***	59.086***	57.680***
	(5.087)	(5.028)	(4.967)	(5.702)	(5.629)	(5.558)	(4.949)	(4.897)	(4.838)	(4.900)	(4.834)	(4.807)
Hungary	6.658***	5.559***	4.577***	12.444***	11.682***	10.976***	6.499***	5.581***	4.568***	9.930***	9.056***	8.300***
	(1.602)	(1.622)	(1.630)	(2.323)	(2.283)	(2.242)	(1.669)	(1.692)	(1.699)	(1.939)	(1.941)	(1.918)
Israel	4293.709***	4251.552***	4212.184***	4032.446***	3998.357***	3965.913***	4240.681***	4207.088***	4167.099***	2975.084***	2918.138***	2870.907***
	(355.968)	(351.806)	(347.707)	(343.235)	(339.110)	(335.066)	(354.364)	(350.045)	(345.982)	(305.993)	(302.863)	(299.636)
Italy	71.614***	71.346***	71.043***	69.944***	69.440***	68.922***	71.491***	71.462***	71.197***	55.047***	54.273***	53.271***
	(4.355)	(4.311)	(4.270)	(4.370)	(4.330)	(4.291)	(4.346)	(4.301)	(4.259)	(3.995)	(3.966)	(3.947)
Japan	38.920***	39.017***	39.090***	31.241***	30.998***	30.763***	38.283***	38.650***	38.739***	35.551***	35.344***	34.847***
	(2.670)	(2.643)	(2.616)	(2.900)	(2.872)	(2.844)	(2.649)	(2.622)	(2.596)	(2.869)	(2.842)	(2.821)
Korea	1.641***	1.715***	1.897***	2.696***	2.653***	2.659***	1.808***	1.780***	1.962***	2.042***	1.985***	2.054***
	(0.387)	(0.378)	(0.376)	(0.318)	(0.310)	(0.302)	(0.380)	(0.378)	(0.377)	(0.342)	(0.344)	(0.337)
Luxembourg	13.322***	13.294***	13.308***	12.321***	12.263***	12.235***	13.323***	13.404***	13.430***	8.910***	8.902***	8.784***
	(0.830)	(0.820)	(0.811)	(0.843)	(0.833)	(0.823)	(0.822)	(0.811)	(0.802)	(0.713)	(0.705)	(0.698)
Mexico	1190.404***	1185.906***	1181.778***	1158.366***	1146.944***	1136.279***	1184.509***	1192.022***	1188.372***	1077.157***	1061.227***	1042.219***
	(103.610)	(101.833)	(100.114)	(111.883)	(110.044)	(108.257)	(102.885)	(100.866)	(99.160)	(120.218)	(118.319)	(116.562)
Netherlands	7.620***	7.653***	7.673***	8.708***	8.711***	8.703***	7.573***	7.653***	7.683***	4.061***	3.967***	3.848***
	(0.421)	(0.417)	(0.413)	(0.513)	(0.508)	(0.503)	(0.420)	(0.417)	(0.413)	(0.504)	(0.499)	(0.496)
Norway	10.021***	9.880***	9.829***	10.372***	10.240***	10.245***	10.132***	9.994***	9.948***	10.844***	10.712***	10.735***
	(0.890)	(0.877)	(0.863)	(0.902)	(0.888)	(0.874)	(0.885)	(0.872)	(0.858)	(0.878)	(0.865)	(0.851)
Portugal	112.471***	113.646***	114.891***	101.398***	101.330***	101.216***	110.650***	112.614***	113.871***	96.445***	97.949***	98.111***
	(5.154)	(5.111)	(5.071)	(6.003)	(5.926)	(5.852)	(5.026)	(5.013)	(4.975)	(4.962)	(4.939)	(4.881)
Spain	7.618***	8.612***	9.697***	7.351***	8.067***	8.863***	7.290***	8.929***	10.115***	7.308***	8.502***	9.491***
	(0.524)	(0.655)	(0.782)	(0.572)	(0.634)	(0.703)	(0.469)	(0.678)	(0.824)	(0.535)	(0.644)	(0.751)
Sweden	19.839***	19.984***	20.146***	18.233***	18.363***	18.520***	19.667***	19.941***	20.112***	18.978***	19.221***	19.195***
	(1.036)	(1.025)	(1.015)	(1.004)	(0.993)	(0.983)	(1.037)	(1.027)	(1.017)	(1.061)	(1.051)	(1.038)
United Kingdom	39.039***	38.782***	38.359***	37.004***	36.793***	36.403***	38.655***	38.662***	38.241***	38.373***	38.438***	38.015***
	(3.111)	(3.073)	(3.039)	(3.091)	(3.052)	(3.018)	(3.087)	(3.045)	(3.011)	(3.091)	(3.049)	(3.015)
United States	13.682***	13.619***	13.563***	14.292***	14.168***	14.042***	13.809***	13.780***	13.742***	12.167***	11.967***	11.629***
	(1.104)	(1.093)	(1.082)	(1.112)	(1.102)	(1.092)	(1.109)	(1.098)	(1.087)	(1.021)	(1.014)	(1.013)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (core inflation rates) and the restricted model (the Random walk model). The negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table B5: In-sample Predictability Results for Inflation rates (Headline) using Traditional Phillips Curve and Commodity prices-augmented Phillips Curve

Country	$\pi_t^{tr\_pc\_h}$	$\pi_t^{aug\_pc\_h}$							
		CASE I		**CASE II**		**CASE III**		**CASE IV**	
	IPI	IPI	CR	IPI	AG	IPI	EN	IPI	ME
Austria	-2.967***	23.934***	0.762***	21.259***	2.504***	24.096***	0.798***	25.568***	1.134***
	(0.362)	(0.803)	(0.088)	(0.916)	(0.262)	(0.817)	(0.098)	(0.835)	(0.299)
Belgium	-3.925***	-1.178	3.224***	13.086***	3.006***	2.413	3.412***	32.537***	-3.382***
	(0.619)	(2.107)	(0.237)	(2.611)	(0.861)	(2.107)	(0.259)	(3.480)	(0.682)
Canada	1.863***	18.951***	3.231***	15.889***	8.726***	18.249***	3.472***	22.754***	4.982***
	(0.546)	(0.481)	(0.095)	(0.969)	(0.454)	(0.486)	(0.103)	(1.133)	(0.599)
Finland	0.450	31.153***	3.582***	33.066***	6.257***	30.559***	3.837***	40.965***	1.535
	(0.582)	(1.032)	(0.218)	(1.493)	(0.686)	(1.076)	(0.249)	(1.619)	(1.136)
France	-11.270***	25.781***	3.090***	32.191***	6.965***	26.887***	3.263***	46.300***	2.472***
	(1.670)	(2.017)	(0.144)	(2.340)	(0.546)	(2.032)	(0.161)	(3.486)	(0.621)
Germany	-1.679***	21.503***	0.513***	18.706***	2.358***	21.456***	0.497***	21.538***	1.141***
	(0.562)	(0.973)	(0.101)	(1.069)	(0.316)	(0.991)	(0.112)	(1.094)	(0.360)
Greece	3.820**	44.168***	2.961***	41.731***	9.113***	43.325***	3.327***	46.831***	9.636***
	(1.555)	(2.163)	(0.423)	(1.839)	(0.959)	(2.266)	(0.479)	(1.890)	(0.867)
Hungary	-21.496***	11.034***	1.307	19.332***	20.701***	12.356***	0.936	7.930***	8.957***
	(1.013)	(3.236)	(1.490)	(2.059)	(2.224)	(3.284)	(1.700)	(2.028)	(1.281)
Israel	-15.790***	20.147***	6.233***	11.154**	3.610*	19.549***	6.985***	17.537***	4.926***
	(1.514)	(2.914)	(0.589)	(4.357)	(2.019)	(2.943)	(0.650)	(3.169)	(0.704)
Italy	1.216	24.860***	4.476***	19.561***	14.575***	24.380***	4.719***	35.061***	6.160***
	(1.173)	(0.866)	(0.214)	(0.895)	(0.596)	(0.901)	(0.241)	(1.707)	(0.842)
Japan	-2.478***	15.271***	2.777***	6.944***	15.307***	15.596***	2.609***	18.041***	2.481**
	(0.798)	(0.859)	(0.329)	(0.707)	(0.723)	(0.895)	(0.368)	(1.052)	(1.192)
Korea	-3.823***	-28.745***	3.183***	-12.730***	6.879***	-27.495***	3.259***	-20.215***	4.854***
	(0.475)	(2.372)	(0.449)	(2.498)	(1.101)	(2.416)	(0.490)	(2.364)	(0.572)
Luxembourg	-8.229***	7.860***	3.115***	0.301	7.972***	8.103***	3.356***	-3.178**	4.369***
	(0.725)	(1.184)	(0.225)	(1.226)	(0.687)	(1.204)	(0.258)	(1.380)	(0.787)
Mexico	-188.446***	-408.632***	7.764*	-393.974***	-4.319	-403.363***	7.241	-354.478***	-2.678
	(9.878)	(20.678)	(4.435)	(19.861)	(11.940)	(20.966)	(5.053)	(19.715)	(5.726)
Netherlands	1.287***	16.872***	0.646***	16.697***	1.328***	16.845***	0.651***	16.274***	0.758
	(0.482)	(0.634)	(0.144)	(0.678)	(0.426)	(0.654)	(0.158)	(0.677)	(0.499)
Norway	-12.184***	-1.247	2.589***	-10.317***	1.634*	-0.055	3.116***	-10.679***	0.708
	(0.436)	(1.857)	(0.405)	(1.648)	(0.874)	(1.890)	(0.453)	(1.711)	(0.625)
Portugal	-1.018	9.695***	8.481***	15.449***	26.464***	9.338***	9.638***	34.322***	23.887***
	(1.392)	(2.385)	(0.588)	(1.922)	(1.305)	(2.337)	(0.629)	(2.650)	(1.853)
Spain	-42.528***	32.494***	-0.936	32.436***	3.650**	33.599***	-0.924	40.325***	-3.857***
	(1.724)	(4.569)	(0.765)	(4.152)	(1.650)	(4.567)	(0.810)	(4.921)	(0.980)
Sweden	-12.559***	2.217	2.893***	-4.121*	5.035***	2.508	3.271***	1.835	6.347***
	(0.720)	(1.761)	(0.259)	(2.125)	(0.876)	(1.739)	(0.285)	(1.827)	(0.561)
United Kingdom	-35.078***	4.515	3.321***	-8.904	5.824***	3.588	3.811***	-30.422***	12.892***
	(3.270)	(5.666)	(0.396)	(6.001)	(1.368)	(5.726)	(0.433)	(6.538)	(1.255)
United States	3.124***	26.814***	3.146***	21.411***	9.652***	26.430***	3.435***	24.929***	9.417***
	(0.583)	(0.818)	(0.091)	(0.896)	(0.260)	(0.816)	(0.099)	(1.412)	(0.519)

Note: The in-sample predictability in a single-factor model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for industrial production index in the traditional Phillips Curve equation. We also extend the traditional Phillips Curve to accommodate the role of commodity prices, so that we can have a multi-factor commodity prices-augmented Phillips Curve equation. In this case z comprises industrial production index and commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). Here, we employ the headline inflation rate (π_t^h). ***, **, and * imply the rejection of the null hypothesis of no predictability at 1%, 5%, and 10% levels of significance, respectively. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive models (Traditional and commodity prices-augmented Phillips Curve equations). We therefore consider four cases for each of the commodity prices. Here, we capture Pre-GFC sample data for in-sample forecast.

Table B6: In-sample Predictability Results for Inflation rates (Core) using Traditional Phillips Curve and Commodity prices-augmented Phillips Curve

Country	$\pi_t^{tr\_pc\_c}$	$\pi_t^{aug\_pc\_c}$							
		CASE I		**CASE II**		**CASE III**		**CASE IV**	
	IPI	IPI	CR	IPI	AG	IPI	EN	IPI	ME
Austria	-3.192***	17.057***	1.883***	17.370***	4.402***	16.775***	2.080***	27.542***	0.922
	(0.485)	(1.289)	(0.132)	(1.454)	(0.386)	(1.303)	(0.146)	(1.502)	(0.650)
Belgium	-9.229***	-7.699***	0.471**	6.420***	-0.350	-7.313***	0.561**	12.014***	-1.927***
	(0.441)	(1.750)	(0.209)	(1.545)	(0.687)	(1.714)	(0.225)	(1.897)	(0.451)
Canada	1.485***	17.361***	3.045***	16.102***	7.740***	16.716***	3.251***	22.106***	3.460***
	(0.469)	(0.490)	(0.101)	(0.953)	(0.478)	(0.493)	(0.109)	(1.080)	(0.590)
Finland	0.180	29.943***	3.792***	32.070***	7.058***	29.026***	4.125***	38.676***	1.210
	(0.536)	(1.038)	(0.226)	(1.521)	(0.729)	(1.073)	(0.256)	(1.631)	(1.140)
France	-7.210***	15.574***	2.857***	24.904***	6.506***	16.429***	3.096***	39.527***	3.185***
	(1.452)	(1.675)	(0.112)	(2.096)	(0.420)	(1.649)	(0.122)	(3.318)	(0.580)
Germany	-0.426	16.523***	0.458***	15.257***	1.368***	16.402***	0.468***	16.704***	0.960***
	(0.420)	(0.825)	(0.094)	(0.864)	(0.273)	(0.838)	(0.104)	(0.962)	(0.345)
Greece	3.451**	48.852***	1.990***	-19.577***	11.529***	48.005***	2.277***	48.574***	7.832***
	(1.515)	(2.177)	(0.428)	(1.917)	(1.529)	(2.265)	(0.480)	(1.923)	(0.867)
Hungary	-22.299***	12.281***	-0.190	14.688***	13.789***	12.453***	0.462	5.879**	8.236***
	(1.0280)	(3.207)	(1.697)	(2.164)	(3.016)	(3.179)	(1.915)	(2.303)	(1.705)
Israel	-19.991***	16.507***	5.293***	17.424***	3.903	15.986***	6.056***	14.517***	3.953***
	(1.588)	(3.340)	(0.719)	(5.613)	(2.497)	(3.342)	(0.785)	(3.707)	(0.925)
Italy	1.439	23.031***	4.675***	22.009***	12.622***	22.309***	5.017***	34.426***	7.059***
	(1.149)	(0.702)	(0.167)	(0.862)	(0.575)	(0.727)	(0.188)	(1.560)	(0.740)
Japan	-1.839***	14.122***	2.460***	7.318***	12.613***	14.409***	2.302***	15.625***	3.182***
	(0.663)	(0.638)	(0.265)	(0.527)	(0.560)	(0.667)	(0.296)	(0.835)	(1.034)
Korea	-5.589***	-19.619***	5.412***	13.621***	10.322***	-16.384***	5.663***	1.240	5.332***
	(0.520)	(2.612)	(0.494)	(3.477)	(1.212)	(2.584)	(0.496)	(3.330)	(0.678)
Luxembourg	-7.327***	7.551***	2.835***	1.317	7.372***	7.799***	3.098***	-2.398*	4.170***
	(0.734)	(0.950)	(0.161)	(0.970)	(0.470)	(0.943)	(0.177)	(1.284)	(0.758)
Mexico	-190.702***	-408.207***	6.690	-393.773***	-11.581	-402.914***	6.116	-355.509***	-2.640
	(9.874)	(21.363)	(4.525)	(20.136)	(11.699)	(21.636)	(5.133)	(20.378)	(5.836)
Netherlands	2.205***	17.110***	0.321***	17.369***	0.225	17.176***	0.284**	17.251***	-1.078***
	(0.419)	(0.509)	(0.121)	(0.518)	(0.340)	(0.524)	(0.133)	(0.531)	(0.409)
Norway	-11.103***	-4.145**	0.614	-9.396***	-1.222	-4.117**	0.626	-6.807***	-0.060
	(0.424)	(1.897)	(0.381)	(1.585)	(0.780)	(1.961)	(0.430)	(1.754)	(0.653)
Portugal	-6.083***	18.784***	5.681***	21.550***	22.015***	18.175***	6.621***	29.620***	17.274***
	(1.325)	(2.804)	(0.757)	(2.394)	(1.676)	(2.772)	(0.814)	(3.067)	(1.937)
Spain	-48.194***	42.278***	-2.322***	34.399***	2.967**	43.332***	-2.532***	42.576***	-4.076***
	(1.626)	(3.726)	(0.459)	(3.652)	(1.408)	(3.712)	(0.499)	(4.185)	(0.833)
Sweden	-11.422***	-6.493***	1.602***	-13.258***	2.813***	-6.030***	1.794***	-10.301***	4.552***
	(0.596)	(1.767)	(0.283)	(2.016)	(0.924)	(1.755)	(0.309)	(1.722)	(0.527)
United Kingdom	-22.930***	18.756***	3.040***	3.948	8.073***	18.393***	3.422***	-15.801***	12.913***
	(2.635)	(5.001)	(0.350)	(4.796)	(1.224)	(5.069)	(0.380)	(5.381)	(1.118)
United States	3.749***	25.131***	2.802***	20.437***	8.671***	24.373***	3.096***	26.673***	6.521***
	(0.480)	(0.843)	(0.091)	(0.914)	(0.286)	(0.798)	(0.094)	(1.671)	(0.643)

Note: The in-sample predictability in a single-factor model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for industrial production index in the traditional Phillips Curve equation. We also extend the traditional Phillips Curve to accommodate the role of commodity prices, so that we can have a multi-factor commodity prices-augmented Phillips Curve equation. In this case z comprises industrial production index and commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). Here, we employ the core inflation rate (π_t^c). ***, **, and * imply the rejection of the null hypothesis of no predictability at 1%, 5%, and 10% levels of significance, respectively. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive models (Traditional and commodity prices-augmented Phillips Curve equations). We therefore consider four cases for each of the commodity prices. Here, we capture Pre-GFC sample data for in-sample forecast.

Table B7: In-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Headline and core inflation)

Country	$\pi_t^{aug\_pc\_h}$				$\pi_t^{aug\_pc\_c}$			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	7.107***	6.463***	7.100***	6.200***	9.673***	8.965***	9.633***	6.763***
	(0.399)	(0.369)	(0.401)	(0.377)	(0.527)	(0.455)	(0.534)	(0.476)
Belgium	8.106***	5.585***	8.497***	4.520***	0.929***	1.194***	1.015***	1.171***
	(0.369)	(0.330)	(0.391)	(0.344)	(0.081)	(0.170)	(0.086)	(0.170)
Canada	35.411***	36.742***	35.517***	24.766***	28.109***	28.281***	28.157***	17.750***
	(1.373)	(1.514)	(1.381)	(1.242)	(1.127)	(1.258)	(1.132)	(0.930)
Finland	61.560***	67.703***	61.620***	53.901***	49.541***	51.780***	49.599***	39.499***
	(2.669)	(3.080)	(2.700)	(2.624)	(2.163)	(2.463)	(2.183)	(2.020)
France	23.715***	20.128***	23.534***	16.079***	26.362***	24.824***	26.220***	18.688***
	(0.937)	(0.801)	(0.927)	(0.897)	(0.935)	(0.919)	(0.934)	(0.896)
Germany	6.027***	6.196***	6.013***	5.541***	4.223***	4.076***	4.232***	3.988***
	(0.292)	(0.293)	(0.291)	(0.288)	(0.235)	(0.224)	(0.234)	(0.236)
Greece	91.140***	88.262***	91.426***	95.453***	85.850***	82.909***	86.014***	89.105***
	(4.062)	(4.146)	(4.071)	(4.455)	(3.942)	(3.830)	(3.935)	(4.066)
Hungary	20.102***	42.057***	19.441***	45.674***	20.269***	34.198***	21.605***	43.930***
	(1.824)	(2.391)	(1.855)	(2.658)	(1.982)	(2.125)	(2.054)	(2.475)
Israel	13.008***	12.090***	13.096***	12.469***	12.124***	13.938***	12.281***	12.529***
	(1.472)	(1.297)	(1.476)	(1.364)	(1.411)	(1.482)	(1.429)	(1.363)
Italy	102.255***	114.268***	100.890***	83.257***	103.891***	105.104***	103.404***	80.789***
	(3.545)	(4.265)	(3.541)	(3.828)	(3.601)	(4.192)	(3.605)	(3.747)
Japan	117.009***	133.312***	115.985***	111.493***	87.874***	96.237***	87.586***	81.439***
	(6.425)	(6.519)	(6.396)	(6.326)	(5.106)	(5.030)	(5.098)	(4.922)
Korea	2.725***	1.974***	2.666***	2.509***	7.311***	3.744***	7.597***	5.650***
	(0.386)	(0.353)	(0.370)	(0.347)	(0.950)	(0.724)	(0.939)	(0.818)
Luxembourg	4.941***	2.424***	4.810***	0.433	4.503***	2.726***	4.475***	0.827***
	(0.451)	(0.473)	(0.449)	(0.305)	(0.393)	(0.396)	(0.397)	(0.230)
Mexico	479.169***	412.334***	479.207***	566.337***	482.931***	442.472***	483.137***	584.350***
	(50.811)	(41.591)	(49.995)	(43.392)	(50.342)	(42.552)	(49.603)	(44.687)
Netherlands	25.546***	25.478***	25.358***	23.168***	29.229***	28.350***	29.157***	27.548***
	(1.107)	(1.106)	(1.098)	(0.999)	(1.354)	(1.317)	(1.349)	(1.289)
Norway	0.439**	0.041	0.502***	0.013	0.192**	0.317***	0.196**	0.283***
	(0.173)	(0.046)	(0.181)	(0.063)	(0.082)	(0.066)	(0.081)	(0.068)
Portugal	186.819***	206.082***	190.704***	185.939***	70.140***	85.214***	72.608***	80.397***
	(8.799)	(10.767)	(8.961)	(11.646)	(3.607)	(4.977)	(3.669)	(4.774)
Spain	12.850***	16.257***	13.043***	15.897***	24.851***	24.075***	25.315***	23.141***
	(1.793)	(1.599)	(1.779)	(1.703)	(1.945)	(1.738)	(1.959)	(1.750)
Sweden	6.005***	3.015***	6.039***	5.024***	2.729***	2.406***	2.653***	4.157***
	(0.449)	(0.295)	(0.457)	(0.427)	(0.248)	(0.186)	(0.246)	(0.271)
United Kingdom	15.583***	7.719***	15.575***	13.568***	35.485***	29.578***	35.557***	40.261***
	(1.066)	(0.775)	(1.063)	(0.960)	(1.643)	(1.531)	(1.655)	(1.927)
United States	49.057***	49.404***	50.449***	51.988***	39.210***	42.028***	40.345***	38.306***
	(1.813)	(1.914)	(1.882)	(2.329)	(1.704)	(1.987)	(1.757)	(1.927)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for headline and core inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting both headline and core inflation rates using in-sample data covering Pre-GFC sample period. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting both headline and core inflation rates using in-sample data covering Pre-GFC sample period.

Table B8: Out-of-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Headline inflation)

Country	$\pi_t^{aug\_pc\_h}$											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	7.202***	7.329***	7.319***	6.517***	6.602***	6.580***	7.109***	7.327***	7.318***	6.219***	6.409***	6.395***
	(0.398)	(0.397)	(0.393)	(0.366)	(0.364)	(0.360)	(0.397)	(0.399)	(0.395)	(0.373)	(0.376)	(0.372)
Belgium	8.111***	8.068***	7.961***	5.701***	5.878***	5.843***	8.593***	8.495***	8.384***	4.678***	4.867***	4.859***
	(0.364)	(0.360)	(0.357)	(0.331)	(0.335)	(0.330)	(0.394)	(0.380)	(0.377)	(0.352)	(0.354)	(0.349)
Canada	36.985***	38.527***	39.575***	38.064***	39.435***	40.365***	36.356***	38.639***	39.703***	25.719***	28.260***	29.255***
	(1.503)	(1.617)	(1.656)	(1.593)	(1.675)	(1.700)	(1.410)	(1.625)	(1.666)	(1.290)	(1.585)	(1.621)
Finland	64.262***	67.391***	69.812***	70.585***	74.109***	76.836***	62.684***	67.531***	70.002***	55.044***	60.703***	63.627***
	(2.865)	(3.109)	(3.233)	(3.271)	(3.541)	(3.679)	(2.710)	(3.149)	(3.277)	(2.641)	(3.238)	(3.421)
France	25.449***	26.826***	27.600***	21.924***	23.403***	24.244***	24.168***	26.770***	27.592***	16.810***	20.474***	21.597***
	(1.164)	(1.281)	(1.304)	(1.078)	(1.225)	(1.258)	(0.952)	(1.300)	(1.327)	(0.934)	(1.540)	(1.589)
Germany	6.378***	6.730***	6.905***	6.494***	6.801***	6.950***	6.129***	6.716***	6.892***	5.663***	6.209***	6.353***
	(0.325)	(0.353)	(0.357)	(0.316)	(0.338)	(0.340)	(0.292)	(0.352)	(0.356)	(0.290)	(0.344)	(0.346)
Greece	96.107***	100.997***	104.888***	92.464***	96.734***	100.151***	94.410***	101.301***	105.186***	98.385***	106.631***	110.228***
	(4.489)	(4.858)	(5.055)	(4.435)	(4.710)	(4.857)	(4.198)	(4.869)	(5.064)	(4.557)	(5.396)	(5.529)
Hungary	22.236***	23.008***	22.801***	43.472***	43.381***	42.523***	20.249***	22.471***	22.292***	45.772***	48.831***	47.949***
	(1.978)	(1.954)	(1.908)	(2.400)	(2.340)	(2.307)	(1.837)	(1.997)	(1.949)	(2.588)	(2.757)	(2.712)
Israel	12.069***	11.290***	10.738***	11.304***	10.401***	9.453***	12.965***	11.273***	10.619***	12.354***	10.806***	10.342***
	(1.484)	(1.481)	(1.464)	(1.304)	(1.324)	(1.348)	(1.440)	(1.495)	(1.484)	(1.330)	(1.380)	(1.363)
Italy	106.332***	110.009***	113.006***	117.523***	120.498***	122.871***	102.910***	108.655***	111.711***	85.458***	92.917***	96.407***
	(3.881)	(4.123)	(4.260)	(4.424)	(4.544)	(4.601)	(3.600)	(4.121)	(4.264)	(3.894)	(4.663)	(4.829)
Japan	123.448***	126.350***	129.604***	138.230***	139.565***	141.411***	121.305***	125.429***	128.795***	116.859***	121.636***	125.050***
	(7.341)	(7.367)	(7.421)	(7.184)	(7.136)	(7.111)	(7.386)	(7.329)	(7.392)	(7.332)	(7.369)	(7.432)
Korea	3.344***	3.392***	3.543***	2.353***	2.367***	2.425***	2.907***	3.320***	3.450***	2.754***	2.740***	2.846***
	(0.488)	(0.478)	(0.471)	(0.385)	(0.376)	(0.367)	(0.387)	(0.467)	(0.459)	(0.367)	(0.357)	(0.352)
Luxembourg	5.094***	5.075***	4.917***	2.481***	2.466***	2.407***	4.806***	4.956***	4.786***	0.482	0.576*	0.555*
	(0.451)	(0.448)	(0.447)	(0.468)	(0.462)	(0.458)	(0.444)	(0.446)	(0.447)	(0.302)	(0.303)	(0.300)
Mexico	515.495***	563.061***	616.021***	444.635***	481.076***	520.012***	498.880***	562.187***	613.745***	584.481***	644.135***	683.741***
	(52.094)	(54.756)	(57.957)	(42.935)	(44.728)	(46.719)	(49.780)	(53.897)	(56.964)	(43.283)	(47.491)	(49.532)
Netherlands	26.334***	27.335***	28.189***	26.241***	27.221***	28.051***	25.494***	27.137***	27.991***	23.326***	24.872***	25.631***
	(1.142)	(1.202)	(1.239)	(1.137)	(1.195)	(1.230)	(1.088)	(1.193)	(1.231)	(0.991)	(1.096)	(1.129)
Norway	0.404**	0.451***	0.456***	0.041	0.037	0.037	0.499***	0.522***	0.528***	0.018	0.019	0.013
	(0.171)	(0.170)	(0.168)	(0.045)	(0.044)	(0.044)	(0.178)	(0.178)	(0.176)	(0.061)	(0.061)	(0.060)
Portugal	195.289***	202.445***	208.345***	213.692***	220.899***	226.783***	196.371***	206.557***	212.610***	191.668***	214.994***	223.168***
	(9.342)	(9.672)	(9.846)	(11.069)	(11.314)	(11.424)	(9.144)	(9.840)	(10.022)	(11.732)	(14.110)	(14.342)
Spain	17.127***	21.422***	24.186***	19.701***	23.166***	25.335***	14.215***	21.564***	24.312***	17.025***	24.662***	27.594***
	(2.537)	(3.058)	(3.221)	(2.145)	(2.547)	(2.663)	(1.828)	(3.041)	(3.203)	(1.751)	(3.062)	(3.250)
Sweden	6.187***	6.368***	6.360***	3.168***	3.393***	3.438***	6.193***	6.430***	6.425***	5.191***	5.442***	5.392***
	(0.452)	(0.453)	(0.448)	(0.300)	(0.311)	(0.307)	(0.460)	(0.463)	(0.458)	(0.432)	(0.437)	(0.432)
United Kingdom	17.574***	20.077***	21.066***	8.937***	10.502***	11.130***	15.716***	20.079***	21.069***	13.735***	15.268***	15.349***
	(1.336)	(1.676)	(1.708)	(0.915)	(1.111)	(1.129)	(1.052)	(1.678)	(1.710)	(0.952)	(1.060)	(1.048)
United States	51.526***	53.753***	55.251***	51.303***	53.080***	54.260***	52.106***	55.265***	56.826***	53.629***	57.083***	58.203***
	(2.059)	(2.241)	(2.301)	(2.046)	(2.159)	(2.191)	(1.983)	(2.316)	(2.380)	(2.402)	(2.730)	(2.741)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for headline inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting headline inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting headline inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table B9: Out-of-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Core inflation)

Country	$\pi_t^{aug\_pc\_c}$											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	9.720***	9.796***	9.866***	8.974***	9.017***	9.054***	9.570***	9.767***	9.844***	6.734***	6.858***	6.910***
	(0.521)	(0.516)	(0.511)	(0.450)	(0.445)	(0.440)	(0.528)	(0.523)	(0.519)	(0.470)	(0.466)	(0.461)
Belgium	0.880***	0.847***	0.816***	1.135***	1.086***	1.060***	1.046***	0.930***	0.898***	1.200***	1.089***	1.061***
	(0.082)	(0.082)	(0.082)	(0.169)	(0.168)	(0.166)	(0.086)	(0.087)	(0.087)	(0.168)	(0.167)	(0.165)
Canada	29.144***	30.082***	30.968***	29.171***	30.057***	30.904***	28.515***	30.125***	31.025***	18.218***	19.977***	20.882***
	(1.192)	(1.241)	(1.280)	(1.297)	(1.334)	(1.364)	(1.130)	(1.244)	(1.285)	(0.940)	(1.113)	(1.163)
Finland	51.676***	54.156***	56.073***	53.998***	56.728***	58.849***	50.345***	54.256***	56.199***	40.349***	44.729***	46.999***
	(2.313)	(2.501)	(2.599)	(2.602)	(2.806)	(2.910)	(2.184)	(2.526)	(2.625)	(2.030)	(2.491)	(2.636)
France	27.587***	28.509***	29.353***	26.245***	27.380***	28.405***	26.667***	28.435***	29.320***	19.233***	22.100***	23.371***
	(1.052)	(1.105)	(1.144)	(1.080)	(1.162)	(1.222)	(0.942)	(1.113)	(1.157)	(0.914)	(1.314)	(1.398)
Germany	4.463***	4.673***	4.857***	4.277***	4.458***	4.615***	4.350***	4.680***	4.866***	4.109***	4.423***	4.581***
	(0.253)	(0.264)	(0.272)	(0.236)	(0.245)	(0.251)	(0.236)	(0.263)	(0.271)	(0.239)	(0.263)	(0.269)
Greece	90.003***	94.593***	99.168***	86.488***	90.434***	94.366***(	87.819***	94.760***	99.317***	90.869***	98.643***	102.830***
	(4.242)	(4.583)	(4.895)	(4.052)	(4.309)	4.547)	(3.953)	(4.578)	(4.888)	(4.077)	(4.809)	(5.047)
Hungary	22.608***	22.818***	22.567***	36.359***	36.057***	35.384***	22.447***	24.172***	23.885***	44.169***	46.698***	45.814***
	(2.155)	(2.103)	(2.052)	(2.255)	(2.200)	(2.162)	(2.030)	(2.176)	(2.124)	(2.413)	(2.648)	(2.605)
Israel	10.190***	9.052***	8.679***	12.774***	11.662***	11.132***	13.638***	9.013***	8.501***	13.879***	9.715***	9.532***
	(1.584)	(1.614)	(1.588)	(1.523)	(1.554)	(1.535)	(1.503)	(1.657)	(1.635)	(1.442)	(1.537)	(1.516)
Italy	107.554***	110.754***	113.576***	108.367***	111.360***	113.985***	105.032***	110.248***	113.105***	82.650***	89.440***	92.658***
	(3.864)	(4.040)	(4.161)	(4.356)	(4.481)	(4.562)	(3.629)	(4.039)	(4.164)	(3.786)	(4.431)	(4.578)
Japan	92.861***	95.144***	97.955***	100.038***	101.147***	102.818***	91.456***	94.950***	97.862***	85.372***	88.995***	91.730***
	(5.733)	(5.754)	(5.816)	(5.494)	(5.460)	(5.453)	(5.713)	(5.738)	(5.809)	(5.568)	(5.616)	(5.674)
Korea	8.454***	9.256***	9.967***	3.493***	3.700***	4.020***	8.767***	9.291***	9.920***	6.873***	5.460***	5.940***
	(1.045)	(1.073)	(1.086)	(0.726)	(0.714)	(0.708)	(1.040)	(1.030)	(1.037)	(0.949)	(0.796)	(0.804)
Luxembourg	4.466***	4.384***	4.323***	2.703***	2.656***	2.621***	4.426***	4.352***	4.289***	0.822***	0.806***	0.796***
	(0.390)	(0.387)	(0.383)	(0.392)	(0.388)	(0.383)	(0.393)	(0.391)	(0.387)	(0.227)	(0.225)	(0.222)
Mexico	516.935***	562.485***	614.208***	471.708***	505.517***	542.347***	499.830***	561.998***	612.475***	599.267***	659.410***	699.062***
	(51.389)	(53.824)	(56.923)	(43.477)	(44.894)	(46.592)	(49.218)	(53.056)	(56.035)	(44.337)	(48.263)	(50.251)
Netherlands	30.167***	31.031***	31.794***	29.280***	30.133***	30.874***	29.475***	30.954***	31.719***	27.882***	29.290***	30.056***
	(1.393)	(1.423)	(1.443)	(1.357)	(1.387)	(1.406)	(1.341)	(1.418)	(1.438)	(1.283)	(1.358)	(1.380)
Norway	0.183**	0.212***	0.331***	0.308***	0.328***	0.422***	0.193**	0.217***	0.340***	0.279***	0.296***	0.405***
	(0.081)	(0.080)	(0.094)	(0.065)	(0.064)	(0.075)	(0.080)	(0.080)	(0.094)	(0.067)	(0.066)	(0.080)
Portugal	75.544***	80.484***	85.301***	89.846***	94.416***	98.821***(	75.379***	83.030***	87.903***	83.066***	96.276***	101.757***
	(4.187)	(4.598)	(4.946)	(5.264)	(5.524)	5.743)	(3.798)	(4.660)	(5.010)	(4.840)	(6.524)	(6.829)
Spain	28.090***	32.113***	35.868***	26.671***	29.840***(	32.772***	25.756***	32.537***	36.275***	23.616***	30.491***	34.385***
	(2.368)	(2.847)	(3.196)	(2.040)	2.386)	(2.638)	(1.942)	(2.848)	(3.193)	(1.739)	(2.751)	(3.142)
Sweden	2.839***	2.880***	2.889***	2.394***	2.392***	2.406***	2.975***	2.827***	2.845***	4.459***	4.380***	4.293***
	(0.250)	(0.248)	(0.245)	(0.184)	(0.181)	(0.179)	(0.284)	(0.248)	(0.245)	(0.302)	(0.278)	(0.278)
United Kingdom	38.223***	40.713***	42.280***	31.463***	33.197***	34.268***	36.187***	40.808***	42.390***	40.830***	43.229***	43.491***
	(1.966)	(2.191)	(2.256)	(1.694)	(1.816)	(1.846)	(1.653)	(2.204)	(2.270)	(1.916)	(2.075)	(2.052)
United States	40.818***	42.405***	44.024***	43.374***	44.712***	46.079***	41.098***	43.577***	45.235***	39.081***	41.853***(	43.283***
	(1.809)	(1.903)	(1.996)	(2.041)	(2.093)	(2.145)	(1.766)	(1.954)	(2.049)	(1.933)	2.145)	(2.203)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for core inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting core inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting core inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

C: Post-GFC Results

Table C1: In-sample Predictability Results for inflation rates (Headline and Core) using Commodity prices-inflation model

Country	π_t^h				π_t^c			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	2.612***	7.761***	2.938***	2.775***	0.427**	0.840**	0.603***	0.402
	(0.315)	(0.791)	(0.318)	(0.445)	(0.182)	(0.408)	(0.202)	(0.262)
Belgium	2.163***	6.570***	2.427***	1.762**	0.070	0.229	0.046	-0.150
	(0.554)	(1.452)	(0.585)	(0.770)	(0.138)	(0.395)	(0.152)	(0.235)
Canada	2.631***	6.061***	2.788***	2.822***	-0.676***	-1.803***	-0.679***	-1.409***
	(0.436)	(0.821)	(0.442)	(0.516)	(0.189)	(0.659)	(0.214)	(0.453)
Finland	2.198***	6.786***	3.107***	0.471	0.170	2.899**	0.833*	-0.703
	(0.547)	(1.618)	(0.556)	(0.711)	(0.458)	(1.288)	(0.467)	(0.599)
France	2.038***	6.739***	2.338***	2.966***	0.289***	0.443**	0.366***	0.275**
	(0.330)	(0.816)	(0.349)	(0.429)	(0.070)	(0.215)	(0.081)	(0.118)
Germany	1.333***	5.386***	1.709***	1.924***	-0.230	-1.093***	-0.186	-0.631***
	(0.234)	(0.583)	(0.239)	(0.418)	(0.155)	(0.339)	(0.163)	(0.188)
Greece	-1.016*	2.777*	-1.191*	5.921***	-2.183***	0.367	-2.272***	2.091***
	(0.554)	(1.622)	(0.614)	(0.653)	(0.451)	(1.283)	(0.483)	(0.644)
Hungary	0.950*	8.088***	0.985	5.952***	-4.747***	-6.879***	-5.011***	-6.481***
	(0.538)	(1.489)	(0.595)	(0.869)	(0.727)	(1.104)	(0.756)	(0.757)
Israel	1.314***	3.693***	1.499***	1.774***	-0.676***	-1.573***	-0.838***	-0.745***
	(0.186)	(0.415)	(0.199)	(0.206)	(0.153)	(0.435)	(0.165)	(0.217)
Italy	2.131***	8.675***	2.525***	4.551***	0.690***	3.130***	0.809***	1.551***
	(0.379)	(0.645)	(0.457)	(0.467)	(0.132)	(0.318)	(0.151)	(0.161)
Japan	2.486***	1.459	2.810***	1.939**	1.108***	-1.756*	1.151***	-2.047***
	(0.346)	(1.300)	(0.367)	(0.931)	(0.257)	(0.935)	(0.283)	(0.438)
Korea	0.888***	2.996***	1.134***	1.678***	-0.848***	-1.369***	-0.923***	-0.876***
	(0.238)	(0.544)	(0.265)	(0.257)	(0.115)	(0.402)	(0.129)	(0.181)
Luxembourg	2.468***	8.066***	2.595***	3.365***	0.169	1.373***	0.141	0.261
	(0.452)	(1.206)	(0.473)	(0.547)	(0.144)	(0.412)	(0.169)	(0.223)
Mexico	-0.677***	-0.641	-0.815***	-0.760***	-1.115***	-3.690***	-1.305***	-1.366***
	(0.156)	(0.498)	(0.176)	(0.219)	(0.088)	(0.264)	(0.093)	(0.141)
Netherlands	1.281***	4.353***	1.585***	1.510***	1.520***	1.437	1.686***	0.900
	(0.301)	(0.766)	(0.339)	(0.485)	(0.321)	(1.030)	(0.353)	(0.703)
Norway	-1.424**	-4.808***	-1.534**	-1.445	-0.564**	-1.572***	-0.554**	-1.429***
	(0.604)	(1.088)	(0.683)	(0.903)	(0.234)	(0.514)	(0.260)	(0.233)
Portugal	3.741***	8.650***	3.906***	5.162***	1.300**	4.418***	1.651***	2.109***
	(0.777)	(1.503)	(0.798)	(0.857)	(0.501)	(0.806)	(0.570)	(0.389)
Spain	2.788***	9.901***	3.010***	4.176***	0.521	2.892***	0.677	0.234
	(0.548)	(1.124)	(0.599)	(0.685)	(0.390)	(0.977)	(0.444)	(0.515)
Sweden	3.532***	7.336***	3.788***	2.845***	2.540***	4.131***	2.612***	3.444***
	(0.652)	(1.065)	(0.673)	(0.614)	(0.545)	(1.281)	(0.569)	(0.808)
United Kingdom	2.581***	7.048***	3.041***	3.735***	1.043***	2.387***	1.045***	2.654***
	(0.231)	(0.500)	(0.255)	(0.306)	(0.164)	(0.329)	(0.179)	(0.151)
United States	4.139***	10.041***	4.401***	5.715***	0.990***	0.810**	1.081***	-0.112
	(0.448)	(1.446)	(0.452)	(0.602)	(0.153)	(0.397)	(0.167)	(0.337)

Note: The in-sample predictability in a bivariate model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). We employ both the headline inflation rate (π_t^h) and the core inflation rate (π_t^c). *** implies the rejection of the null hypothesis of no predictability at 1% level of significance. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive model. Here, we consider the Post-GFC sample data.

Table C2: In-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Headline and core inflation)

Country	π_t^h				π_t^c			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	1.330***	1.748***	1.372***	1.132***	0.080***	0.053***	0.095***	0.058***
	(0.144)	(0.240)	(0.147)	(0.158)	(0.018)	(0.012)	(0.018)	(0.016)
Belgium	1.191***	1.872***	1.227***	1.044***	0.007	0.012	0.008	0.008
	(0.375)	(0.351)	(0.391)	(0.306)	(0.012)	(0.011)	(0.012)	(0.012)
Canada	0.424**	0.624***	0.433**	0.538***	0.268***	0.287***	0.254***	0.293***
	(0.169)	(0.176)	(0.172)	(0.171)	(0.052)	(0.056)	(0.049)	(0.052)
Finland	2.957***	3.127***	3.445***	1.866***	0.859***	1.105***	1.110***	0.703***
	(0.404)	(0.338)	(0.465)	(0.430)	(0.206)	(0.200)	(0.236)	(0.201)
France	0.937***	1.530***	0.968***	1.270***	0.121***	0.097***	0.126***	0.105***
	(0.097)	(0.201)	(0.099)	(0.153)	(0.018)	(0.014)	(0.018)	(0.016)
Germany	0.584***	0.969***	0.679***	0.582***	0.069***	0.082***	0.070***	0.080***
	(0.051)	(0.100)	(0.059)	(0.063)	(0.015)	(0.016)	(0.015)	(0.014)
Greece	6.515***	6.916***	6.486***	8.054***	2.483***	2.623***	2.490***	3.013***
	(1.057)	(1.028)	(1.052)	(1.036)	(0.367)	(0.395)	(0.365)	(0.397)
Hungary	5.613***	7.196***	5.584***	7.378***	0.912	1.961***	0.948	1.913***
	(0.470)	(0.576)	(0.468)	(0.622)	(0.631)	(0.603)	(0.626)	(0.606)
Israel	1.663***	1.688***	1.680***	1.527***	0.411***	0.436***	0.395***	0.406***
	(0.189)	(0.237)	(0.189)	(0.204)	(0.087)	(0.095)	(0.085)	(0.084)
Italy	1.283***	2.205***	1.305***	2.051***	0.421***	0.546***	0.430***	0.571***
	(0.239)	(0.348)	(0.238)	(0.371)	(0.059)	(0.074)	(0.059)	(0.080)
Japan	4.234***	4.268***	4.230***	4.079***	2.424***	2.725***	2.411***	2.696***
	(0.648)	(0.632)	(0.651)	(0.636)	(0.318)	(0.309)	(0.318)	(0.321)
Korea	1.275***	1.440***	1.325***	1.571***	0.029	-0.023	0.029	-0.013
	(0.232)	(0.245)	(0.230)	(0.265)	(0.028)	(0.037)	(0.029)	(0.034)
Luxembourg	1.592***	2.580***	1.540***	1.857***	0.149***	0.208***	0.143***	0.125***
	(0.183)	(0.331)	(0.177)	(0.215)	(0.034)	(0.042)	(0.033)	(0.035)
Mexico	0.132*	0.272***	0.116*	0.226***	0.006	0.071***	0.005	0.006
	(0.067)	(0.077)	(0.069)	(0.067)	(0.031)	(0.026)	(0.033)	(0.017)
Netherlands	0.783***	1.099***	0.836***	0.702***	0.361***	0.213***	0.361***	0.195***
	(0.104)	(0.159)	(0.105)	(0.122)	(0.068)	(0.060)	(0.069)	(0.063)
Norway	0.468***	0.622***	0.433***	0.348***	0.383***	0.362***	0.370***	0.416***
	(0.102)	(0.103)	(0.094)	(0.080)	(0.079)	(0.068)	(0.078)	(0.061)
Portugal	1.663***	2.289***	1.603***	2.222***	0.921***	1.027***	0.937***	0.944***
	(0.266)	(0.341)	(0.262)	(0.350)	(0.207)	(0.191)	(0.204)	(0.204)
Spain	2.350***	3.783***	2.320***	2.939***	0.177***	0.356***	0.182***	0.178***
	(0.257)	(0.499)	(0.251)	(0.388)	(0.047)	(0.077)	(0.048)	(0.042)
Sweden	0.864***	1.410***	0.870***	0.932***	0.326	0.576***	0.349	0.644***
	(0.252)	(0.259)	(0.253)	(0.205)	(0.231)	(0.172)	(0.227)	(0.222)
United Kingdom	2.792***	2.918***	2.845***	3.036***	1.322***	1.345***	1.296***	1.348***
	(0.318)	(0.406)	(0.312)	(0.424)	(0.130)	(0.125)	(0.127)	(0.142)
United States	1.101***	1.483***	1.111***	1.450***	0.230***	0.177***	0.228***	0.197***
	(0.257)	(0.268)	(0.257)	(0.258)	(0.058)	(0.043)	(0.057)	(0.048)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (headline and core inflation rates) and the restricted model (the Random walk model). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for in-sample data covering Post-GFC sample. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for in-sample data covering Post-GFC sample.

Table C3: Out-of-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Headline Inflation)

Country	π_t^h											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	1.254***	1.200***	1.161***	1.646***	1.537***	1.420***	1.351***	1.244***	1.206***	1.126***	1.021***	1.025***
	(0.139)	(0.132)	(0.126)	(0.228)	(0.219)	(0.212)	(0.138)	(0.134)	(0.127)	(0.149)	(0.144)	(0.136)
Belgium	1.055***	0.958***	0.888***	1.725***	1.575***	1.456***	1.212***	1.003***	0.938***	1.041***	0.858***	0.806***
	(0.355)	(0.336)	(0.318)	(0.334)	(0.320)	(0.305)	(0.366)	(0.350)	(0.331)	(0.286)	(0.274)	(0.259)
Canada	0.402**	0.389**	0.359**	0.586***	0.553***	0.524***	0.413**	0.396**	0.363**	0.511***	0.486***	0.438***
	(0.158)	(0.149)	(0.141)	(0.166)	(0.156)	(0.148)	(0.162)	(0.152)	(0.144)	(0.160)	(0.151)	(0.144)
Finland	2.772***	2.612***	2.468***	2.934***	2.720***	2.544***	3.227***	3.038***	2.865***	1.749***	1.680***	1.610***
	(0.386)	(0.368)	(0.352)	(0.325)	(0.317)	(0.308)	(0.444)	(0.424)	(0.405)	(0.405)	(0.382)	(0.362)
France	0.905***	0.791***	0.696***	1.455***	1.285***	1.136***	0.913***	0.821***	0.724***	1.195***	1.108***	1.024***
	(0.092)	(0.099)	(0.100)	(0.191)	(0.192)	(0.191)	(0.095)	(0.100)	(0.102)	(0.146)	(0.143)	(0.139)
Germany	0.562***	0.524***	0.488***	0.949***	0.795***	0.647***	0.666***	0.612***	0.569***	0.576***	0.526***	0.491***
	(0.049)	(0.048)	(0.048)	(0.095)	(0.110)	(0.119)	(0.056)	(0.056)	(0.056)	(0.060)	(0.059)	(0.057)
Greece	6.277***	5.206***	4.080***	6.686***	5.500***	4.269***	6.098***	5.179***	4.059***	7.566***	6.614***	5.374***
	(0.995)	(1.049)	(1.086)	(0.967)	(1.053)	(1.108)	(0.996)	(1.044)	(1.081)	(0.989)	(1.058)	(1.114)
Hungary	5.688***	4.880***	4.022***	7.223***	6.238***	5.177***	5.394***	4.856***	4.004***	7.073***	6.572***	5.688***
	(0.449)	(0.543)	(0.618)	(0.548)	(0.661)	(0.756)	(0.446)	(0.541)	(0.615)	(0.596)	(0.668)	(0.722)
Israel	1.672***	1.489***	1.367***	1.672***	1.496***	1.374***	1.619***	1.507***	1.383***	1.476***	1.377***	1.267***
	(0.177)	(0.187)	(0.188)	(0.222)	(0.223)	(0.220)	(0.179)	(0.188)	(0.189)	(0.192)	(0.194)	(0.192)
Italy	1.184***	0.859***	0.501*	2.050***	1.657***	1.207***	1.226***	0.850***	0.465	1.925***	1.650***	1.391***
	(0.227)	(0.254)	(0.279)	(0.332)	(0.353)	(0.378)	(0.225)	(0.261)	(0.290)	(0.351)	(0.347)	(0.344)
Japan	3.849***	3.761***	3.743***	3.804***	3.780***	3.839***	3.983***	3.761***	3.739***	3.841***	3.635***	3.722***
	(0.626)	(0.590)	(0.557)	(0.622)	(0.586)	(0.555)	(0.617)	(0.592)	(0.559)	(0.603)	(0.587)	(0.557)
Korea	1.354***	1.196***	0.969***	1.506***	1.335***	1.091***	1.315***	1.253***	1.012***	1.546***	1.474***	1.225***
	(0.223)	(0.221)	(0.230)	(0.234)	(0.233)	(0.242)	(0.216)	(0.222)	(0.233)	(0.249)	(0.252)	(0.260)
Luxembourg	1.781***	1.639***	1.435***	2.702***	2.487***	2.194***	1.604***	1.589***	1.396***	1.901***	1.865***	1.681***
	(0.189)	(0.191)	(0.199)	(0.314)	(0.312)	(0.317)	(0.169)	(0.185)	(0.191)	(0.203)	(0.210)	(0.211)
Mexico	0.211***	0.013	-0.490**	0.350***	0.141	-0.374	0.169**	-0.008	-0.534**	0.271***	0.087	-0.442*
	(0.071)	(0.121)	(0.231)	(0.079)	(0.129)	(0.239)	(0.069)	(0.126)	(0.241)	(0.067)	(0.125)	(0.242)
Netherlands	0.821***	0.754***	0.692***	1.106***	1.015***	0.929***	0.906***	0.817***	0.749***	0.781***	0.628***	0.601***
	(0.099)	(0.097)	(0.095)	(0.149)	(0.145)	(0.141)	(0.104)	(0.100)	(0.098)	(0.120)	(0.109)	(0.104)
Norway	0.675***	0.728***	0.643***	0.780***	0.832***	0.734***	0.804***	0.679***	0.604***	0.724***	0.276***	0.275***
	(0.127)	(0.124)	(0.123)	(0.115)	(0.113)	(0.115)	(0.182)	(0.116)	(0.114)	(0.178)	(0.075)	(0.071)
Portugal	1.671***	1.465***	1.301***	2.199***	2.003***	1.832***	1.515***	1.418***	1.263***	2.095***	1.997***	1.879***
	(0.251)	(0.256)	(0.252)	(0.321)	(0.314)	(0.304)	(0.248)	(0.251)	(0.246)	(0.332)	(0.315)	(0.301)
Spain	2.275***	1.634***	1.124***	3.602***	2.787***	2.097***	2.226***	1.633***	1.142***	2.805***	2.445***	2.168***
	(0.252)	(0.355)	(0.392)	(0.477)	(0.561)	(0.596)	(0.238)	(0.345)	(0.379)	(0.367)	(0.376)	(0.372)
Sweden	0.710***	0.484*	0.204	1.260***	1.028***	0.729***	0.839***	0.507**	0.251	0.898***	0.751***	0.679***
	(0.245)	(0.248)	(0.260)	(0.249)	(0.253)	(0.267)	(0.237)	(0.246)	(0.255)	(0.193)	(0.187)	(0.179)
United Kingdom	2.675***	2.238***	1.585***	2.774***	2.368***	1.743***	2.678***	2.284***	1.619***	2.857***	2.492***	1.907***
	(0.303)	(0.337)	(0.411)	(0.385)	(0.399)	(0.452)	(0.300)	(0.336)	(0.413)	(0.403)	(0.412)	(0.454)
United States	1.015***	1.066***	1.068***	1.394***	1.288***	1.199***	1.068***	1.085***	1.091***	1.385***	1.371***	1.347***
	(0.243)	(0.231)	(0.218)	(0.253)	(0.242)	(0.231)	(0.242)	(0.231)	(0.219)	(0.243)	(0.229)	(0.217)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (headline inflation rates) and the restricted model (the Random walk model). The negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table C4: Out-of-sample forecast performance results for Commodity prices-inflation model versus Random walk model based on CW test (Core Inflation)

Country	π_t^c											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	0.045**	0.024	0.037	0.034**	0.024*	0.029**	0.130***	0.047**	0.057***	0.096***	-0.006	0.013
	(0.022)	(0.023)	(0.023)	(0.013)	(0.013)	(0.013)	(0.023)	(0.021)	(0.021)	(0.022)	(0.024)	(0.025)
Belgium	-0.006	-0.002	0.004	0.005	0.007	0.010	0.029*	-0.00	0.004	0.029*	0.002	0.008
	(0.013)	(0.012)	(0.012)	(0.011)	(0.010)	(0.010)	(0.015)	(0.012)	(0.011)	(0.015)	(0.011)	(0.011)
Canada	0.324***	0.349***	0.336***	0.331***	0.356***	0.343***	0.284***	0.332***	0.320***	0.320***	0.359***	0.344***
	(0.054)	(0.052)	(0.050)	(0.056)	(0.054)	(0.052)	(0.048)	(0.050)	(0.047)	(0.051)	(0.051)	(0.048)
Finland	0.809***	0.742***	0.659***	1.041***	0.972***	0.899***	1.046***	0.963***	0.883***	0.665***	0.606***	0.533***
	(0.194)	(0.185)	(0.178)	(0.189)	(0.180)	(0.172)	(0.222)	(0.211)	(0.202)	(0.189)	(0.180)	(0.172)
France	0.152***	0.182***	0.200***	0.123***	0.151***	0.169***	0.153***	0.191***	0.209***	0.133***	0.161***	0.177***
	(0.021)	(0.023)	(0.023)	(0.017)	(0.020)	(0.020)	(0.021)	(0.024)	(0.024)	(0.019)	(0.021)	(0.021)
Germany	0.073***	0.083***	0.110***	0.086***	0.099***	0.130***	0.067***	0.081***	0.107***	0.077***	0.090***	0.109***
	(0.014)	(0.015)	(0.019)	(0.015)	(0.017)	(0.021)	(0.015)	(0.015)	(0.018)	(0.014)	(0.014)	(0.016)
Greece	2.491***	2.412***	1.673***	2.733***	2.665***	1.710***	2.390***	2.417***	1.663***	2.879***	3.162***	2.022***
	(0.346)	(0.362)	(0.452)	(0.380)	(0.419)	(0.552)	(0.345)	(0.363)	(0.457)	(0.376)	(0.452)	(0.626)
Hungary	0.914	1.032*	1.082**	2.015***	2.079***	2.069***	1.085*	1.077*	1.132**	1.989***	2.103***	2.194***
	(0.591)	(0.558)	(0.527)	(0.565)	(0.532)	(0.501)	(0.589)	(0.554)	(0.523)	(0.568)	(0.540)	(0.510)
Israel	0.416***	0.415***	0.478***	0.446***	0.443***	0.503***	0.382***	0.401***	0.466***	0.392***	0.414***	0.483***
	(0.082)	(0.078)	(0.083)	(0.089)	(0.084)	(0.088)	(0.080)	(0.076)	(0.082)	(0.079)	(0.075)	(0.082)
Italy	0.470***	0.479***	0.489***	0.577***	0.577***	0.583***	0.445***	0.492***	0.503***	0.576***	0.624***	0.624***
	(0.059)	(0.057)	(0.055)	(0.071)	(0.068)	(0.065)	(0.057)	(0.058)	(0.056)	(0.076)	(0.075)	(0.072)
Japan	2.339***	2.135***	1.925***	2.640***	2.402***	2.156***	2.269***	2.122***	1.913***	2.536***	2.397***	2.146***
	(0.300)	(0.295)	(0.291)	(0.293)	(0.293)	(0.294)	(0.303)	(0.295)	(0.291)	(0.307)	(0.303)	(0.303)
Korea	0.025	0.044*	0.077***	-0.026	0.006	0.058	0.029	0.047*	0.085***	-0.010	0.020	0.081**
	(0.026)	(0.026)	(0.028)	(0.035)	(0.035)	(0.040)	(0.027)	(0.027)	(0.030)	(0.032)	(0.033)	(0.040)
Luxembourg	0.224***	0.276***	0.277***	0.313***	0.387***	0.387***	0.239***	0.264***	0.264***	0.223***	0.284***	0.286***
	(0.044)	(0.047)	(0.045)	(0.058)	(0.062)	(0.059)	(0.050)	(0.045)	(0.043)	(0.052)	(0.054)	(0.052)
Mexico	0.006	-0.101*	-0.330***	0.067***	-0.031	-0.223**	0.006	-0.108*	-0.349***	0.006	-0.114**	-0.384***
	(0.029)	(0.057)	(0.106)	(0.025)	(0.050)	(0.090)	(0.031)	(0.060)	(0.112)	(0.016)	(0.056)	(0.121)
Netherlands	0.374***	0.357***	0.342***	0.174***	0.150***	0.130**	0.474***	0.351***	0.329***	0.318***	0.081	0.019
	(0.064)	(0.061)	(0.058)	(0.059)	(0.056)	(0.054)	(0.080)	(0.061)	(0.059)	(0.078)	(0.064)	(0.065)
Norway	0.501***	0.490***	0.381***	0.463***	0.452***	0.347***	0.499***	0.481***	0.372***	0.543***	0.493***	0.418***
	(0.088)	(0.085)	(0.092)	(0.076)	(0.074)	(0.082)	(0.094)	(0.085)	(0.092)	(0.081)	(0.067)	(0.070)
Portugal	0.954***	0.969***	0.787***	1.027***	1.022***	0.864***	0.884***	0.990***	0.804***	0.891***	0.967***	0.825***
	(0.195)	(0.198)	(0.202)	(0.180)	(0.178)	(0.180)	(0.192)	(0.197)	(0.201)	(0.192)	(0.186)	(0.185)
Spain	0.150***	0.091*	0.031	0.311***	0.209**	0.099	0.176***	0.085	0.017	0.173***	0.122***	0.082*
	(0.046)	(0.050)	(0.053)	(0.075)	(0.082)	(0.089)	(0.045)	(0.053)	(0.057)	(0.040)	(0.041)	(0.042)
Sweden	0.484**	0.570**	0.934***	0.671***	0.699***	0.889***	0.430**	0.599***	0.981***	0.706***	0.847***	1.250***
	(0.226)	(0.218)	(0.253)	(0.166)	(0.157)	(0.167)	(0.216)	(0.215)	(0.255)	(0.211)	(0.208)	(0.255)
United Kingdom	1.430***	1.416***	1.228***	1.424***	1.405***	1.221***	1.295***	1.388***	1.205***	1.344***	1.423***	1.266***
	(0.130)	(0.127)	(0.141)	(0.121)	(0.118)	(0.134)	(0.119)	(0.123)	(0.138)	(0.133)	(0.134)	(0.141)
United States	0.249***	0.265***	0.233***	0.197***	0.208***	0.184***	0.231***	0.261***	0.229***	0.203***	0.260***	0.226***
	(0.054)	(0.052)	(0.051)	(0.041)	(0.039)	(0.038)	(0.054)	(0.052)	(0.050)	(0.045)	(0.046)	(0.046)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is the commodity prices-based inflation model (core inflation rates) and the restricted model (the Random walk model). The negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-based inflation model significantly outperforms the Random walk model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that Random walk model significantly outperforms the commodity prices-based inflation model for out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Table C5: In-sample Predictability Results for Inflation rates (Headline) using Traditional Phillips Curve and Commodity prices-augmented Phillips Curve

Country	$\pi_t^{tr\_pc\_h}$	$\pi_t^{aug\_pc\_h}$							
		CASE I		**CASE II**		**CASE III**		**CASE IV**	
	IPI	IPI	CR	IPI	AG	IPI	EN	IPI	ME
Austria	5.115*	40.004***	0.591**	28.467***	3.519***	40.353***	0.535*	34.709***	1.476***
	(3.044)	(3.136)	(0.238)	(3.478)	(0.774)	(3.368)	(0.285)	(2.710)	(0.224)
Belgium	11.059***	39.246***	-1.085**	37.393***	-2.284	38.372***	-1.011**	58.137***	-4.786***
	(3.625)	(3.551)	(0.412)	(5.267)	(1.624)	(3.604)	(0.469)	(4.856)	(0.719)
Canada	15.086***	48.000***	0.245	35.450***	2.454***	49.528***	-0.021	36.021***	1.334***
	(2.500)	(3.775)	(0.333)	(4.189)	(0.761)	(3.959)	(0.369)	(3.956)	(0.361)
Finland	26.096***	26.168***	0.244	33.333***	1.504	20.657***	1.589**	26.847***	0.016
	(4.431)	(4.857)	(0.604)	(5.957)	(1.599)	(4.599)	(0.641)	(5.137)	(0.756)
France	17.101***	27.100***	0.668***	26.358***	1.550**	26.372***	0.860***	30.412***	0.472
	(5.696)	(3.105)	(0.176)	(3.953)	(0.745)	(3.018)	(0.205)	(4.775)	(0.495)
Germany	1.810	16.108***	-0.138	14.990***	0.683	15.332***	0.021	23.581***	-1.457***
	(1.771)	(1.470)	(0.188)	(2.663)	(1.024)	(1.543)	(0.219)	(2.276)	(0.458)
Greece	12.993***	-53.457***	-3.072**	-38.573***	-3.512	-51.743***	-3.155**	29.593**	7.627***
	(3.877)	(14.093)	(1.318)	(12.517)	(3.428)	(14.610)	(1.491)	(11.533)	(2.082)
Hungary	-11.957***	20.387***	2.051***	22.817***	8.788***	21.707***	2.216***	21.280**	1.503
	(2.963)	(7.317)	(0.601)	(6.366)	(1.467)	(7.471)	(0.683)	(8.237)	(1.311)
Israel	-19.558***	2.323	1.481***	-1.371	3.980***	2.405	1.508***	3.931***	1.561***
	(3.225)	(1.930)	(0.271)	(1.426)	(0.496)	(1.948)	(0.306)	(1.394)	(0.278)
Italy	19.979***	13.670***	1.928***	0.906	7.200***	14.221***	2.246***	5.015	3.214***
	(4.483)	(3.470)	(0.362)	(3.162)	(0.944)	(3.490)	(0.433)	(4.664)	(0.701)
Japan	17.069***	-7.057***	2.232***	-4.883*	1.616	-7.154***	2.699***	-6.989*	3.625***
	(4.457)	(2.478)	(0.415)	(2.570)	(1.691)	(2.486)	(0.446)	(3.975)	(1.063)
Korea	-3.106	19.705***	-1.296***	4.437	2.328*	18.192***	-1.236**	5.358	0.511
	(3.202)	(2.633)	(0.489)	(3.007)	(1.312)	(2.607)	(0.513)	(5.614)	(1.393)
Luxembourg	7.850*	9.112***	1.389***	11.434***	7.358***	8.871***	1.672***	-1.818	3.582***
	(4.414)	(2.986)	(0.374)	(2.332)	(1.039)	(2.944)	(0.414)	(4.652)	(0.789)
Mexico	-12.305***	-1.622	-0.676	23.289**	-3.463***	-8.211	-0.375	32.192***	-1.932***
	(1.863)	(9.579)	(0.438)	(10.504)	(1.191)	(9.977)	(0.533)	(7.658)	(0.505)
Netherlands	5.334	5.942	1.044***	7.014	2.984**	5.293	1.303***	0.216	1.665**
	(3.396)	(4.034)	(0.359)	(4.447)	(1.153)	(4.027)	(0.422)	(6.151)	(0.830)
Norway	0.264	-10.186	-2.157***	-14.138**	-6.800***	-12.262*	-2.471***	8.446	-0.684
	(4.043)	(6.959)	(0.782)	(5.503)	(1.372)	(7.171)	(0.871)	(6.864)	(1.168)
Portugal	-3.437	5.992	3.543***	8.519	11.842***	6.355	3.766***	-10.584	4.965***
	(6.998)	(8.839)	(0.793)	(9.868)	(2.402)	(8.732)	(0.825)	(6.986)	(0.977)
Spain	0.498	-0.902	2.677***	4.483	13.565***	0.255	2.944***	-25.677***	2.703***
	(5.257)	(7.333)	(0.670)	(5.310)	(1.546)	(7.244)	(0.709)	(6.280)	(0.791)
Sweden	28.991***	35.136***	0.022	30.925***	1.037	33.739***	0.282	34.831***	0.246
	(3.430)	(3.280)	(0.361)	(4.577)	(1.224)	(3.343)	(0.428)	(3.773)	(0.499)
United Kingdom	18.685	27.628***	2.425***	23.292***	6.930***	29.555***	2.809***	8.031	3.636***
	(18.886)	(6.163)	(0.181)	(4.742)	(0.467)	(6.238)	(0.203)	(7.614)	(0.286)
United States	16.788***	59.024***	0.071	35.053***	5.044**	55.128***	0.259	6.553	4.780***
	(3.659)	(15.567)	(1.133)	(9.369)	(1.924)	(17.463)	(1.358)	(10.165)	(1.001)

Note: The in-sample predictability in a single-factor model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for industrial production index in the traditional Phillips Curve equation. We also extend the traditional Phillips Curve to accommodate the role of commodity prices, so that we can have a multi-factor commodity prices-augmented Phillips Curve equation. In this case z comprises industrial production index and commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). Here, we employ the headline inflation rate (π_t^h). ***, **, and * imply the rejection of the null hypothesis of no predictability at 1%, 5%, and 10% levels of significance, respectively. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive models (Traditional and commodity prices-augmented Phillips Curve equations). We therefore consider four cases for each of the commodity prices. Here, we capture Post-GFC sample data for in-sample forecast.

Table C6: In-sample Predictability Results for Inflation rates (Core) using Traditional Phillips Curve and Commodity prices-augmented Phillips Curve

Country	$\pi_t^{tr\_pc\_c}$	$\pi_t^{aug\_pc\_c}$							
		CASE I		**CASE II**		**CASE III**		**CASE IV**	
	IPI	IPI	CR	IPI	AG	IPI	EN	IPI	ME
Austria	3.016**	14.995***	-0.252	10.031***	-0.389	14.462***	-0.271	16.101***	-0.470**
	(1.210)	(2.653)	(0.159)	(2.581)	(0.443)	(2.714)	(0.191)	(2.443)	(0.201)
Belgium	-0.219	2.384	-0.083	-2.006	0.565	2.562	-0.139	9.326***	-1.396***
	(1.145)	(2.190)	(0.189)	(2.253)	(0.572)	(2.155)	(0.206)	(2.466)	(0.394)
Canada	4.450***	9.829**	-1.074***	15.629***	-3.998***	13.343***	-1.293***	11.361**	-2.056***
	(1.564)	(3.778)	(0.199)	(5.056)	(0.850)	(4.040)	(0.225)	(4.798)	(0.491)
Finland	24.156***	32.347***	-1.453***	48.953***	-7.484***	29.526***	-1.026**	33.864***	-2.011***
	(3.331)	(3.481)	(0.348)	(5.348)	(1.345)	(3.755)	(0.410)	(3.242)	(0.470)
France	0.790	1.624	0.327***	-0.887	1.279***	1.692	0.397***	2.036	0.305
	(2.570)	(1.375)	(0.084)	(1.811)	(0.370)	(1.387)	(0.100)	(2.062)	(0.213)
Germany	0.629	-8.171***	0.763***	-8.989***	1.999***	-8.149***	0.838***	-8.724***	1.067***
	(0.642)	(0.796)	(0.130)	(1.274)	(0.485)	(0.798)	(0.139)	(1.935)	(0.381)
Greece	29.605***	-26.509***	-3.286***	5.122	-0.720	-26.567***	-3.546***	32.880***	2.198
	(2.848)	(8.955)	(1.003)	(8.308)	(2.047)	(9.190)	(1.134)	(9.002)	(1.690)
Hungary	-14.707***	-42.616***	1.003	-29.266***	0.358	-40.864***	0.785	-49.169***	3.196***
	(2.456)	(5.179)	(0.665)	(6.638)	(1.672)	(5.257)	(0.828)	(6.479)	(0.847)
Israel	-18.364***	-2.010	-0.310	-3.718*	-0.296	-2.265	-0.307	-2.973*	-0.679**
	(2.342)	(2.010)	(0.264)	(1.991)	(0.608)	(2.022)	(0.322)	(1.786)	(0.324)
Italy	12.039***	6.134***	0.508***	2.510*	2.104***	6.286***	0.569***	3.925***	0.556**
	(1.921)	(1.101)	(0.112)	(1.272)	(0.369)	(1.102)	(0.125)	(1.440)	(0.219)
Japan	0.921	-7.378***	1.242***	-4.927***	-1.442	-7.779***	1.414***	-5.574**	0.596
	(6.214)	(2.082)	(0.251)	(1.812)	(0.980)	(2.072)	(0.273)	(2.323)	(0.596)
Korea	-2.994**	0.439	-0.456	-5.150**	1.063	0.010	-0.408	-4.082	0.835
	(1.243)	(2.146)	(0.355)	(2.033)	(0.847)	(2.059)	(0.384)	(3.367)	(0.827)
Luxembourg	5.886***	3.081**	-0.008	0.694	1.122**	2.936**	-0.053	4.426*	-0.279
	(2.090)	(1.383)	(0.170)	(1.596)	(0.517)	(1.398)	(0.194)	(2.557)	(0.462)
Mexico	-13.151***	-31.144***	0.111	-13.526*	-1.278	-34.128***	0.426	-22.779***	-0.198
	(1.325)	(5.488)	(0.293)	(6.807)	(0.942)	(5.592)	(0.352)	(5.856)	(0.485)
Netherlands	6.442*	1.889	1.401***	5.324	0.279	2.356	1.537***	1.615	0.864
	(3.500)	(3.712)	(0.369)	(4.780)	(1.504)	(3.733)	(0.410)	(6.003)	(0.962)
Norway	-4.369	7.890***	-0.228	8.794***	0.060	7.246***	-0.260	6.649***	-0.577
	(3.841)	(1.932)	(0.230)	(2.185)	(0.623)	(1.988)	(0.252)	(2.159)	(0.365)
Portugal	11.631***	6.814	1.940***	3.430	3.779***	7.617	2.197***	-2.097	1.843***
	(3.687)	(4.872)	(0.544)	(4.510)	(1.021)	(4.982)	(0.613)	(4.442)	(0.521)
Spain	-3.949*	-22.227***	-0.535	-16.061***	-0.322	-22.473***	-0.578	-21.067***	-0.151
	(2.277)	(3.500)	(0.375)	(4.889)	(1.437)	(3.571)	(0.435)	(3.180)	(0.427)
Sweden	19.708***	18.962***	0.841	26.649***	-2.353	19.204***	0.891	16.028***	1.583
	(4.713)	(4.864)	(0.654)	(6.682)	(1.867)	(4.883)	(0.696)	(5.169)	(1.220)
United Kingdom	2.265	5.963*	1.049***	12.621***	3.190***	4.369	0.980***	-1.457	2.693***
	(7.661)	(3.269)	(0.157)	(2.752)	(0.394)	(3.418)	(0.179)	(2.780)	(0.153)
United States	8.296***	-26.091***	1.993***	-6.342	1.457**	-29.735***	2.434***	9.139	-0.510
	(1.487)	(4.798)	(0.301)	(3.900)	(0.651)	(4.791)	(0.329)	(5.743)	(0.578)

Note: The in-sample predictability in a single-factor model case is obtained by estimating the equation $\pi_t = \mu + \delta z_{t-1} + \eta(z_t - \rho z_{t-1}) + \varepsilon_t$ where δ denotes the coefficient on the predictor z, which in this case stands for industrial production index in the traditional Phillips Curve equation. We also extend the traditional Phillips Curve to accommodate the role of commodity prices, so that we can have a multi-factor commodity prices-augmented Phillips Curve equation. In this case z comprises industrial production index and commodity prices. The commodity prices include crude oil price index (CR), agricultural price index (AG), energy price index (EN), and industrial metal price index (ME). Here, we employ the core inflation rate (π_t^c). ***, **, and * imply the rejection of the null hypothesis of no predictability at 1%, 5%, and 10% levels of significance, respectively. The values in parentheses are the standard errors associated with the first-order autoregressive coefficients in our predictive models (Traditional and commodity prices-augmented Phillips Curve equations). We therefore consider four cases for each of the commodity prices. Here, we capture Post-GFC sample data for in-sample forecast.

Table C7: In-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Headline and core inflation)

Country	$\pi_t^{aug\_pc\_h}$				$\pi_t^{aug\_pc\_c}$			
	CR	AG	EN	ME	CR	AG	EN	ME
Austria	1.555***	1.587***	1.543***	1.615***	0.090***	0.071***	0.085***	0.101***
	(0.187)	(0.182)	(0.187)	(0.187)	(0.018)	(0.012)	(0.017)	(0.019)
Belgium	2.467***	2.215***	2.462***	2.606***	0.014*	0.014*	0.013	0.046***
	(0.259)	(0.244)	(0.258)	(0.301)	(0.008)	(0.008)	(0.008)	(0.017)
Canada	2.157***	2.400***	2.079***	2.126***	0.214***	0.214***	0.232***	0.208***
	(0.296)	(0.321)	(0.275)	(0.270)	(0.034)	(0.041)	(0.038)	(0.038)
Finland	0.575***	0.719***	0.882***	0.416***	0.282***	0.260***	0.271***	0.396***
	(0.100)	(0.115)	(0.136)	(0.090)	(0.062)	(0.086)	(0.057)	(0.057)
France	0.919***	0.864***	0.943***	0.809***	0.169***	0.170***	0.173***	0.144***
	(0.097)	(0.095)	(0.098)	(0.091)	(0.024)	(0.024)	(0.025)	(0.021)
Germany	0.883***	0.954***	0.909***	1.005***	0.145***	0.144***	0.146***	0.096***
	(0.107)	(0.110)	(0.107)	(0.122)	(0.024)	(0.025)	(0.024)	(0.020)
Greece	4.512***	4.675***	4.481***	5.607***	1.135***	0.596***	1.164***	0.349***
	(0.665)	(0.737)	(0.652)	(0.568)	(0.249)	(0.156)	(0.242)	(0.130)
Hungary	3.568***	4.487***	3.441***	3.641***	2.248***	2.827***	2.393***	1.780***
	(0.374)	(0.414)	(0.372)	(0.472)	(0.277)	(0.342)	(0.278)	(0.316)
Israel	2.893***	2.840***	2.843***	2.755***	1.028***	1.059***	1.040***	1.084***
	(0.390)	(0.351)	(0.382)	(0.330)	(0.129)	(0.141)	(0.132)	(0.140)
Italy	1.039***	1.661***	1.087***	0.629***	0.180***	0.221***	0.181***	0.163***
	(0.273)	(0.280)	(0.286)	(0.213)	(0.040)	(0.040)	(0.040)	(0.041)
Japan	3.827***	3.274***	3.842***	2.811***	2.946***	3.304***	2.928***	3.007***
	(0.730)	(0.728)	(0.717)	(0.611)	(0.425)	(0.406)	(0.427)	(0.419)
Korea	2.965***	3.044***	2.948***	2.397***	0.006	0.031***	0.005	-0.002
	(0.389)	(0.411)	(0.392)	(0.341)	(0.019)	(0.010)	(0.018)	(0.010)
Luxembourg	1.109***	2.453***	1.166***	1.648***	0.447***	0.525***	0.443***	0.329***
	(0.149)	(0.291)	(0.157)	(0.175)	(0.089)	(0.087)	(0.088)	(0.078)
Mexico	-0.039	0.062	-0.017	0.215***	0.048**	0.038**	0.054**	0.031*
	(0.024)	(0.044)	(0.012)	(0.059)	(0.021)	(0.015)	(0.021)	(0.015)
Netherlands	0.443***	0.552***	0.478***	0.199***	0.202***	0.057**	0.208***	-0.013
	(0.093)	(0.098)	(0.098)	(0.059)	(0.050)	(0.028)	(0.050)	(0.012)
Norway	0.647***	0.717***	0.618***	0.302***	0.661***	0.579***	0.639***	0.626***
	(0.147)	(0.104)	(0.143)	(0.089)	(0.093)	(0.085)	(0.092)	(0.076)
Portugal	2.501***	4.013***	2.411***	2.905***	1.321***	1.463***	1.338***	1.282***
	(0.418)	(0.431)	(0.399)	(0.406)	(0.188)	(0.154)	(0.187)	(0.159)
Spain	1.875***	4.582***	1.900***	2.508***	0.331***	0.287***	0.331***	0.384***
	(0.331)	(0.487)	(0.328)	(0.422)	(0.084)	(0.067)	(0.085)	(0.084)
Sweden	0.730***	1.036***	0.783***	0.801***	0.422***	0.287***	0.451***	0.482***
	(0.171)	(0.198)	(0.178)	(0.173)	(0.112)	(0.096)	(0.114)	(0.120)
United Kingdom	4.662***	4.460***	4.622***	4.940***	0.923***	1.056***	0.872***	1.145***
	(0.395)	(0.439)	(0.396)	(0.457)	(0.109)	(0.127)	(0.106)	(0.120)
United States	1.249***	2.469***	1.228***	2.748***	0.142**	0.166***	0.165***	0.017
	(0.292)	(0.377)	(0.281)	(0.324)	(0.062)	(0.036)	(0.060)	(0.017)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for headline and core inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting both headline and core inflation rates using in-sample data covering Post-GFC sample period. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting both headline and core inflation rates using in-sample data covering Post-GFC sample period.

Table C8: Out-of-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Headline inflation)

Country	$\pi_t^{aug\_pc\_h}$											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	1.822***	1.815***	1.769***	1.804***	1.798***	1.763***	1.734***	1.812***	1.767***	1.802***	1.852***	1.797***
	(0.207)	(0.196)	(0.186)	(0.192)	(0.182)	(0.173)	(0.193)	(0.197)	(0.187)	(0.193)	(0.194)	(0.184)
Belgium	2.336***	2.218***	2.237***	2.100***	1.995***	2.017***	2.311***	2.220***	2.255***	2.445***	2.326***	2.322***
	(0.249)	(0.241)	(0.227)	(0.233)	(0.225)	(0.213)	(0.249)	(0.239)	(0.226)	(0.289)	(0.277)	(0.262)
Canada	2.624***	3.031***	3.569***	2.830***	3.233***	3.840***	2.246***	2.905***	3.407***	2.290***	2.796***	3.194***
	(0.342)	(0.363)	(0.406)	(0.355)	(0.373)	(0.431)	(0.272)	(0.340)	(0.380)	(0.267)	(0.310)	(0.336)
Finland	0.422***	0.289**	0.041	0.622***	0.539***	0.392***	0.896***	0.714***	0.603***	0.460***	0.103	-0.189
	(0.112)	(0.120)	(0.151)	(0.114)	(0.113)	(0.122)	(0.129)	(0.130)	(0.131)	(0.087)	(0.120)	(0.164)
France	0.923***	0.861***	0.856***	0.870***	0.809***	0.811***	0.916***	0.889***	0.886***	0.790***	0.752***	0.737***
	(0.091)	(0.091)	(0.086)	(0.090)	(0.090)	(0.085)	(0.093)	(0.092)	(0.087)	(0.086)	(0.084)	(0.080)
Germany	0.891***	0.754***	0.656***	0.988***	0.812***	0.679***	0.900***	0.778***	0.673***	0.990***	0.833***	0.697***
	(0.101)	(0.112)	(0.112)	(0.105)	(0.124)	(0.129)	(0.101)	(0.113)	(0.115)	(0.115)	(0.136)	(0.140)
Greece	5.950***	6.932***	7.598***	6.057***	6.871***	7.393***	4.724***	6.851***	7.506***	5.778***	5.582***	5.239***
	(0.855)	(0.965)	(0.961)	(0.893)	(0.960)	(0.938)	(0.619)	(0.947)	(0.943)	(0.538)	(0.527)	(0.516)
Hungary	3.847***	3.172***	2.365***	4.667***	3.923***	3.015***	3.419***	3.075***	2.318***	3.606***	3.220***	2.565***
	(0.374)	(0.457)	(0.542)	(0.398)	(0.492)	(0.593)	(0.351)	(0.443)	(0.520)	(0.444)	(0.487)	(0.529)
Israel	3.451***	3.519***	3.630***	3.305***	3.361***	3.462***	3.063***	3.451***	3.556***	2.981***	3.256***	3.317***
	(0.429)	(0.419)	(0.406)	(0.378)	(0.370)	(0.360)	(0.369)	(0.410)	(0.396)	(0.323)	(0.351)	(0.339)
Italy	1.511***	1.710***	2.024***	2.115***	2.371***	2.849***	1.440***	1.794***	2.107***	1.011***	1.212***	1.484***
	(0.319)	(0.318)	(0.328)	(0.321)	(0.330)	(0.371)	(0.304)	(0.334)	(0.342)	(0.253)	(0.260)	(0.270)
Japan	3.188***	2.664***	2.164***	2.352***	1.666**	0.959	3.967***	2.771***	2.304***	3.002***	1.566**	0.923
	(0.729)	(0.716)	(0.705)	(0.774)	(0.777)	(0.786)	(0.674)	(0.695)	(0.682)	(0.579)	(0.637)	(0.654)
Korea	3.404***	3.491***	3.504***	3.511***	3.589***	3.592***	3.207***	3.513***	3.531***	2.691***	2.903***	2.911***
	(0.406)	(0.390)	(0.370)	(0.430)	(0.410)	(0.389)	(0.389)	(0.398)	(0.378)	(0.349)	(0.350)	(0.332)
Luxembourg	1.295***	1.217***	1.121***	2.649***	2.486***	2.299***	1.287***	1.295***	1.192***	1.737***	1.745***	1.619***
	(0.159)	(0.157)	(0.154)	(0.284)	(0.281)	(0.276)	(0.158)	(0.169)	(0.165)	(0.171)	(0.183)	(0.180)
Mexico	-0.044*	-0.064***	-0.149***	0.124**	-0.062	-0.604**	0.037	-0.030**	-0.077***	0.254***	-0.011	-0.840**
	(0.023)	(0.024)	(0.041)	(0.049)	(0.105)	(0.240)	(0.027)	(0.013)	(0.023)	(0.058)	(0.158)	(0.366)
Netherlands	0.636***	0.640***	0.647***	0.720***	0.718***	0.726***	0.705***	0.688***	0.694***	0.444***	0.296***	0.295***
	(0.117)	(0.112)	(0.106)	(0.114)	(0.110)	(0.104)	(0.131)	(0.120)	(0.113)	(0.115)	(0.065)	(0.061)
Norway	0.987***	1.037***	0.975***	0.919***	0.930***	0.875***	1.135***	1.009***	0.950***	0.839***	0.320***	0.298***
	(0.197)	(0.189)	(0.180)	(0.132)	(0.126)	(0.121)	(0.256)	(0.190)	(0.181)	(0.241)	(0.090)	(0.086)
Portugal	2.611***	2.506***	2.390***	3.934***	3.735***	3.546***	2.380***	2.422***	2.307***	2.843***	2.883***	2.753***
	(0.395)	(0.375)	(0.357)	(0.406)	(0.390)	(0.376)	(0.374)	(0.359)	(0.342)	(0.381)	(0.365)	(0.349)
Spain	2.117***	1.823***	1.634***	4.752***	4.158***	3.766***	2.105***	1.854***	1.673***	2.675***	2.458***	2.082***
	(0.329)	(0.337)	(0.327)	(0.466)	(0.509)	(0.505)	(0.329)	(0.331)	(0.320)	(0.409)	(0.529)	(0.522)
Sweden	0.757***	0.841***	0.974***	1.048***	1.155***	1.326***	0.779***	0.902***	1.046***	0.796***	0.902***	1.037***
	(0.173)	(0.169)	(0.172)	(0.197)	(0.195)	(0.203)	(0.167)	(0.177)	(0.181)	(0.163)	(0.170)	(0.173)
United Kingdom	4.949***	4.709***	4.280***	4.642***	4.417***	4.003***	4.656***	4.681***	4.261***	4.954***	5.058***	4.585***
	(0.391)	(0.383)	(0.400)	(0.420)	(0.408)	(0.419)	(0.375)	(0.386)	(0.401)	(0.431)	(0.439)	(0.455)
United States	1.559***	1.469***	1.605***	2.641***	2.485***	2.545***	1.296***	1.427***	1.553***	2.720***	2.653***	2.568***
	(0.302)	(0.290)	(0.282)	(0.361)	(0.348)	(0.331)	(0.266)	(0.278)	(0.269)	(0.305)	(0.295)	(0.281)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for headline inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting headline inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting headline inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

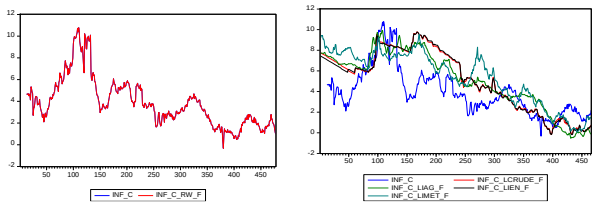
Table C9: Out-of-sample forecast performance results for Commodity prices-augmented Phillips Curve versus Traditional Phillips Curve based on CW test (Core inflation)

Country	$\pi_t^{aug\_pc\_c}$											
	CR			AG			EN			ME		
	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$	$h=6$	$h=12$	$h=18$
Austria	0.143***	0.172***	0.170***	0.109***	0.128***	0.127***	0.182***	0.163***	0.162***	0.197***	0.186***	0.185***
	(0.027)	(0.029)	(0.027)	(0.019)	(0.020)	(0.019)	(0.043)	(0.028)	(0.026)	(0.043)	(0.030)	(0.028)
Belgium	0.008	0.011	0.014*	0.015*	0.015*	0.014*	0.025**	0.011	0.013*	0.056***	0.047***	0.047***
	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.010)	(0.008)	(0.007)	(0.017)	(0.015)	(0.014)
Canada	0.207***	0.194***	0.175***	0.184***	0.171***	0.155***	0.233***	0.206***	0.190***	0.210***	0.192***	0.180***
	(0.032)	(0.031)	(0.030)	(0.041)	(0.039)	(0.037)	(0.036)	(0.034)	(0.033)	(0.036)	(0.034)	(0.033)
Finland	0.183**	-0.056	-0.477**	0.126	-0.249	-0.975***	0.285***	0.014	-0.295*	0.402***	0.070	-0.309
	(0.084)	(0.129)	(0.210)	(0.119)	(0.196)	(0.351)	(0.055)	(0.102)	(0.157)	(0.056)	(0.122)	(0.191)
France	0.210***	0.250***	0.276***	0.208***	0.251***	0.284***	0.205***	0.257***	0.284***	0.178***	0.215***	0.237***
	(0.028)	(0.031)	(0.031)	(0.027)	(0.031)	(0.032)	(0.027)	(0.032)	(0.032)	(0.024)	(0.027)	(0.027)
Germany	0.144***	0.153***	0.166***	0.149***	0.162***	0.181***	0.141***	0.153***	0.167***	0.094***	0.114***	0.137***
	(0.023)	(0.023)	(0.023)	(0.025)	(0.025)	(0.026)	(0.022)	(0.023)	(0.023)	(0.019)	(0.021)	(0.023)
Greece	1.494***	3.347***	2.983***	0.870***	1.945***	1.727***	1.192***	3.378***	3.011***	0.429***	0.471***	0.430***
	(0.317)	(0.885)	(0.863)	(0.215)	(0.519)	(0.506)	(0.231)	(0.886)	(0.864)	(0.133)	(0.124)	(0.118)
Hungary	2.352***	2.526***	2.827***	3.170***	3.665***	4.473***	2.501***	2.835***	3.272***	1.927***	1.911***	2.181***
	(0.263)	(0.258)	(0.276)	(0.349)	(0.384)	(0.486)	(0.265)	(0.276)	(0.319)	(0.303)	(0.286)	(0.299)
Israel	1.198***	1.340***	1.490***	1.268***	1.426***	1.596***	1.111***	1.363***	1.518***	1.152***	1.454***	1.643***
	(0.140)	(0.149)	(0.161)	(0.157)	(0.166)	(0.180)	(0.128)	(0.152)	(0.165)	(0.134)	(0.167)	(0.185)
Italy	0.259***	0.341***	0.471***	0.298***	0.392***	0.555***	0.256***	0.344***	0.474***	0.239***	0.343***	0.489***
	(0.051)	(0.059)	(0.077)	(0.050)	(0.062)	(0.089)	(0.052)	(0.059)	(0.077)	(0.053)	(0.065)	(0.086)
Japan	2.614***	2.189***	1.770***	2.878***	2.327***	1.775***	2.792***	2.184***	1.771***	2.865***	2.124***	1.610***
	(0.420)	(0.430)	(0.439)	(0.417)	(0.450)	(0.478)	(0.404)	(0.430)	(0.437)	(0.396)	(0.444)	(0.466)
Korea	0.009	0.020	0.040**	0.029***	0.026***	0.024***	0.006	0.020	0.042**	0.000	0.002	0.002
	(0.018)	(0.017)	(0.018)	(0.010)	(0.009)	(0.009)	(0.017)	(0.017)	(0.018)	(0.010)	(0.009)	(0.009)
Luxembourg	0.472***	0.491***	0.485***	0.572***	0.606***	0.604***	0.494***	0.478***	0.472***	0.387***	0.397***	0.397***
	(0.084)	(0.080)	(0.076)	(0.083)	(0.080)	(0.076)	(0.086)	(0.079)	(0.075)	(0.078)	(0.072)	(0.068)
Mexico	0.051**	0.189***	0.493***	0.038***	0.092***	0.196***	0.051**	0.179***	0.465***	0.030**	0.123***	0.312***
	(0.021)	(0.066)	(0.136)	(0.014)	(0.028)	(0.050)	(0.020)	(0.060)	(0.127)	(0.014)	(0.044)	(0.086)
Netherlands	0.277***	0.305***	0.337***	0.108***	0.134***	0.175***	0.415***	0.295***	0.314***	0.208**	-0.006	-0.016
	(0.056)	(0.055)	(0.053)	(0.036)	(0.036)	(0.038)	(0.098)	(0.053)	(0.051)	(0.092)	(0.013)	(0.013)
Norway	0.689***	0.653***	0.513***	0.607***	0.575***	0.438***	0.698***	0.639***	0.500***	0.686***	0.607***	0.495***
	(0.090)	(0.088)	(0.101)	(0.083)	(0.082)	(0.096)	(0.094)	(0.087)	(0.101)	(0.081)	(0.073)	(0.083)
Portugal	1.719***	2.111***	2.490***	1.733***	2.058***	2.404***	1.430***	2.119***	2.479***	1.378***	1.976***	2.355***
	(0.238)	(0.279)	(0.309)	(0.181)	(0.219)	(0.254)	(0.180)	(0.276)	(0.302)	(0.155)	(0.243)	(0.282)
Spain	0.319***	0.171*	-0.016	0.278***	0.156*	0.002	0.314***	0.170*	-0.020	0.363***	0.207*	-0.004
	(0.081)	(0.100)	(0.123)	(0.066)	(0.081)	(0.101)	(0.079)	(0.101)	(0.125)	(0.079)	(0.105)	(0.133)
Sweden	0.520***	0.482***	0.543***	0.375***	0.343***	0.428***	0.586***	0.504***	0.567***	0.616***	0.528***	0.579***
	(0.115)	(0.112)	(0.109)	(0.101)	(0.100)	(0.102)	(0.127)	(0.113)	(0.110)	(0.132)	(0.117)	(0.113)
United Kingdom	1.024***	0.999***	0.844***	1.118***	1.082***	0.932***	0.892***	0.948***	0.798***	1.148***	1.220***	1.059***
	(0.110)	(0.107)	(0.118)	(0.122)	(0.118)	(0.126)	(0.100)	(0.104)	(0.115)	(0.113)	(0.117)	(0.128)
United States	0.194***	0.227***	0.155**	0.188***	0.196***	0.161***	0.172***	0.253***	0.174***	0.033*	0.032**	0.024
	(0.061)	(0.061)	(0.064)	(0.035)	(0.034)	(0.035)	(0.056)	(0.061)	(0.065)	(0.017)	(0.016)	(0.015)

Note: The Clark and West (CW) test statistic as used here compares the forecast errors of the unrestricted model, which in this case is commodity prices-augmented Phillips Curve equation for core inflation rates and the restricted model (the traditional Phillips Curve equation). The positive and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the commodity prices-augmented Phillips Curve equation significantly outperforms the traditional Phillips Curve equation in predicting core inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months. However, the negative and statistical significance at 1% (***), 5% (**) and 10% (*) implies that the traditional Phillips Curve equation significantly outperforms the commodity prices-augmented Phillips Curve equation in predicting core inflation rates using out-of-sample data involving three forecast horizons of 6, 12, and 18 months.

Supplementary Figures

Austria



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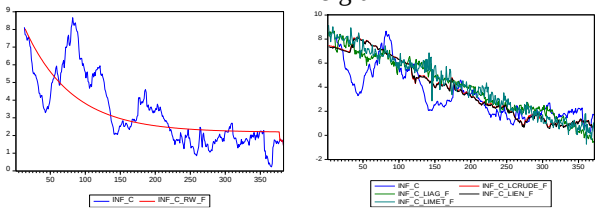

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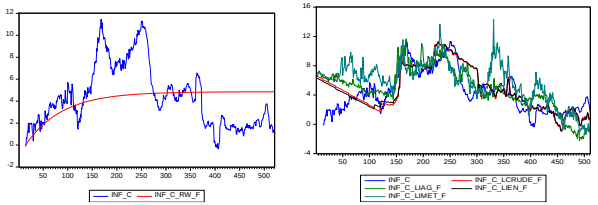

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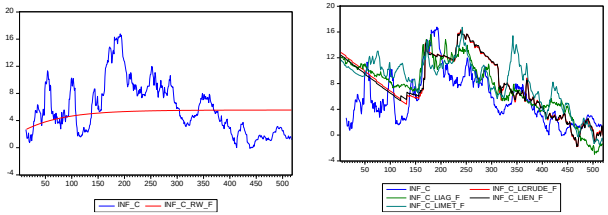

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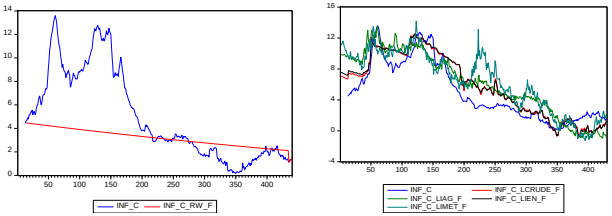

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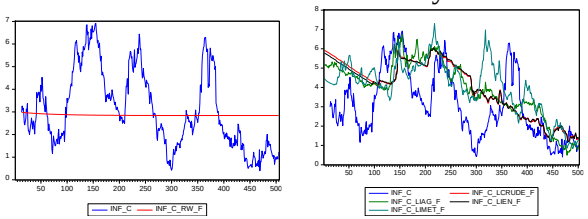

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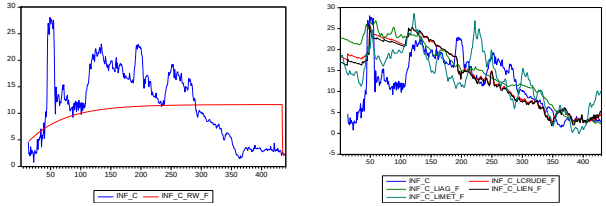

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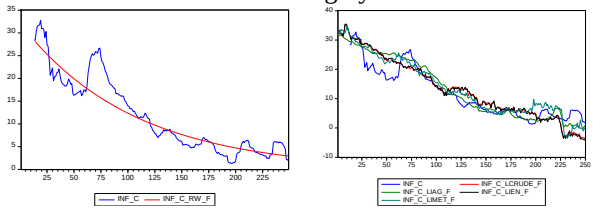

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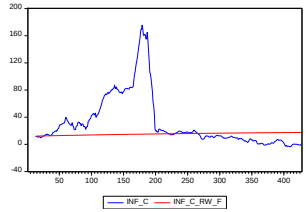
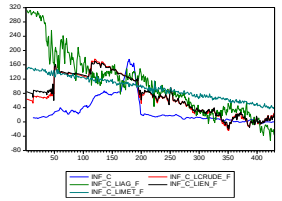

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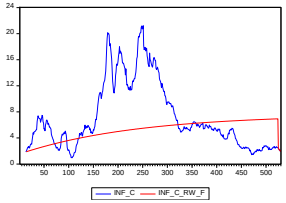
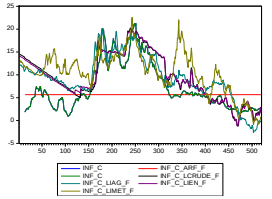

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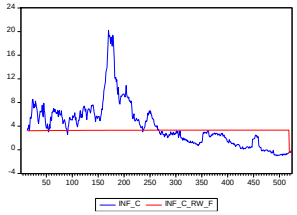
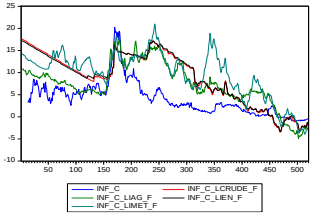

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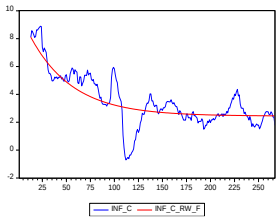
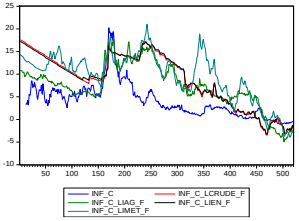

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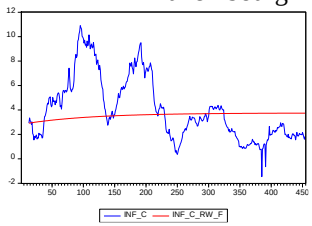
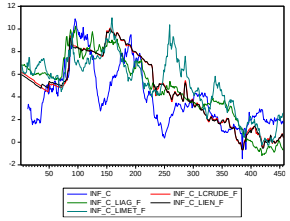

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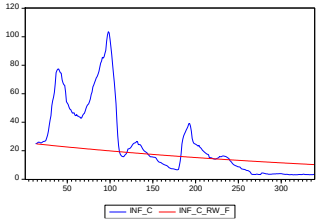
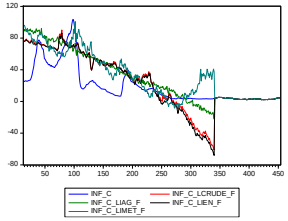

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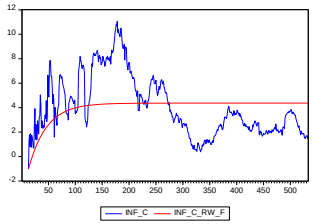
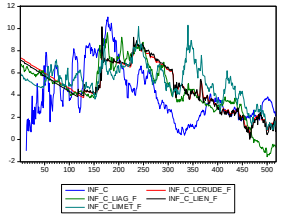

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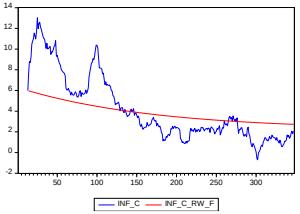
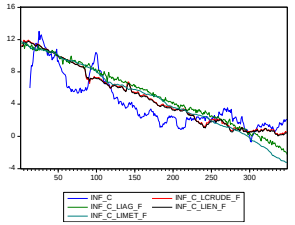

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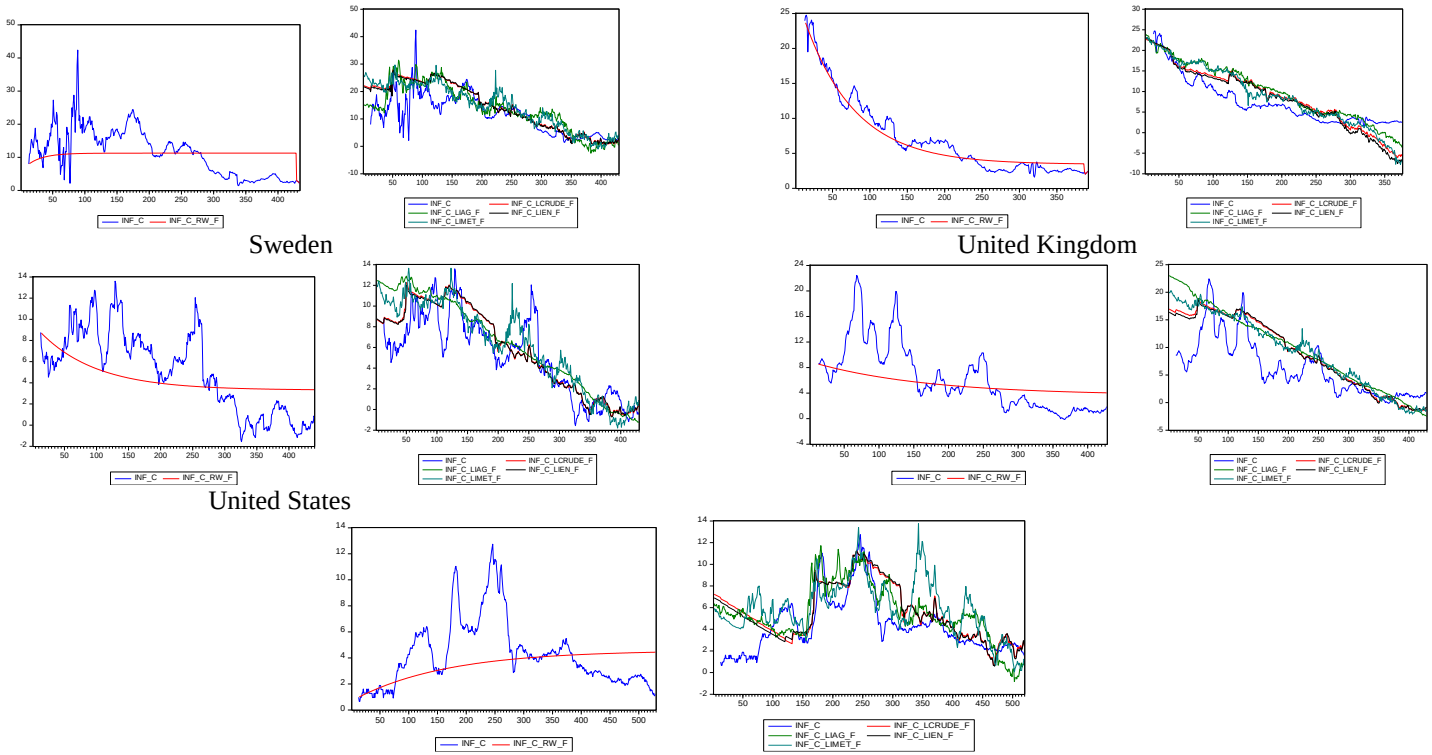

Figure A1: Forecast graphs of Random Walk model versus Commodity prices-based models (core inflation)

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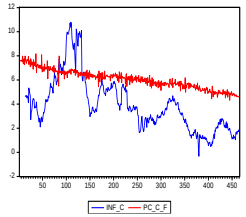

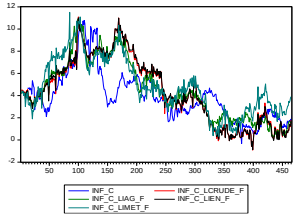

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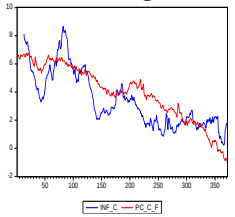

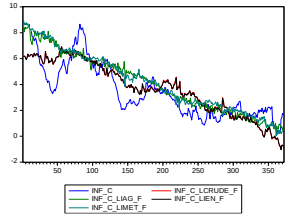

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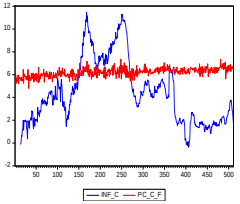

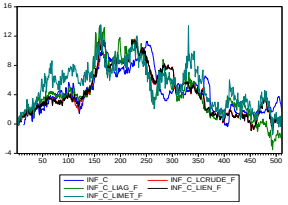

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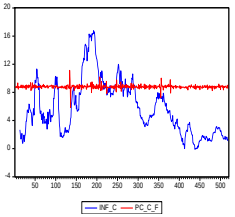

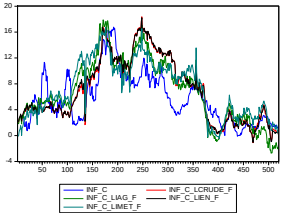

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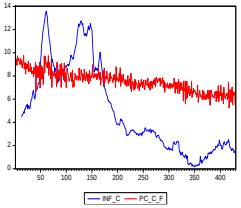

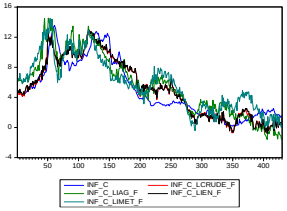

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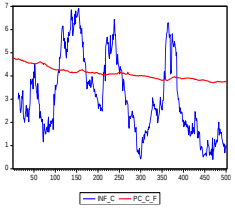

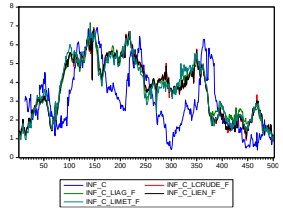

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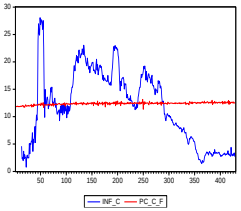

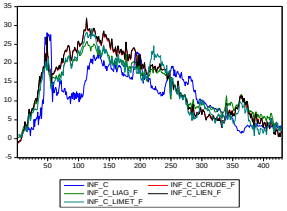

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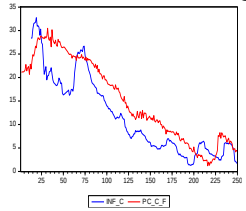

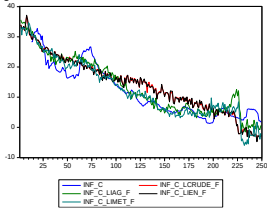

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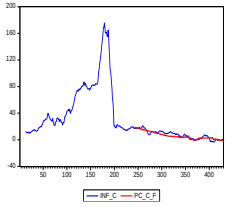

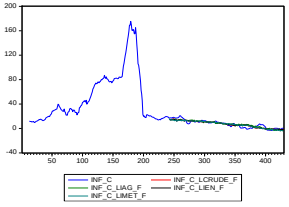

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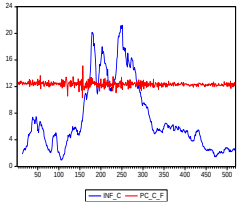

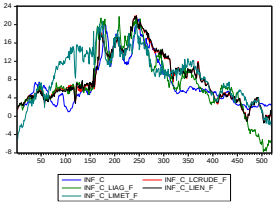

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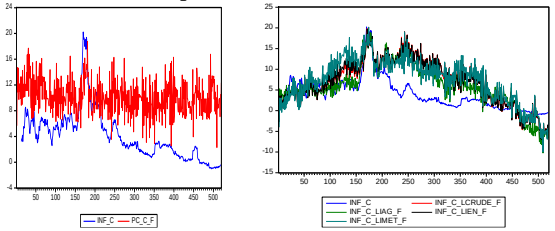

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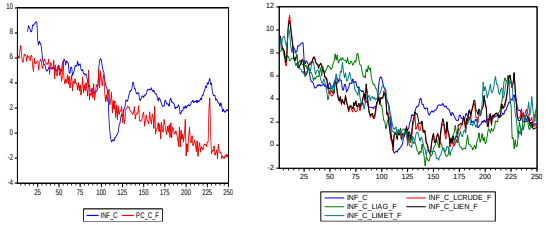

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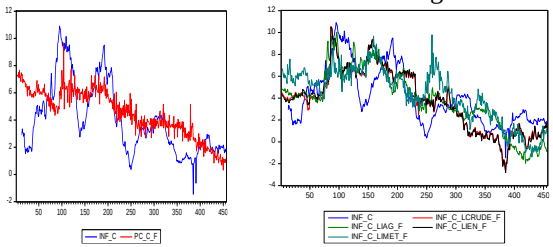

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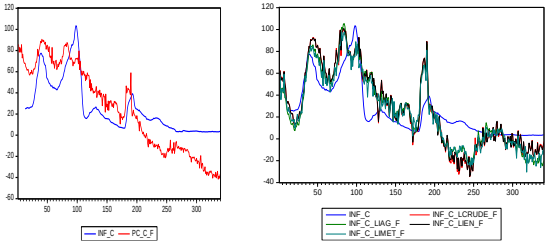

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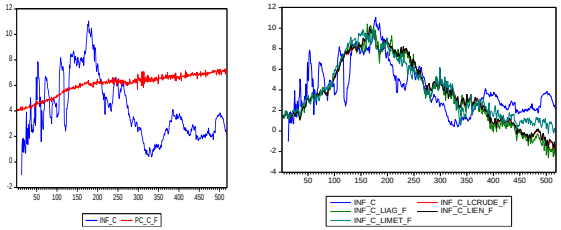

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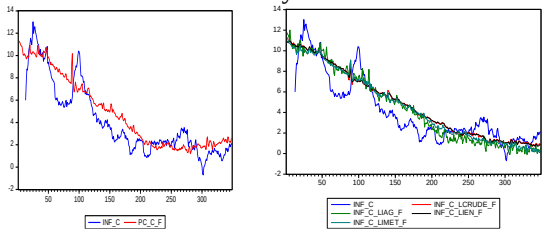

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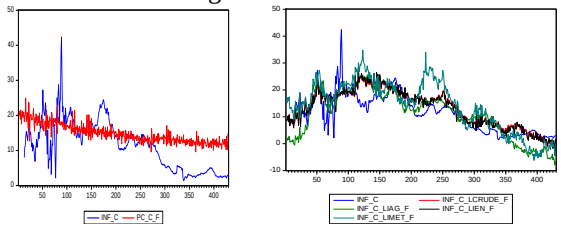

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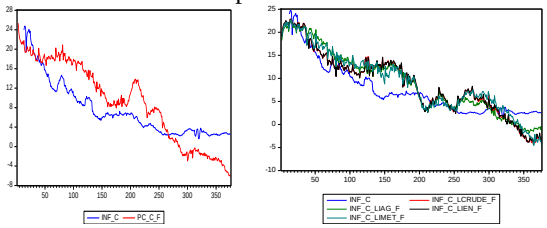

Sweden

United Kingdom

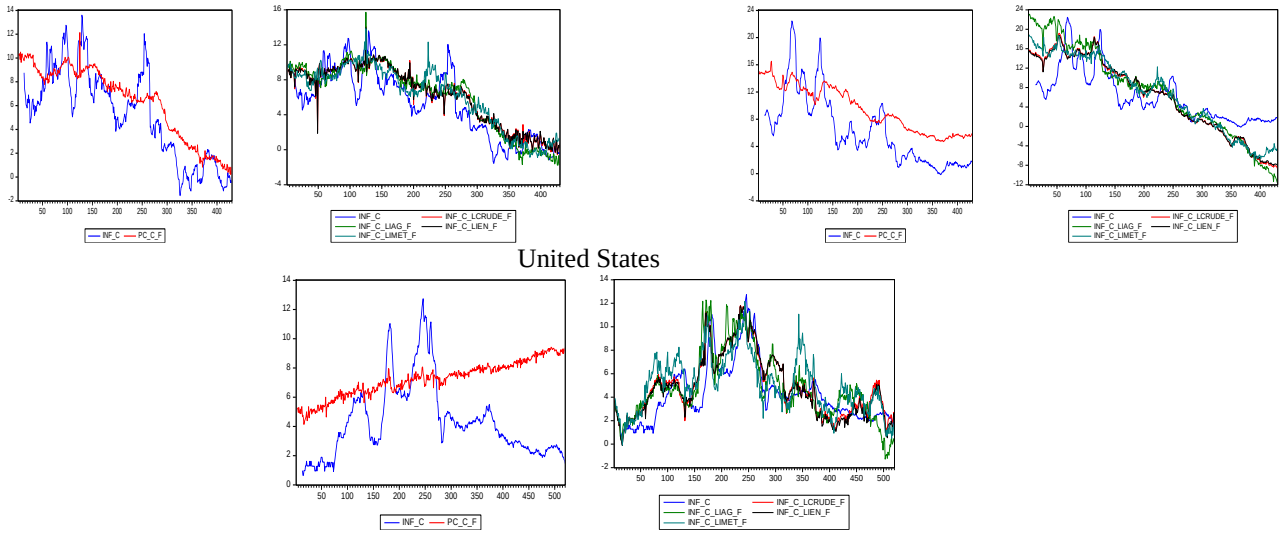

Figure A2: Forecast Graphs of Traditional versus Commodity prices-augmented Phillips Curve Equations (core inflation)