The Philippine Review of Economics

**SPECIAL ISSUE ON MONETARY POLICY
AND CENTRAL BANKING**

Issue Editor   **Faith Christian Q. Cacnio**

ARTICLES IN THIS ISSUE

A joint publication of the
**University of the Philippines
School of Economics**
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Publication Information: The PRE (ISSN 1655-1516) is a peer-reviewed journal published every June and December of each year. A searchable database of published articles and their abstracts is available at the PRE website (http://pre.econ.upd.edu.ph).

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The Philippine Review of Economics

Insights on inflation expectations in the Philippines from a household survey

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The study contributes to the literature on expectations by providing insights on household expectations from an emerging market and inflation targeting country like the Philippines. Using the results of the Consumer Expectations Survey (CES), a quarterly household survey conducted by the Bangko Sentral ng Pilipinas (BSP), the study is the first to look at the characteristics and determinants of household inflation expectations in the Philippines at a granular level. Results show that survey-based household expectations in the country are not rational. Filipino households exhibit an upward bias in their forecast of future inflation and they tend to rely more on information about past inflation to form their expectations. Nonetheless, in recent years, households have started to incorporate information about future outcomes in their inflation expectations process. To determine the factors that drive household expectations in the Philippines, aggregated (i.e., time series) and disaggregated (i.e., pooled data) data from CES quarterly survey rounds between 2010 and 2020 are used on a standard inflation expectations model. Empirical results point to a significant effect of income conditions, perceptions on economic and financial conditions, the inflation target, and demographic factors (e.g., educational attainment, marital status) on the formation of household expectations in the Philippines. Based on the findings and observations, the study draws insights for central bank communication strategy, particularly in influencing household expectations.

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** The views expressed in this paper are those of the authors and do not necessarily reflect those of Bangko Sentral ng Pilipinas. Any errors and omissions are solely of the authors.

"…We need to know more about the manner in which inflation expectations are formed and how monetary policy influences them" [Yellen 2016].

1. Introduction

Central banks have long recognized the crucial role of inflation expectations in the conduct of monetary policy. Well-anchored inflation expectations allow central banks to achieve price stability and reduce volatilities of key economic variables like interest rates, wages, and output. During the 2009 Global Financial Crisis (GFC), the significance of the expectations transmission channel became acutely evident when central banks shifted to using unconventional monetary policy tools. With interest rates at the zero-lower bound (ZLB), central banks resorted to the use of quantitative easing policies and forward guidance on the future path of interest rates to affect economic outcomes. Extensive discussions were also made on alternative monetary policy actions such as raising the inflation target and adopting nominal gross domestic product (GDP) or price level targets, with the view to influencing the inflation expectations of economic agents. Expectations of higher future inflation will lower households' and firms' perception of current real interest rates. This, in turn, would encourage households to increase current spending. Anticipation of higher inflation can lead firms to raise their prices and workers to bargain for higher wages.

Several measures of inflation expectations are currently in use in central banks. These are commonly based on two sources of information. Market-based inflation expectations (e.g., yield curve, term structure of interest rates) are derived from information on expected inflation based on the prices of assets in the financial market. Meanwhile, survey-based inflation expectations are generated from the responses of professional forecasters, businesses, households, and consumers on questions regarding predicted future inflation.

Survey-based measures have increasingly been used in exploring the different aspects of the expectations formation process of economic agents (e.g., professional forecasters, firms, households). These measures are observed to capture important economic information, including the public's understanding of monetary policy (Berge [2017]; Clark and Davig [2011]; Kiley [2009]). Some studies (e.g., Faust and Wright [2013]; Gil-Alana et al. [2012]; Ang et al. [2007]) have shown that survey-based measures of inflation expectations have better predictive power on future inflation developments than standard time series models. Thus, an expanding literature on inflation dynamics uses survey-based expectations to estimate the New Keynesian Phillips curve (NKPC) (e.g., Fuhrer [2012]; Koop and Onorante [2012]; Zhang et al. [2009]; Gerberding [2001]; Fuhrer and Moore [1995]). However, these studies offer contradicting conclusions regarding these expectations measures (Fuhrer [2012]). Roberts [1995, 1998] estimated the NKPC for the US using survey measures of inflation expectations from the Michigan and Livingston surveys as proxy for inflation expectations.

His model managed to track and explain the behavior of US inflation in the 1990s. Meanwhile, Adam and Padula [2011] use inflation forecasts from the Survey of Professional Forecasters (SPF) and concluded that survey expectations are an important determinant of inflation for UK data. By contrast, Rudebusch [2002] estimates the hybrid NKPC for the US using data from the Michigan survey and observed a relatively small coefficient on the expectations term. His finding is echoed by Nunes [2010] who finds little empirical role for survey expectations.

While expectations measures from surveys can provide economic information, they do not strictly adhere to rationality conditions. They have been found to deviate from rational expectations in a systematic and quantitatively significant way, including forecast-error predictability and bias (Coibion et al. [2018]; Nunes [2010]; Capistran and Timmerman [2009]; Caroll [2003]; Mehra [2002]; Thomas [1999]; Batchelor and Dua [1989]; Perasan [1987]). Rational expectations hypothesis holds that market agents form expectations on an economic variable using all available information, including past values of the variable and current information on its future values. It is a central economic theory which has been used as the main approach in incorporating expectations in macroeconomic modelling. Deviations from this assumption imply that economic agents make systematic errors in forming their expectations [Muth 1961]. For policymakers and authorities, such deviations present a challenge when trying to influence the behavior of economic agents to achieve a given objective (e.g., price stability).

In this paper, we test for the rationality of micro-level, survey-based expectations in the Philippines using the Consumer Expectations Survey (CES), a quarterly household survey conducted by the Bangko Sentral ng Pilipinas (BSP). Results of tests of rationality on expectations reveal whether or not economic agents have inherent biases (i.e., in addition to noisy signals and passing uncertainties) (Thomas [1999]; Kean and Runkle [1990]; Gramlich [1983]). Moreover, these tests indicate if economic agents use all available and relevant information to them (i.e., efficient). Tests of rationality are useful in understanding how economic agents use available information to form their expectations. They are also useful in informing policy. For example, if economic agents display some bias in their expectations, decision makers can properly calibrate their analysis and policy prescriptions to take this into account. This, in turn, could make policy more effective.

Our test results signify that survey-based household expectations in the Philippines are outperformed by naïve forecasts which are based on lagged values of actual inflation. This indicates that households rely more on past information about actual inflation than on future information about inflation in making their forecast. However, we observe that the forecast accuracy of household inflation expectations has improved in recent years. Nonetheless, there is little evidence that these survey-based expectations are characterized by rationality (i.e., unbiased and efficient). Results suggest that Filipino households do not utilize all available information and they tend to put more weight on information about the past to form their expectations of future outcomes. Moreover, expectations are

not fully, but only partly, driven by fundamentals. Thus, realized inflation is not necessarily a result of self-fulfilling variations in expectations [Rafiq 2013].

Tests of rationality offer insights on how households use and process information to form their inflation expectations. However, these do not tell the specific information and factors that underpin the expectations formation process of households. Understanding the underlying process of how households form their inflation expectations is crucial as these could affect their economic decisions such as consumption, savings, and investment (Armantier et al. [2015]; Bernanke [2007]). From a macro perspective, central banks' commitment to low and stable inflation, which is generally associated with the adoption of the inflation targeting framework, is observed to have led to better monetary policy and, consequently, to the firmer anchoring of inflation expectations (Mishkin [2007]; Gurkaynak et al. [2007]; Levin et al. [2004]). Meanwhile, at a micro level, factors including age, gender, income, and educational status have been found to be important characteristics in forming expectations. Households that are better educated and with higher incomes tend to have lower inflation forecast relative to those that are younger, less educated, and with lower incomes (Blanchflower and MacCoille [2009]; Armantier et al. [2015]; Pfajfar and Santoro [2008]). Moreover, perceptions about current inflation as well as the frequency and size of goods price changes matter for inflation expectations [D'Acunto et al. 2019].

Using the BSP CES micro-level data, we explore the factors that drive household expectations in the Philippines. Our regression results point to the significant effect of income conditions, perceptions on economic and financial conditions, and the inflation target on the formation of household expectations in the country. Moreover, we use a more disaggregated data (i.e., pooled CES survey data) to further examine the factors that could affect household expectations. The empirical results yield similar observations on the effect of household income conditions and perceptions about economic and financial conditions on expectations. In addition, we find that demographic factors (e.g., educational attainment, marital status, gender) also affect the formation of household expectations.

Our study contributes to the literature on expectations by providing insights on household expectations from an emerging market and inflation targeting country like the Philippines. The study is the first to look at the characteristics and determinants of household inflation expectations in the Philippines at the granular level. The inferences and observations offer clear distinctions on how demographics and perceptions affect the formation of household expectations. These are useful for studying inflation dynamics as well as in designing an effective central bank communication strategy to manage expectations.

The paper is organized as follows. Section 2 evaluates the rationality of household expectations in the Philippines. It also presents some of the key characteristics and properties of survey-based expectations in the country. Section 3 looks at the expectations formation process of Filipino households and determines the factors that affect it. Section 4 discusses the observed decline in

inflation expectations in the Philippines. Section 5 presents the policy implications on central bank communication. The last section concludes.

2. Survey-based expectations in the Philippines: forecast accuracy and rationality

We first provide a short description of the BSP CES, the main source of data for this study. Next, we explore the characteristics and properties of survey-based expectations in the Philippines. We then evaluate whether or not expectations based on the CES have forecast bias and if they exhibit rationality.

2.1. Data

In 2002, the Philippines adopted inflation targeting as its framework for monetary policy. The shift led to the greater significance of the expectations channel in the transmission of monetary policy in the country. This increased the importance of monitoring inflation expectations to ensure that they are aligned with the central bank's policy objectives as well as to inform monetary policy formulation. Hence, the BSP initiated and institutionalized the conduct of expectations surveys for firms, consumers, households as well as professional forecasters.

For this study, we use the results of the CES, a quarterly survey of a random sample of about 5,000 households in the Philippines, to analyze expectations in the country.[1,2] The CES, together with the BSP Business Expectations Survey (BES),[3] is a tool that the BSP uses to gather information to gauge the sentiment of consumers, households, and businesses. The survey was first officially conducted in the 4th quarter of 2004. It initially included a sample of households in the National Capital Region (NCR). Eventually, the survey was expanded to cover the entire Philippines starting in the first quarter of 2007.[4]

The CES results provide advanced information on the consumption spending and buying intentions of households as well as potential changes in family incomes and financial conditions. It gives monetary authorities some leading indications of household sentiments for the current quarter, for the next quarter, and for the

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[1] The CES adopts the sampling design of the Labor Force Survey (LFS) of the Philippine Statistics Authority (PSA). The CES samples are drawn from the PSA Master Sample for household surveys, which is considered as a representative sample of households nationwide. The CES sample households are generated using a stratified multi-stage probability sampling scheme.

[2] Central banks that conduct surveys on the inflation expectations of consumers include the Bank of England, Bank of Canada, European Central Bank, Federal Reserve of New York, Bank of Japan, Bank Indonesia, and the Reserve Bank of India.

[3] The BES gathers information from entrepreneurs about business conditions in their own companies. It also collects information about entrepreneurs' views on the general business situation in their own industry and on the national economy. Additionally, the BES presents the perception of different groups on current and near-term business conditions, including levels of production and economic activity and factors that could influence the movement of key economic variables such as GDP, interest rate, peso/dollar exchange rate, and inflation rate.

[4] From an initial sample survey of 3,039 households in NCR, the quarterly CES currently covers about 5,000 sample households equally allocated at about 2,500 households for each geographical area (i.e., NCR and areas outside NCR).

next 12 months on selected economic indicators, including inflation. For instance, the CES asks households their expected inflation for the next 12 months. In Q1 2021, the CES started asking households their expected inflation for both the current quarter and the next quarter. In this paper, we focus on inflation expectations for the next 12 months (i.e., long-run inflation expectations) given that it has a longer series.

Since Q2 2014, the CES has been reporting two series that try to capture households' expectations of price changes for the next 12 months. These are (i) inflation rate aggregated from the individual inflation rate of major consumer price index (CPI) items[5] (i.e., inflation rate CPI items); and (ii) inflation rate as a point forecast (i.e., inflation rate point forecast). For the inflation rate (CPI items), households are asked about their expectations of what would happen to the prices of goods and services in the next 12 months.[6] Meanwhile, for the inflation rate (point forecast), households are asked the question about their expected inflation rate for the next 12 months. A comparison of the two series shows that over the period Q2 2014 to Q2 2021, average inflation rate (CPI items) is higher than average inflation rate (point forecast) by 0.6 percent (i.e., in terms of the rate and the trend). Nonetheless, correlation results indicate a significant positive association between the two series at 64.0 percent. The inflation rate (CPI items) has a longer series than the inflation rate (point forecast). Thus, for the purposes of this paper, we use the inflation (CPI items) as our measure for household inflation expectations.

2.2. Initial observations

Figure 1 plots the quarterly year-on-year percent change in CPI (i.e., inflation rate) together with quarterly survey-based household inflation expectations over the period 2010 to 2020. It also shows the upper- and lower-bounds of the National Government's (NG's) inflation target for the same period. The chart yields some general observations. First, Filipino households tend to overpredict future inflation. On average, the difference between inflation expectations and actual inflation is 2.7 percentage points. Interestingly, households underpredicted inflation in 2018, a year when inflation was above the BSP's inflation target. A possible explanation for this is that supply shocks in 2018 were unexpected which made them difficult to predict. The World Bank and International Monetary Fund (IMF) forecasts as well as oil futures contracts likewise failed to significantly foresee the steep rise in oil prices in 2018. However, the gap between actual inflation and expected inflation has narrowed in recent years.

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[5] The inflation rate (CPI items) is computed by multiplying the percentage of households that answered that prices will increase (decrease) with the average rate of price increase (decrease). The resulting difference between the two sets of household responses (i.e., price increase and decrease) is combined with the associated CPI weights of the different commodities.

[6] The CES questionnaire covers the major CPI commodity items. Since 2016, survey respondents have been asked about their expected inflation for 21 CPI commodity items in the next 12 months. These items account for 93.9 percent of the country's CPI basket.

Second, there is a noticeable lowering of expected inflation by households starting in the latter quarters of 2014. The dispersion of inflation forecasts has declined over time which may have contributed to lower expectations. This could have been partly due to the general decline in trend inflation (Figure 2). In 2015 and 2016, domestic inflation settled at 0.7 percent and 1.3 percent, respectively, which were substantially below the 2.0 percent lower-bound of the inflation target for those years. Factors that contributed to the disinflationary pressure were China's economic slowdown, the drop in international oil prices, and the general decline in food prices.[7] Subsequently, inflation would rise sharply to 5.2 percent in 2018 on the back of high food and energy prices. This figure was above the inflation target for 2018 and highest over the previous nine years.

Third, household expectations of inflation started to move closer to the NG's target range for inflation in recent years. Correlation results show that there is a positive and significant relationship between the BSP's inflation target and households' expected inflation (Table 1). This suggests that households have started to include the inflation target in their information set when forming expectations about future inflation.

FIGURE 1. Inflation, inflation expectations, and inflation target

(in percent; year-on-year)
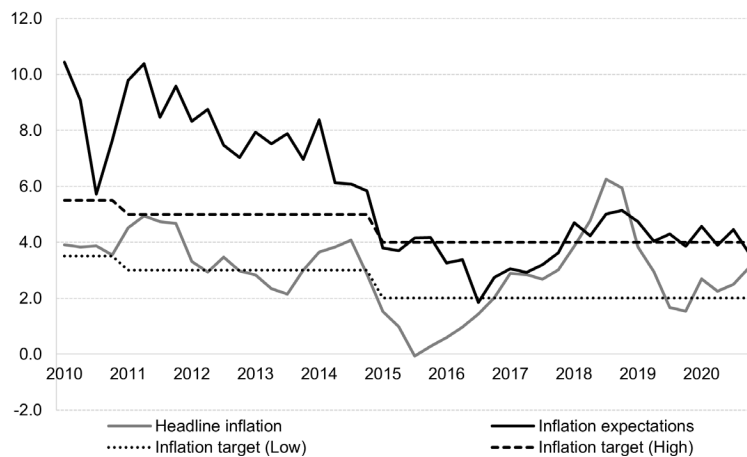
Source: Philippine Statistics Authority (PSA).

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[7] In 2015, China's economy expanded at an average rate of 6.9 percent, its slowest growth in 25 years. Fears of an overheating economy, stock market meltdown, and possibility of a hard landing dominated the landscape for the Chinese economy in 2015. Moreover, international oil prices substantially declined between 2014 and 2016 owing to a supply glut.

FIGURE 2. Trend ᵃ/: inflation and inflation expectations

(in percent)
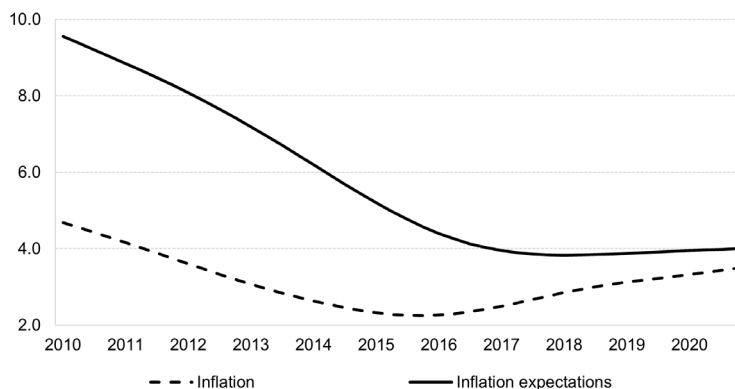
Note: ᵃ/ Trend is generated using the HP filter.
Source: Philippine Statistics Authority (PSA).

TABLE 1. Descriptive statistics

	Inflation (in percent)			Household expected inflation (in percent)		
	Q1 2010–Q4 2020	Q1 2010–Q4 2014	Q1 2015–Q4 2020	Q1 2010–Q4 2020	Q1 2010–Q4 2014	Q1 2015–Q4 2020
Mean	3.1	3.6	2.7	5.6	8.0	3.9
Median	3.0	3.6	2.7	4.7	7.9	3.9
Maximum	10.4	4.9	6.3	6.3	10.4	5.1
Minimum	1.8	2.2	-0.1	-0.1	5.7	1.8
Std. Dev.	2.3	0.8	1.6	1.4	1.4	0.8
Correlation with inflation	1.0	1.0	1.0	0.44	0.42	0.46
Correlation with inflation target[1/]	0.32	0.14	0.18	0.87	0.08	0.60

Note: [1/] Using the midpoint of the inflation target range.
Source: Authors' calculations.

2.3. Testing for forecast accuracy and rationality

In Figure 1, we observe that households' prediction of future inflation is often higher than actual inflation. We formally test the forecast accuracy of households' expectations and assess their performance against a naïve model. Moreover, we assess whether or not household expectations in the Philippines are rational by testing for unbiasedness and efficiency (i.e., using all available information).

2.3.1. Forecast accuracy

To determine forecast accuracy, we use the mean error (ME), mean absolute error (MAE), and the root mean square error (RMSE). The mean error is the average magnitude of forecast error (e_t) over the n periods being forecasted. It is considered as a basic measure of forecasting bias. The forecast error (e_t) is defined as forecast (i.e., expected) inflation rate minus the actual inflation rate that subsequently occurred. Thus, a positive mean error signifies that households, on average, overpredict inflation. Conversely, a negative mean error indicates that households, on average, underpredict inflation. Meanwhile, the MAE measures the accuracy of forecasts. An alternative measure of accuracy is the RMSE. It is derived by summing the squares of each of the errors, divided by the number of forecast periods, and taking the square root of the resulting quotient. Relative to the MAE, the RMSE amplifies the effect of large forecast errors.

We calculate the ME, MAE and RMSE using standard equations, as follows:

$$ME = \tfrac{1}{n}\sum\nolimits_{i=1}^{n} e_t$$

$$MAE = \tfrac{1}{n}\sum\nolimits_{i=1}^{n} |e_t|$$

$$RMSE = \left[\tfrac{1}{n}\sum_{i=1}^{n} |e_i^2| \right]^{\frac{1}{2}} \tag{1}$$

Survey-based inflation expectations vis-à-vis naïve forecast

While these metrics provide numerical evaluation of forecast accuracy, they are difficult to assess without a baseline comparison. Thus, we compare them to a naïve forecast to better gauge the forecast accuracy of household inflation expectations. The naïve forecast is defined as the average rate of inflation during the past two quarters.[8] It is therefore a purely backward-looking process (i.e., adaptive expectations).[9] The household is assumed to know the average rate of previous inflation at the time that the forecast is made. If survey-based household expectations do not outperform the naïve forecasts, this implies that households fail to consider relevant information on future inflation other than that contained in previous rate of actual inflation [Thomas 1999].

Table 2 presents the forecasting statistics for the survey-based inflation expectations and the naïve forecasts. Based on the forecast evaluation metrics, the

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[8] The use of the average rate of inflation over the past two quarters is based on regression results of an augmented Phillips curve equation which shows that lagged inflation of up to two quarters significantly affects current inflation.

[9] This is based on the adaptive expectations hypothesis which posits that people form their expectations about future outcomes based on historical information (Fisher [1911]; Cagan [1956]). Thus, inflation expectations have been modeled adaptively (i.e., using distributed lags of actual inflation) in the analysis of the expectations-augmented Phillips curve [Friedman 1968].

survey-based inflation expectations are unable to outperform the naïve forecast.[10] This signifies that Filipino households heavily rely on information about past inflation to form expectations of future inflation. In Figure 1, we observe actual inflation and inflation expectations exhibit a more rapid decline starting in 2015. Hence, we split our sample period to account for this observation and see how the survey-based forecast and naïve forecast performed between periods. From Table 2, we note the marked improvement of the forecasting performance of survey-based inflation expectations between the Q1 2010–Q4 2014 period and the Q1 2015–Q4 2020 period. This suggests that Filipino households are incorporating more information about future economic outcomes in their expectations in recent years.

TABLE 2. Inflation forecasting performance[2/]

Forecast	Q1 2010–Q4 2020			Q1 2010–Q4 2014			Q1 2015–Q4 2020		
	Mean Error	Mean Absolute Error	Root Mean Square Error	Mean Error	Mean Absolute Error	Root Mean Square Error	Mean Error	Mean Absolute Error	Root Mean Square Error
Survey-based inflation expectations (CES)	2.722	2.841	3.393	4.396	4.396	14.472	1.328	1.544	1.911
Naïve forecast	0.026	1.123	1.391	-0.049	0.773	0.904	0.089	1.415	1.692

Note: [2/] Based on authors' calculations.

2.3.2. Rationality: unbiasedness and efficiency

For inflation expectations to be considered rational, they must be unbiased and efficient (Thomas [1999]; Mehra [2002]). Expectations are unbiased if economic agents, on average, can forecast inflation correctly. Meanwhile, expectations are efficient if economic agents use all relevant information with the marginal benefit of gathering and processing the information exceeding the associated marginal cost [Thomas 1999].[11]

a. Test for unbiasedness
We test for bias using the following regression equation:

$$\pi_t = \alpha + \beta \pi^e_t + \varepsilon_t \tag{2}$$

where π_t is actual inflation, π^e_t is expected inflation with a forecast horizon of h periods (i.e., expectations of inflation formed at period $t-h$; $h = 12$ months), and ε_t is a random residual. The existence of bias is determined by testing the joint null

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[10] Our analysis provides a simple comparison of the predictive accuracy of two competing forecasting procedures. However, we would like to note that there are statistical tests (e.g., Diebold-Mariano test) that can be used for a more formal significance tests of equal predictive accuracy.

[11] Rational expectations requires that the forecast error be distributed independently of the expected value [Muth 1961].

hypothesis that $\alpha = 0$ and $\beta = 1$. Forecasts are considered unbiased if the joint null hypothesis cannot be rejected.

We use the quarterly (year-on-year) inflation rate and quarterly results of the BSP CES for households' expected inflation. Table 3 presents the results of the test of for unbiasedness of survey forecasts for inflation.

TABLE 3. Test for unbiasedness, Q1 2010–Q4 2020

	α	β	*F*-stat for Ho	No. of obs
Inflation expectations	1.57 (0.762)	0.26 (0.094)	7.87*** [0.007]	44

*** Significant at 0.01 level.
Note: Figures in parentheses are standard errors while figure in bracket is *p*-value. Equation was estimated using OLS. Hypothesis test was based on Newey-West HAC covariance matrix of residuals.

Table 3 shows that the null hypothesis is rejected at 1 percent confidence level. This indicates the presence of a forecast bias in the expectations results of the BSP CES.[12] The BIS [2016] reported a similar finding when they assessed survey-based expectations from the Philippines. Moreover, the result of the test for unbiasedness is in line with the calculated mean errors of household inflation expectations from Table 2. The survey-based inflation forecasts were shown to have a positive forecast bias.

Average (or median) survey-based expectations are observed to be a biased estimate of actual inflation (e.g., Thomas [1999]; Mehra [2002]; Carroll [2003]; Capistran and Timmerman [2009]; Nunes [2010]; Coibion [2018]). In the case of households, they often exhibit forecast bias because inflation may not always be part of their core information sets. Thus, households' beliefs about inflation may not be properly formed when they are asked about their expectations. There is also a lack of incentive for households to make an exhaustive assessment of the information available to them to come up with the best possible prediction of future inflation. Moreover, households know that there is no penalty in case their expectations turn out to be inaccurate. Thus, they may become indifferent and give biased responses to survey questions. However, the presence of an aggregate bias does not necessarily preclude the possibility that households are giving what they perceive as an accurate assessment of future inflation on which they base their economic decisions [Armantier et al. 2015]. Also, households may not be able to consider the structural changes or regime shifts happening in the economy. This could result in systematic errors in their forecasts over certain periods, even if they are fully rational [Thomas 1999].

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[12] Results from the test for unbiasedness could suggest a weak form of rationality. Lovell [1986] distinguishes between a weak form rationality and strong form rationality. He described the weak rationality condition as "sufficient" expectations which requires the forecast error to be uncorrelated to historical information on previous values of the variable being forecast. Meanwhile, the strong rationality condition needs to be satisfied to attain full rationality. This entails that any other variables known to the forecaster must also be uncorrelated with the forecast error.

b.   Test for efficiency[13]

Efficiency tests are done to reveal whether or not households use readily available information to improve expectations accuracy. To do this, we test the hypothesis that $\alpha_0 = 0$, $\alpha_1 = 1$, and $\alpha_2 = 0$ in the following equation [Keane and Runkle 1990]:

$$\pi_{t+h} = \alpha_0 + \alpha_{1t}\pi^e_{i,t+h} + \alpha_2 X_{i,t} + \varepsilon^i_{t,1},$$

$$E(\varepsilon^i_{t,i} \mid I_{i,t}) = 0$$

(3)

where π_{t+h} is actual inflation in period $t + h$ (i.e., $h = 12$ months); while $\pi^e_{t,}$ is household i's expected inflation with a forecast horizon of h periods (i.e., expectations of inflation formed at period t). The set of other variables affecting actual inflation is represented by $X_{i,t}$.

Testing the hypothesis on expectations by applying CES data to run a regression analysis of Equation 3, we cannot conclusively say that households efficiently use information in formulating their expectations. In Table 4, the null hypothesis that the constant term is zero is rejected. Furthermore, the coefficient of households' expected inflation does not indicate a one-to-one ($\alpha_1 = 1$) relationship with actual inflation. Overall, aggregate information from survey data does not provide evidence that Filipino households form their expectations using all available information. Thus, households' inflation forecast does not sufficiently predict actual inflation, even after considering other factors such as time variables (i.e., year and survey quarter), lagged inflation, and expectations error. The two variables on expected income are derived from the CES questions on perceived income conditions of households (i.e., expected income in the current quarter and expected income in the next 12 months, respectively). These variables refer to survey questions relating to (i) the current level of the household's income (relative to 12 months ago) and (ii) expectations about the household's income in the next 12 months, respectively.

TABLE 4. Tests of efficiency in the formulation of household expectations using aggregated time series CES data, Q1 2010 to Q4 2020

Dependent variable: π_{t+h} (i.e., actual inflation 12 months from t). Column headings refer to different specifications of Equation 3

	1		2		3		4	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Constant	2.353	0.620	239.19	305.9	917.17*	246.10	37.905*	11.270
Lagged inflation (1st lag)	0.912*	0.287	0.887*	0.295	-0.102	0.276	0.808*	0.258
Expected inflation at t	-0.718*	0.291	-0.760*	0.301	0.500	0.299	-0.411	0.277
Expectations error (1st lag)	0.733*	0.299	0.643**	0.329	-0.197	0.273	0.628*	0.268

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[13] An efficiency test determines whether no readily available information could have improved forecast accuracy.

TABLE 4. Tests of efficiency in the formulation of household expectations using aggregated time series CES data, Q1 2010 to Q4 2020 (continued)

	1		2		3		4	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Survey quarter			-0.022	0.209	-0.077	0.150		
Year			-0.117	0.151	-0.415*	0.119		
Expected income (current quarter)					-32.020*	6.902		
Expected income (12 months ahead)					-8.166	5.662	-19.338*	6.120
N	39		39		39		39	
Adjusted R-squared	0.163		0.129		0.589		0.334	
F-statistic (p-value)	3.47 (0.026)		2.13 (0.087)		8.78 (0.000)		5.77 (0.001)	
Root mean squared error (RMSE)	1.33		1.36		0.93		0.93	

Note: ** and * indicate significance at 0.05 and 0.10 percent levels.

We apply a similar empirical exercise of testing the hypothesis to a pooled CES data. This gives us a more disaggregated view of the data and allows us to include more factors in the equation.

Table 5 also rejects the null hypothesis that the α_2 coefficients are zero. In particular, there appears to be a relationship between inflation and other variables such as lagged inflation and perceived income conditions, i.e., "Expected income (current quarter)" and "Expected income (12 months ahead)." This result suggests that there are many other factors that affect overall inflation performance which are not necessarily captured or reflected in households' expectations. As such, the assumption of rationality of expectations in terms of the availability and use of relevant information in forming expectations is not evident in the survey data.

The coefficients of the year and quarter variables indicate that temporal and timing conditions are important exogenous factors affecting inflation. Expectations results could therefore be dependent on the period when the survey was conducted. This could imply that households do not renew their information set every period.[14] Moreover, the negative coefficient of the year variable reflects the decline of households' expectations in recent years which coincided with the general downtrend in inflation over the same period (Figure 1 and Table 1). These developments could, in part, be attributed to the successful adoption of inflation targeting in the country and the resulting deceleration of inflation and "disinflation of expectations" in the country.

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[14] Ueno [2014] argues that although households may not be renewing their expectations periodically, it is more frequent than what is assumed in the literature. In addition, expectations are updated more often during periods of shocks and volatilities.

Past expectations error (i.e., difference between expected inflation minus actual inflation in the previous period) tend to have a significant coefficient, indicating that α_2, the coefficient associated with variables other than expected inflation, is nonzero. Thus, it may be concluded that the formulation of households' expectations does not appear to be sufficiently explained by future outcomes. Expected inflation therefore does not pass the efficiency criteria. Households do not use all available information in forming their expectations. Actual inflation is affected by factors that could or could not be correlated with or predicted by their own inflation expectations.

Several authors (e.g., Mankiw and Reis [2002]; Sims [2006]; Mackowiak and Wiederholt [2009]; Capistran and Timmermann [2009]) have recognized that agents, like households, may not be using all available information when making economic decisions. The reason for this is the presence of information asymmetries and rigidities. Information could be "sticky" such that agents do not frequently update their information sets. On the other hand, when they do, agents tend to adhere to the assumption of rational expectations [Mankiw and Reis 2002]. Another possible explanation is that of rational inattention among economic agents. Rational inattention assumes that agents face constraints in processing information. They either receive noisy signals (i.e., agents observe the true values but with some error) [Woodford 2002] or they rationally choose the information that they would pay attention to subject to some information constraints (Sims [2006]; Mackowiak and Wiederholt [2009]).

TABLE 5. Tests of efficiency in the formulation of household expectations using pooled CES data Q1 2010 to Q4 2020

Dependent variable: π_{t+h} (i.e., actual inflation 12 months from t). Column headings refer to different specifications of Equation 3

	1		2		3	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Constant	2.296*	0.008	86.894*	2.115	115.560*	2.233
Lagged inflation (1st lag)	0.930*	0.004	0.921*	0.004	0.939*	0.004
Expected inflation at t	-0.730*	0.004	-0.739*	0.004	-0.759*	0.004
Expectations error (1st lag)	0.736	0.004	0.740*	0.004	0.760*	0.004
Survey quarter			0.022*	0.002	0.025*	0.002
Year			-0.042*	0.001	-0.056*	0.001
Gross family income					0.036	0.001
Expected income (current quarter)					-0.037	0.004
Expected income (12 months ahead)					-0.070	0.006
N	215,006		215,006		214,999	
Adjusted R-squared	0.238		0.244		0.250	
F-statistic (p-value)	22400 (0.000)		13900 (0.000)		8950 (0.000)	
Root mean squared error (RMSE)	1.26		1.25		1.25	

Note: ** and * indicate significance at 0.05 and 0.10 percent levels.

We assess the degree to which Filipino households are either rationally attentive or inattentive to information about price changes in major CPI commodity groups. Annex 1 presents the composition of the Philippine CPI basket and their corresponding weights. Using the results of the CES, we examine their response and nonresponse rates to survey questions on price expectations for these commodity groups. We observe that Filipino households are more perceptive to price movements of basic commodities like food items (i.e., rice, meat, fish and milk), gasoline and fuel, utilities (i.e., electricity, water), transport, and alcoholic beverages (Figure 3). This finding is unsurprising given that households consume more of these commodities relative to other goods. Thus, they see the prices of these commodities more frequently. Filipino households are less attentive to developments in house rents and in the costs of communication, recreation, and clothing. These observations suggest that developments in the prices of different commodities have varying effects on the household expectations of inflation. Georganas et al. [2014] show laboratory evidence that, when forming expectations, consumers put more weight on price changes that they are exposed to more frequently.

FIGURE 3. Consumer Expectations Survey: Nonresponse per commodity group Q1 2010–Q4 2020

(as percent of total surveyed households; median average)
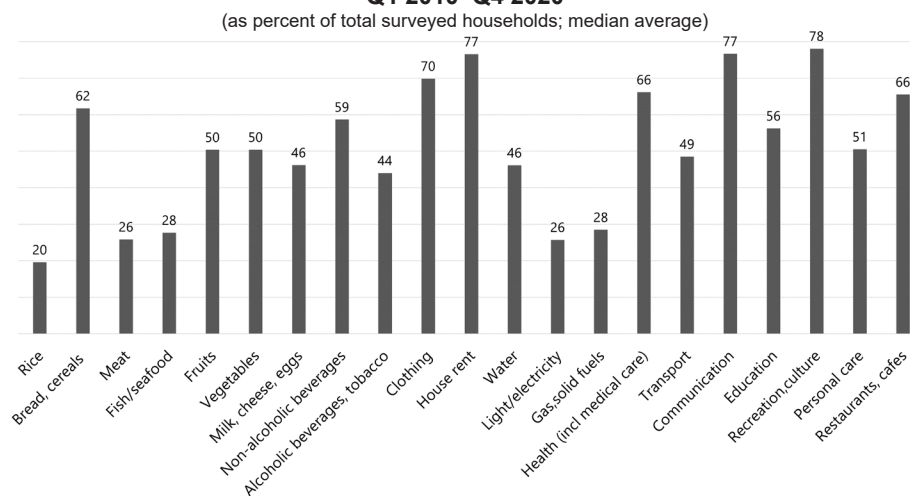
Note: Nonresponse rates are obtained by calculating both the number of respondents who did not answer and the number of those who provided answer to the question "What do you think would happen to the prices of the following goods and services in the next 12 months?" where the goods and services are as indicated in the horizontal axis of the figure. The nonresponse rates shown in the figure are the median (between Q1 2010 to Q4 2020) percentage shares of the number of respondents who did not provide answers to the total number of respondents for each survey period.
Source: BSP Consumer Expectations Survey, various quarters, authors' calculations.

3. Drivers of household inflation expectations

The growing literature on household expectations has tried to determine how these expectations are formed. Understanding the process that underpins how households form their expectations is crucial as these could affect their consumption, savings, and investment decisions. For central banks, these economic decisions and actions of households have important implications for the transmission of monetary policy to the real economy.

To identify the factors that drive household expectations in the Philippines, we conduct regression analyses based on the following specification:

$$\pi^e_{t,th} = \alpha + \beta_1 \cdot \pi_{t\text{-}1} + \beta_i \cdot X_t + \varepsilon_t \qquad (4)$$

where: π^e_t is expected inflation with a forecast horizon of h periods (i.e., expectations of inflation formed at period t; $h = 12$ months) and $\pi_{t\text{-}1}$ is lagged inflation. X_t is a set of the other factors that could affect inflation expectations, including general macroeconomic conditions (e.g., unemployment, interest rate and exchange rate), demographic variables, and households' perception of their future income and financial condition as well as general economic conditions. We also include the BSP's inflation target which is denoted as the mid-point in the NG's inflation target range.

We estimate Equation 4 using aggregated (i.e., time series) and disaggregated (i.e., pooled data) data per CES quarterly survey round. Table 6 shows that, in aggregated terms, demographic variables such as age and sex do not appear to offer significant contribution to expectations formation. Meanwhile, gross family income appears to be significant for a given specification (i.e., specification 1) but not in the other equations. Gross family income refers to the household's gross monthly income which includes income from domestic employment and remittances from family members.

The inflation target is observed to be significant only for the third and fourth specifications. This could indicate that households are partly anchored to the monetary policy objectives of price stability and they find monetary policy to be credible. Moreover, this could suggest that households are incorporating authorities' inflation outlook in their assessment of future inflation.

Compared to the result obtained for gross family income, household's perception of their own future income conditions for the current quarter and in the next 12 months appears to be significant in the formation of their expectations about prices of goods and services. In aggregate terms, households appear to implicitly recognize the role of current market conditions (e.g., supply factors, public policies and external developments such as in the global oil markets) on prices when forming their expectations.

Moreover, household perceptions about future economic and financial conditions could potentially affect price conditions and, thus, their own expectations about inflation. Household's expected financial conditions for the

current quarter and in the next 12 months in Table 6 refer to the household's assessment of their current financial situation relative to 12 months ago (i.e., same, better, or worse) and expectations about their financial situation in the next 12 months (i.e., same, better, or worse), respectively. Variables for the household's expected economic conditions for the current quarter and in the next 12 months refer to household's perception about the country's current economic condition relative to 12 months ago (i.e., same, better, or worse) and expectations about the country's economic condition in the next 12 months (i.e., same, better, or worse).

To gain deeper micro perspective on household expectations, we use disaggregated data (i.e., pooled CES data) on Equation 4. Some of the results we generated are aligned with our findings using aggregated CES data (Table 7). Households' perceptions about the current and future performance of some macro variables appear to affect how their expectations are formed.[15] A specific result from Table 7 is the consistency of the inflation expectations with the Phillips curve prediction that higher unemployment is associated with declining inflation expectations. The coefficient of unemployment is negative and significant. Moreover, regressions on the drivers of inflation expectations also indicate the significant reaction of inflation expectations on perceived future setting of monetary policy. Perception of higher interest rates over time tends to decrease inflation expectations over the same period of time.

The results of the pooled CES data point to demographic factors like educational status, marital status, and gender as significantly affecting expectations. The estimates in Table 7 show that households with members that have attained a higher level of education tend to have lower inflation expectations. This is consistent with the findings in other studies that people with better access to information or more developed information-processing skills, such as those with more education, tend to have lower and more accurate and lower inflation expectations [Brischetto and de Brouwer 1999]. Households that are better educated are assumed to be more financially literate and more aware of economic conditions relative to households with lower educational attainment [Blanchflower and MacCoille 2009]. Survey respondents that are single are more likely to have higher inflation expectations than those who are married. A possible reason for this is the differences in the consumption patterns and choices of single and married individuals. On one hand, the consumption baskets of married individuals, on average, tend to have more basic commodities in them, especially, if there are children in the household. Moreover, married individuals are more inclined to follow a household budget and, thus, they are more conscious of the prices of the goods and services that they purchase. On the other hand, single individuals, on average, have the propensity to purchase more of the non-basic, more expensive consumption goods and services (e.g., luxury items).

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[15] Households' perceptions about future unemployment, interest rates and exchange rates pertain to their expectations on whether or not these variables will increase or decrease in the current quarter (relative to 12 months ago) and whether or not these variables will increase or decrease in the next 12 months.

TABLE 6. Regression of aggregated CES results and perceptions on economic conditions

Dependent variable: π^e_t (expectations of inflation formed at period t-h with h = 12 months). Column headings refer to different specifications of Equation 4.

	1		2		3		4		5	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Constant	0.309*	45.170	2.377	1.471	61.692*	10.183	37.476*	5.567	14.607*	2.353
Lagged inflation	0.626*	0.338	0.338*	0.200	0.290*	0.159	0.261	0.173	0.504*	0.156
Past error (1st lag)			0.078	0.188	0.317*	0.141	0.237	0.146	0.418*	0.159
Age	0.536	0.505								
Sex	19.239	19.420								
Marital status	-20.346*	2.660								
Educational attainment	-0.924	4.244								
Gross family income	0.562*	0.260	-0.035	0.159	-0.090	0.111	-0.034	0.106	-0.033	0.114
Inflation target			-0.238	0.748	1.179*	0.649	1.883*	0.673	-0.269	0.648
Expected own income condition (current quarter)					-23.615*	5.929				
Expected own income condition (12 months ahead)					-9.201	6.203				
Expected financial condition (current quarter)							-19.414*	4.773		
Expected financial condition (12 months ahead)							0.148	5.072		
Expected economic condition (current quarter)									-2.070	1.621
Expected economic condition (12 months ahead)									-5.019*	1.904
N	42		39		39		39		39	
F-statistic (p-value)	20.420 (0.000)		0.93 (0.000)		7.48 (0.000)		8.80 (0.000)		6.93 (0.000)	
Adjusted R-squared			0.008		0.506		0.552		0.484	

Note: Initial set of regressions indicate that outlook for macroeconomic variables such as unemployment, interest rate and exchange rate did not seem to be significant factors in the formation of household expectations. ** and * indicate significance at 0.05 and 0.10 percent levels.

TABLE 7. Drivers of household expectations using pooled CES data Q1 2010 to Q4 2020

Dependent variable: π_t^e (expectations of inflation formed at period t-h with h = 12 months). Column headings refer to different specifications of Equation 4.

	1		2		3		4		5	
	Coeff.	Std.error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Constant	69.758*	1.108	87.908*	1.183	86.583*	1.183	81.683*	1.185	81.741*	1.200
Lagged inflation	0.836*	0.001	0.835*	0.001	0.834*	0.001	0.834*	0.001	0.835*	0.000
Expectations error (1st Lag)	0.991*	0.000	0.990*	0.000	0.990*	0.000	0.990*	0.000	0.990*	0.000
Survey quarter	-0.012*	0.001	-0.012*	0.001	-0.012*	0.001	-0.011*	0.000	-0.011*	0.000
Year	-0.034*	0.001	-0.043*	0.001	-0.043*	0.001	-0.040*	0.000	-0.040*	0.000
Age	0.0004*	0.000	0.0002*	0.000	0.000	0.000				
Sex	0.004*	0.003								
Marital status	-0.020*	0.002					-0.014*	0.003	-0.016	0.000
Educational attainment	-0.004*	0.001								
Gross family income			0.016*	0.000	0.017*	0.000	0.016*	0.000	0.016*	0.000
Expected own income condition (current quarter)			0.028*	0.002						
Expected own income condition (12 months ahead)			0.020*	0.003						
Expected financial condition (current quarter)					0.038*	0.002				
Expected financial condition (12 months ahead)					0.045*	0.003				
Expected economic condition (current quarter)							0.070*	0.002		
Expected economic condition (12 months ahead)							0.075*	0.002		
Expected unemployment condition (12 months ahead)									-0.050*	0.000
Expected interest rate (12 months ahead)									-0.035*	0.000
Expected exchange rate (12 months ahead)									0.0127*	0.000
N	230,851		230,844		230,851		230,855		230,856	
F-statistic (p-value)	2750000		2770000		2770000		2800000		2460000	
Error variance estimate	0.54		1.81		0.54		0.53		0.53	
Root mean square error (RMSE)	0.74		0.73		0.73		0.73		0.73	

Note: ** and * indicate significance at 0.05 and 0.10 percent levels.

Depending on the other factors that are considered in the regressions, women have lower inflation forecasts compared to men (i.e., fourth column regression results in Table 7). Women are often the ones who handle household needs and purchases. Thus, they are more exposed to the changes in the prices of goods and services than men.

4. Decline in inflation expectations

Households' expected inflation has declined perceptibly starting in 2015. Together with better monetary policy, globalization factors such as increased trade flows, wider use of supply chains to optimize production costs, greater role of emerging markets and their impact on commodities, and lessened bargaining power of workers have also played significant roles in inflation developments in recent decades [Forbes 2019]. These developments resulted in more favorable price conditions which, in turn, led to the decline in inflation expectations. Average inflation forecast fell to 3.9 percent in the Q1 2015 to Q4 2020 period from 8.0 percent in the Q1 2010 and Q4 2014 period. This was largely ascribed to the low and stable inflation that prevailed during the pre-pandemic period (i.e., 2010–2019). Figure 4 presents the mean inflation forecasts for the different CPI commodity groups. Price expectations for these commodities show declining trends, except for a perceptible uptick in 2020, a year marked by the COVID-19 pandemic. However, the rate of decrease in expectations varied across commodities. Fruits, vegetables, bread and cereals, and fish and seafood showed larger declines relative to other commodities as did light/electricity, water, and transport (Figure 4). Figure 3 indicates that Filipino households tend to be more attentive to price developments in certain commodities like food, energy, and utilities compared to other commodities. This could in part explain the differences in the rate of decline in expectations for the various commodities. Moreover, Basilio and Cacnio [2020] observe that, over the past two decades, there was a decline in the frequency of commodity price changes and a lengthening of the duration between price adjustments in the country. Such developments signify lower price volatilities which could have contributed to lower inflation and inflation expectations.

The decline in long-run inflation expectations has also been linked to reduced uncertainty of consumer and households about future inflation [Binder and Verbrugge 2016]. Binder and Verbrugge [2016] attributed lower inflation uncertainty to improvements in macroeconomic conditions and to the adoption of an inflation target. Uncertainty measures point to a countercyclical relationship between uncertainty and economic conditions. Strong economic performance is associated with lower uncertainty. We note that these arguments are in keeping with the empirical results presented in Section 3. Households' perceptions of their future income and financial conditions and economic outcomes affect their expectations of future inflation.

FIGURE 4. Mean inflation forecast of CPI commodity groups (in percent)
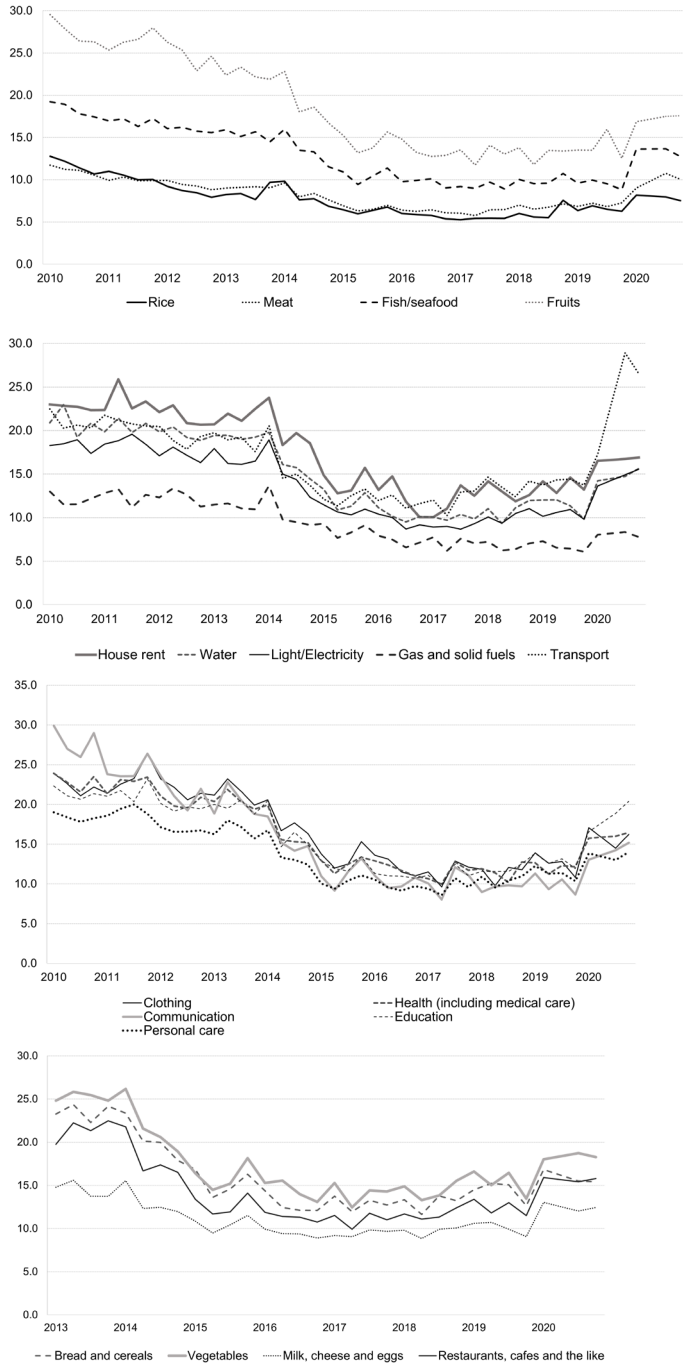
Source. BSP Consumer Expectations Survey (CES), various quarters and years.

The inflation target was similarly observed to affect households' inflation expectations. Announcement of an explicit inflation target from a central bank contributes to the stronger anchoring of inflation expectations to the target which reduces uncertainty about future inflation. In the post-GFC period, the Philippines experienced strong economic growth which was broad-based and more resilient to shocks. Aggregate demand expanded but inflation remained low and stable. These developments, in turn, contributed to lower inflation expectations.

5. Expectations and their implications central bank communication

Central bank communication is crucial in managing expectations. The observations and findings from this study provide insights for central bank communication, particularly in influencing household expectations.

Since the 1990s, central banks have increasingly become more open and transparent in discussing their objectives, policy decisions, and actions. Central banks have designed and implemented communication strategies aimed at providing market participants and the general public a view of what they are doing and what they are trying to achieve for the economy. Clear communication is seen as helping reduce financial and economic volatilities resulting from central bank decisions as well as expanding the tool set of monetary policy [Blinder et al. 2008]. For example, statements regarding the expected path of future short-term interest rates can affect long-term interest rates, thereby influencing current economic conditions even without any change in policy [Coibion et al. 2020].

Central bank communication has often been more focused on influencing the expectations of financial market participants and professional forecasters. The reason for this is that financial markets' perception of the future path of monetary policy could affect long-term interest rates. Subsequently, interest rate movements will have an impact of the economic decisions of households and firms [Coibion et al. 2020]. Nonetheless, theory suggests that household and firm decisions are based on their perceived real interest rate, which depends on both nominal interest rates and their expectations of future inflation. Thus, inflation expectations of households should matter when they make decisions about consumption, savings, and investments and for firms in their price- and wage-setting decisions. This argument has been supported by empirical evidence on the significant effect of inflation expectations on the economic decisions of households and firms (e.g., Coibion et al. [2019]; Duca et al. [2018]; D'Acunto et al. [2016]; Malmendier and Nagel [2016]; Armantier et al. [2015]).

However, while professional forecasters and financial market agents are known to monitor macroeconomic conditions more closely and are able to respond to shocks more swiftly, households seem to be less attuned to economic developments, including price changes [De Fiore et al. 2021]. Moreover, some studies have shown that economic agents in low inflation countries tend

to pay less attention and be less informed about price developments compared to those who are in high inflation economies (Coibion and Gorodnichenko [2015]; Cavallo et al. [2017]; Franche and Lluberas [2017]). The seeming lack of attention of households to market developments poses a challenge for central bank communication strategies that try to influence the inflation expectations of these economic agents.

Should central banks then give up on trying to influence the expectations of households through communication policies? Some recent studies show that, even if households do not give much attention to inflation developments and monetary policy, when they are provided with explicit information about these, their inflation expectations respond quite strongly (Coibion et al. [2020]; Armantier et al. [2012]). This implies that communication policies could still effectively affect the inflation expectations of households. Furthermore, it has been observed that communication that focuses on the inflation expectations of households leads to larger changes in perceived real interest rates, and consequently, results in more substantial effects on economic activity.

Based on the insights and results from this study, we highlight four key points for central bank communication strategy in influencing household inflation expectations.

First, households are different from professional forecasters and financial market participants when forming expectations. Professional forecasters have access to a wider set of information and they are more adept at using these to make predictions about future economic outcomes. Households are not as sophisticated and they may face information constraints. Thus, central banks may consider a communication strategy that takes these differences into consideration. Communication that targets households should be direct, clear, concise and easier to understand (i.e., less use of technical words and jargon). However, some caution needs to be taken if this kind of a communication strategy is adopted. It should not appear that the central bank is providing different messages. The key message should be the same for all economic agents. Communication that targets households could be layered to provide more simplified explanations and discussions.

Second, households have become more forward-looking in their assessment of current inflation and therefore they adjust their expectations more to new information. Also, households are observed to put more attention to price developments in certain commodities (e.g., rice, meat, gasoline, utilities) relative to others (e.g., house rents, communication, recreation). Monetary authorities could therefore emphasize different information in their communication depending on how they want to influence expectations. Additionally, households are generally observed to retain information for a short period of time (i.e., six months) and they do not renew their information sets periodically. Thus, information such as the price developments in specific commodities could only have transitory effects

on expectations. If the central bank wants the effects to be longer, it should ensure that the information or message, for example, on inflation developments or on the inflation target is communicated repeatedly.

Third, less uncertainty about future economic outcomes leads to lower expected inflation. A related finding is that household expectations are affected by their perceptions about economic and financial conditions. If they are more certain about where economic and financial conditions will be, households will have lower inflation expectations. Thus, clear communication could lead to greater certainty about current developments and on the outlook for the economy, including price developments. This becomes even more important during periods of high volatility and uncertainty. Periods of greater uncertainty may require more intensive policy communication initiatives in order to offset the potential impact of uncertainty on expectations and inflation.

Fourth, economic and learning programs for households could contribute to lower household inflation expectations. An empirical finding of this paper is that better educated households have lower inflation expectations. This is because these households are assumed to be more financially literate and are able to understand better existing economic conditions. Thus, they can form more informed expectations of future outcomes on which they base their current economic decisions. Economic and financial learning programs are a means to provide information and educate households about the various factors that they should consider when they make their decisions about consumption, savings, and investments. Policymakers can explore the use of digital platforms for learning and communication. These platforms, such as social media applications and internet websites, present opportunities for reaching a wider audience.

Greater openness and transparency of monetary policy is foreseen to further increase in the future but it will vary across central banks [Blinder 2018]. This entails better and more effective communication strategies by central banks to attain their policy objectives and to manage expectations.

6. Conclusion

In this study, we use the results of the CES, a quarterly survey of households that the BSP conducts, to evaluate whether or not survey-based subjective expectations in the Philippines deviate from rational expectations and to determine the factors that drive household expectations in the country. Based on the tests that we conducted, we find that expectation results from the CES are outperformed by naïve forecasts (which are based on lagged values of actual inflation). This indicates that households fail to consider relevant information on future inflation other than that contained in previous rate of actual inflation. However, we observe that the forecast accuracy of household inflation expectations has improved in recent years. Nonetheless, there is little evidence that expectations from the CES are characterized by rationality (i.e., unbiased and efficient). Results denote

that households do not utilize all available information and that they rely more on information about past inflation to form expectations of future inflation. Expectations are not fully, but only partly, driven by fundamentals.

Nonetheless, we note that in recent years, households seem to incorporate more information about future outcomes in their expectation formation process. Households are also more attentive to price movements of basic commodities like food items (i.e., rice, meat, fish and milk), gasoline and fuel, utilities (i.e., electricity, water), transport, and alcoholic beverages and less on price changes in house rents and in the costs of communication, recreation, and clothing. These observations signify that developments in the prices of different commodities have varying effects on households' expectations of inflation.

Using aggregated and disaggregated CES data, we explore the factors that drive household expectations in the country. Our regression results point to the potential significant effect of income conditions, perceptions on economic and financial conditions and the inflation target on the formation of household expectations in the Philippines. Moreover, we find that demographic factors (e.g., educational attainment, marital status, gender) also affect household expectations.

Our observations and findings help derive some insights for central bank communication strategy, particularly in influencing household expectations. We highlight four key points. First, households are different from professional forecasters and financial market participants when forming their expectations. Thus, central banks should consider communication strategies that take these differences into consideration. Second, households have become more forward-looking in their assessment of current inflation and therefore they adjust their expectations more to new information. Also, households are observed to put more attention to price developments in certain commodities (e.g., rice, meat, gasoline, utilities) relative to others (e.g., house rents, communication, recreation). Central banks could therefore emphasize different information in their communication depending on how they want to influence expectations. Third, less uncertainty about future economic outcomes leads to lower expected inflation. Clear communication could lead to greater certainty about current developments and on the outlook for the economy, including price developments. Thus, periods of greater uncertainty may require a more intensive policy communication initiatives to offset the possible impact of uncertainty on expectations and inflation. Fourth, economic and learning programs could contribute to lower household inflation expectations.

Expectations are an important channel in the transmission mechanism of monetary policy. Well-anchored inflation expectations allow central banks to achieve price stability and lessen the volatilities and gyrations in the economy. Thus, understanding how expectations are formed by economic agents such as households is important for monetary policy decisions and actions. As household expectations become more forward-looking, households' perceptions about future

inflation and their planned consumption decisions can potentially provide an additional means by which stabilization policies can be made effective. This study contributes to efforts to gain insights into the expectations process. The findings offer some possible benchmarks or points of comparison for observing household expectations in an emerging market economy that is under inflation targeting like the Philippines.

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Annex

**ANNEX 1. Weights by commodity group for
Consumer Price Index (CPI), 2012-based**

Commodity groups	Weights
1. Food and non-alcoholic beverages	39.34
Food, of which:	35.46
Rice	9.59
Bread and cereals (except rice)	3.86
Meat	6.25
Fish and seafood	5.74
Fruits	1.40
Vegetables	2.60
Milk, cheese, and eggs	3.08
Non-alcoholic beverages	2.88
2. Alcoholic beverages, tobacco, etc.	1.58
3. Clothing and footwear	2.93
4. Housing, water, electricity, gas and other fuels, of which:	22.04
House rent	12.88
Water	1.17
Light/electricity	4.80
Gas and solid fuels	2.63
5. Furnishings, household equipment and routine maintenance of the house	2.95
6. Health	3.89
7. Transport	8.06
8. Communication	2.93
9. Recreation and culture	1.41
10. Education	3.28
11. Restaurant, miscellaneous goods, and services	8.05
ALL ITEMS	**100.0**

Source: PSA