THE EXPECTED INFLATION STRATEGY
AND IT'S RELATED FACTORS

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Abstract

Central banks in different countries, more and more, are abandoning the monetary policy strategies and are applying the expected inflation (EI). In these paper, we be discussed the sensitiveness that countries have related to this strategy according to explained variables recommended by the literature, and then, we will add some other external variables. In this manner, we can statistically compare if there is a difference on including these variables. Also, we will rely on another point of view, by separating the countries under consideration in countries that are part of the European Union and countries that are not. Furthermore, we will rely on sharing of EI strategy into two periods based on the manner of its application. The methodology used is the probabilistic and logarithmic models, used when the dependent variable is a dummy variable. But, we also use the averages comparing test for two sets of choices. Results and recommendations that will derive will serve as an aid in decisions to be

taken by central banks and related to the factors that should consider when apply the expected inflation strategy in their countries. At last, we will offer some challenges that we will face to perform in the future.

Keywords: expected inflation, explained variables, external variables, central bank

INTRODUCTION

Expected Inflation (EI) is introduced for the first time in 1989 in New Zealand as a monetary policy strategy. Since then, many countries have applied the expected inflation strategy as an option in connection with the exchange rate and the fixed target of money supply growth (Walsh, 2009). To see whether economic, fiscal, financial or external characteristics affect the probability that there is a place to apply the expected inflation strategy as one of their monetary policy strategies, we apply probabilistic models with panel data on a sample of 50 countries and two sub-samples consisting of the EU countries and those from non-EU in the period 1985-2012. Initially, we have include some explanatory variables that are suggested by the literature, to correct any possible variables influenced by external factors. According to Carare, Stone and Lucotte, we include the level of economic development represented by the logarithm of real GDP per capita as a factor that leads to the application of expected inflation strategy. According to Lucotte, developing countries have better conditions to apply the expected inflation. Then, we include financial opening as another external factor. The high capital mobility can shift the focus from inflation to the Central Bank exchange rate, making the strategy of inflation expected a less preferred option. To measure the financial openness variable, we use Chinn and Ito index, (Chinn, Ito, 2008). As another rollover is abolishing all observations for EMU countries (European Monetary Union) after the currency zone starts. By joining the euro zone, these countries renounce their national sovereignty and delegate monetary policy to the ECB (European Central Bank). Since then, the ECB is responsible for monetary policy in the euro zone and BEM countries can not choose a monetary strategy. We have used the introduction of two different dates regarding the application of the expected inflation strategy, the soft application dates for the expected inflation strategy and the full application dates of the expected inflation strategy.

Research question

Which factors lead to the adoption of targeting inflation?

Research hypotheses

We also build the following hypothesis to answer our research question:

Ho: Variables averages (of countries with EI) - variables averages (of countries that did not apply EI) = 0.

Ha: Variables averages (of countries with EI) – variables averages (of countries that have not applied EI) ≠ 0.

METHODOLOGY

We assume that EI is a binary variable. Following the approaches of O'Sullivan and Tomljanovich, we build an EP index. The leveraged variable assumes 0 and 1 values as related to the monetary policy strategy a country will select to apply. Value 0 corresponds to an inflation strategy without an expected target and value 1 corresponds to EI with a single expected target. During each year, a country chooses whether to apply EI or will apply another alternative to a non-EI targeting strategy. In the model we use the dependent variable yit is a dummy variable that assumes value 1 if the country adopts EI in year t, and 0 in reverse. The basic model has a general structure:

$$y_{it}^* = \alpha + \beta * MAK_{i,t-1} + \gamma * FISK_{i,t-1} + \delta * FIN_{i,t-1} + \varepsilon_{it}, \dots i = 1,\dots N,\dots t = 1,\dots T_i$$

Ku
$$y_{it} = \begin{cases} 1\dots\dots if\dots y_{it}^* > 0 \\ \\ 0\dots\dots if\dots y_{it}^* \le 0 \end{cases}$$

Ti is the year of EI application for those countries that have applied EI and the last year in the sample for countries that have not yet applied EI during the analysis period; α is a costly term; B, γ, δ are the parameters estimation vectors; Eit is a normal, independent and symmetric distribution error, with mean zero (0) and variance one (1); And Xi, t-1 ≡ [M Ak, t-1, F I SKi, t-1, F I Ni, t-1] are the explanatory variables. By following the previous studies, we include explanatory variables with a one-year delay to avoid potential endogenousness.

The probability of applying the EI strategy is formulated as follows:

$$P(y_{it} = 1 \mid X_{i,t-1}, \mu_i) = \Phi\left[\alpha + \beta * MAK_{i,t=1} + \gamma * FISK_{i,t-1} + \delta * FIN_{i,t-1} + \mu_i\right]$$

Where, Φ is a cumulative standart distribution of distribution function.

The explanatory variables are classified into three groups: (1) macroeconomic factors (MAKi, t-1): inflation, growth and volatility, flexible exchange rate and exchange rate volatility; (2) fiscal factors (FISKi, t-1): fiscal balances and government debt; (3) financial factors (FINI, t-1): financial instability, financial structure and financial development.

ANALYSIS AND FINDINGS

The results founded in Table 1, shows that, countries before applying EI strategy, had higher inflation, lower output growth rates, as well as higher exchange rate volatility. Also these countries before applying EI strategy had flexible exchange rates.

Comparison tests of financial variables evoke that countries often pass financial crises before applying EI and have fewer developed financial markets than countries that have not applied EI. EI countries have a market-based financial system other than countries with unexpected inflation. By a different point of view, looking at EU countries and non-EU countries, the test show that, the average difference between the EI and the non-expected inflation rates is statistically significant for all variables, except for the output growth.

Table 1. Descriptive Statistics — Averaging comparison tests

Variables	All countries			UE countries			Non-UE countries		
	EI	Non-EI	P-value	Non-EI	EI	P-value	EI	Non-EI	P-value
Inflation	0.14	0.06	0.00	0.11	0.04	0.00	0.19	0.10	0.00
Output growth	4.23	4.33	0.00	3.50	3.45	0.40	4.57	6.15	0.00
Output volatility	8.01	10.19	0.00	9.55	10.25	0.00	7.32	8.38	0.00
Flexible exchange rate regime	0.25	0.20	0.00	0.35	0.28	0.01	0.56	0.20	0.00
Exchange rate volatility	3.50	2.55	0.00	1.13	0.85	0.00	2.26	1.80	0.00
Fiscal balance	-1.80	-2.54	0.06	-1.78	-2.95	0.01	-1.60	-1.55	0.70
Government debt	8.45	55.51	0.00	37.81	65.25	0.00	47.9	55.15	0.25
Financial instability	0.29	0.20	0.00	0.29	0.20	0.03	0.40	0.31	0.02
Market-based financial structure	0.45	0.33	0.00	0.55	0.44	0.00	0.49	0.32	0.00
Financial development	0.49	0.80	0.00	0.75	0.99	0.00	0.38	0.58	0.00

Now we appreciate the model that we have built. Before we evaluate the model, we apply one-root tests for panel data, in order to control the stationarity of the explanatory variables, and beginning from the results given in Table 2, we use Fisher's tests for unbalanced data.

From the results of the table 3, we may note that, there is no heterogeneity between countries since the random effects are irrelevant in this model. In this manner, we evaluate a pooled probit model. But, since estimate probabilities in the probit model can't be interpreted directly, we report the average marginal effects, as in Table 3.

Table 2. One-Root Tests for Panel Data

	ADF-Fisher		PP-Fisher	
	Test-value	P-value	Test-value	P-value
Inflation	300.25	0.00	380.57	0.00
Output growth	290.99	0.00	285.36	0.00
Output volatility	416.38	0.01	450.28	0.01
Flexible exchange rate regime	499.22	0.00	510.50	0.00
Exchange rate volatility	260.77	0.00	258.82	0.00
Government debt	450.25	0.00	550.50	0.00
Trade openness	320.46	0.00	350.91	0.00
External debt	250.50	0.00	270.95	0.00
Financial development	140.39	0.02	88.22	0.45
Economic development	710.77	0.01	539.44	0.02

ADF (Augmented Dickey–Fuller test) (testi i zgjeruar Dickey – Fuller) ose testin **PP** (Phillips–Perron test).

Table 3. Factors that lead to EI application

	(1) Datat e IBP		(2) Datat e IDPP	
Inflation	−0.331	**	−0.450	***
	(0.00)		(0.00)	
Output growth	−0.029		−0.047	**
	(0.070)		(0.004)	
Output volatility	0.004	**	0.004	
	(0.001)		(0.051)	
Flexible exchange rate regime	0.011	**	0.008	
	(0.009)		(0.059)	
Fiscal balance	0.003		0.004	
	(0.051)		(0.063)	
Government debt	−0.002	**	−0.002	**
	(0.000)		(0.000)	
Trade openness	0.000		0.000	
	(0.102)		(0.091)	
External debt	−0.0002		−0.0002	
	(0.060)		(0.065)	
Financial development	−0.067	**	−0.055	**
	(0.001)		(0.009)	
Numri i observimeve	450		500	
Log-likelihood	−79.69		−75.81	
R^2	0.25		0.39	
Wald χ^2	25.99**		21.85**	

Column (2) shows the estimated results for the soft application dates of the EI strategy and the column (3) shows the full EI application dates of the IPP, respectively IBP and IDPP.

The previously results show that inflation, government debt and financial development are important factors in applying EI as in the soft dates of this application, as well as on full-featured dates to apply this strategy. While leverage volatility and exchange rate volatility are important variables during the sight EI application, but as countries apply this strategy with all rights, these variables are no longer statistically significant. While the output increase variable, even if it is not important during the mild EI application, becomes important during its full-fledged application. Equally, other variables such as fiscal balance, trade openness and external debt are not statistically significant, therefore they do not play any major role in applying the EI strategy.

But as we have pointed out in the beginning, we share our sample in EU and non-EU countries. Knowing that these two groups of countries have different macroeconomic characteristics, which may consequently follow different monetary policy objectives. For this reason, we see the results of Table 4. In the column (1) table shows the sample of all countries, including countries that are part of the EU and countries that are not part of the EU. Column (2) shows the sample of EU countries and recently the column (3) shows the sample of non-EU countries.

EU and non-EU countries, if they have low inflation, flexible exchange rates and low government debt, have more opportunities to apply the EI strategy. Observing the trade opening variable, we may conclude that, this variable is significant in EU countries and not significant in non-EU countries. The Financial development is insignificant in the sample of non-EU countries.

While the fiscal balance is unimportant for the three-sample samples and sub-samples taken into consideration. We note that the results for the sample of EU countries are similar to the results of the whole sample when we did not split, while for the sample of non-EU countries other results are produced. For this sample, all the variables under consideration are almost irrelevant.

Through this analysis, we show that our results are self-sustained with few modifications. So, we found out that the factors that lead a central bank to EI application vary widely between countries that are part of the EU and non-part of the EU. Countries that are not part of the EU before applying IP have different characteristics from EU countries. One of the main changes is the selection of multi-objective EI and the selection of EI with a single target.

Table 4. Sensitivity analysis

	(1) EU-Countries and Non EU-Countries	(2) EU-Countries	(3) Non EU-Countries
Inflation	−0.621 **	−1.235 **	−0.300
	−0.003	−0.004	−0.002
Output growth	0.004 **	0.0055 **	0.0003
	(0.010)	(0.009)	(0.071)
Flexible exchange rate regime	0.020 **	0.045 **	0.003
	(0.001)	(0.008)	(0.086)
Fiscal balance	0.003	0.003	−0.004
	(0.054)	(0.075)	(0.085)
Government debt	−0.002 **	−0.003 **	0.0003
	(0.000)	(0.001)	(0.085)
Trade openness	0.000	0.001 **	−0.0002
	(0.110)	(0.023)	(0.134)
Financial development	−0.050 **	−0.080 **	0.030
	(0.003)	(0.004)	(0.083)
Log-likelihood	−90.55	−40.50	−30.95
R^2	0.25	0.45	0.34
Wald χ^2	29.58 **	50.59 **	22.15 **

CONCLUSIONS

Regarding the entire countries sample, only the fiscal balance variable confirmed the hypothesis Ho, so there was no significant change for both countries that had applied EI and for countries that had not applied EI. Whereas all the other variables rejected the Ho hypothesis, there was a significant difference between the average values of variables between the countries that applied the EI and those who did not apply it. Related to the EU countries, the average value difference of the output growth variable was not significant, while for all other variables this difference was statistically significant. But, if we notice the results of the sample of non-EU countries, this is not the case.

For this sample we have two variables that prove the basic hypothesis. The fiscal balance variable and the government debt variable. So, only for these variables there is no significant difference between the countries that have applied the EI and those who have not applied it. Related to the other variables there is a statistically significant difference. As for the dates of application of EI with limited or full rights we have that inflation, government debt and financial development are all three statistically significant variables, as for countries with mild

inflation expectations also for inflation-stricken countries Expected with full rights. Output volatility and exchange rate volatility variables are significant only at the mild EI application stage and become statistically insignificant at the time a country is applying full-fledged EI. While the output growth variable, which is not important for countries that have applied expected soft inflation (ESI) becomes statistically significant at the time whene countries apply the full-fledged EI strategy.

As to the allocation of countries that are part of the EU and non-EU countries, we have different variables that influence the application of the EI strategy. If for the EU countries important variables to apply the EI strategy are almost all except the fiscal balance, it does not happen the same with non-EU countries. For non-EU countries none of these variables is significant. That depends on the type of EI EU and non-EU countries prefer to apply.

Given the fact that the previous literature sets out some factors influencing the chances of applying EI for one country, we have determined several other factors that point countries towards applying the expected inflation strategy. We use a more extensive sample of countries under consideration, more than other empirical articles in this area to precisely study the statistical significance of macroeconomic, fiscal and financial factors related to EI application.

Our findings suggest that countries with low inflation, significant growth in output, exchange rate volatility, low-growth financial markets and a market-based financial system are more likely to apply EI. Also, empirical results show that there are differences between variables that lead to the application of EI between EU countries and non-EU countries. Low inflation, low government debt, a variable exchange rate regime and low financial development are linked to EI application from non-EU countries

SCOPE FOR THE FUTURE

In the future, we also think of studying the econometric spatial aspect of empirical investigations related to EI application, where empirical models are assessed according to maximum likelihood and recursive-importance-sampling methods. We will study monetary policy strategies at the same time with the models of multinomial choice.

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