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Asymmetric Dynamics of Insurance Premium: The Impact of Monetary Policy Uncertainty on Insurance Premiums in Japan

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Abstract:

By employing a non-linear autoregressive distributed lag (NARDL) model, this study investigates the effect of monetary policy uncertainty on insurance premium per-capita in Japan. Asides the confirmation of a long-run relationship between monetary policy uncertainty, insurance premium per-capita and real income per-capita, we also find that a positive relationship exists between monetary policy uncertainty and insurance premium per-capita. This shows that when economic policy uncertainty increases (decreases) then insurance premiums increases (decreases) in response. Moreover, we discovered that monetary policy uncertainty impacts insurance premium per-capita in an asymmetric way, such that negative changes have a bigger effect than positive changes on total insurance premium per-capita in Japan. We also found that real income per-capita has a significant and positive effect on insurance premium per-capita, and that the long run elasticity of insurance premium per-capita real income per-capita is smaller than unit. This implies that insurance is a necessity and not a luxury in Japan.

Keywords: Monetary Policy Uncertainty, Insurance Premiums, NARDL
JEL Classifications: C32, G22, O16

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I. Introduction

The interconnected complexities between economic policy uncertainties and financial markets were brought to prominence by the global financial crisis. Fiscal, monetary and regulatory policy uncertainties in Europe and the United States were touted as parts of the cause of global financial crisis of 2007–2009 and the slow rate of recoveries from the crisis (Baker et al. 2016). As a result, researchers and policy makers are paying closer attention to the effect of economic policy decisions taken by political leaders and the related uncertainties on financial market performance in general (predominantly stock market and banking sector). Examples include studies by Antonakakis et al. (2012), Pástor and Veronesi (2013), Arouri et al. (2016), Chen et al. (2016), Li et al. (2016), and Christou et al. (2017) on the impact of economic policy uncertainty on stock returns, and studies by Gilchrist et al. (2014), Bordo et al. (2016), Caldara et al. (2016), Berger et al. (2017), and Lee et al. (2017) on the role played by economic policy uncertainty in the banking sector.

Some studies have also particularly researched how the insurance sector reacts to uncertainties in economic policy (see Gupta et al. 2016, Balcilar et al. 2017). Existing literature on this relationship is however still limited. Yet, a deeper examination of the insurance sector is necessary for two reasons: (1) Gupta et al. (2016) posit that since economic policy uncertainties generally exert some pressure on economic activities, it is logical to assume that it will also have some influence on insurance purchasing behavior, and (2) the large volume of funds circulating in the insurance sector (the global insurance premium stood at approximately 3.6 trillion euros in 2016) makes it a prime candidate for detailed evaluation as any crisis in such a huge sector will have dire consequences on the entire economy.

In an attempt to bridge the identified gap, we explore the effect of economic policy uncertainty on insurance premiums in Japan, being the second largest insurance market worldwide. We do this by focusing specifically on how uncertainties in monetary policy (one of the major components of economic policy) impacts insurance premiums within the country.

In general, premiums collected by insurers are used to fund investments in guaranteed or low risk securities due to regulatory restrictions and profits are made from interest and returns on these investments. Claims made against insurance companies are paid from the investment pool. The possibility that actual returns may differ from expected returns increases when monetary policy uncertainty increases. Such differences mean that insurers stand the chance of losing substantial portions of their investment.

Furthermore, assertions have been made that the adjustment dynamics in the insurance sector is not symmetric in nature (Harrington and Niehaus, 2000). As an example, Jawadi et al. (2009) particularly claim that the adjustment dynamics of non-life insurance premiums in several countries—Japan inclusive—is asymmetric and non-linear. We therefore take the adjustment dynamics of insurance premiums in Japan into account in our analysis.

This study contributes to the existing literature in three ways. First, we provide additional insight into the sparingly researched economic policy uncertainty-insurance sector relationship. Second, we provide a more detailed analysis of the relationship by disaggregating economic policy uncertainty into its principal components and testing how monetary policy uncertainty, which is one of the major components, influences insurance premiums. Third, we split the monetary policy uncertainty into multiple partial sum series, thus allowing for clearer understanding of the asymmetric nature of the relationship.

The rest of this study is organized as follows; Section-II provides an explanation of the methodology and data used, Section-III presents the results, and the final section is the conclusion with policy implications.

II. Data and Methodology

The bulk of the existing theoretical and empirical literature on the insurance market is based on conventional linear model specifications. The existence of asymmetry in the insurance market has however been suggested. We therefore account for asymmetry in this study.

Most of the available literature on asymmetry revolves around the commonly used regime-switching models—the threshold ECM (Balke and Fomby, 1997), Markov-switching ECM (Psaradakis et al. 2004) and the smooth transition regression ECM (Kapetanios et al. 2006). A common problem with these models is that identification of regime-switching variables and determination of the transition functional forms are not easy procedures (Saikkonen 2008, Shin et al. 2014).

Recently, Shin et al. (2014) pioneered an easier and more flexible non-linear autoregressive distributed lag (NARDL) cointegration methodology. The NARDL model is an extension of the linear autoregressive distributed lag (ARDL) cointegration methodology introduced by Pesaran et al. (2001). The NARDL model is founded on an unrestricted error correction model, and uses positive-negative partial sum decompositions, thus providing a means of detecting both short-run and long-run asymmetric effects. It distinguishes clearly between relationships; for example, the existence of either only a long-run asymmetry, or only a short-run asymmetry, or a combination of both.

Other benefits of the NARDL model include the following; its results remain valid regardless of the integration order of the variables (whether, I (0), I (1) or a mixture of both), distinction can be made between linear cointegration, non-linear (asymmetric) cointegration and non-cointegration, the asymmetric cumulative dynamic multipliers provide a means of measuring the asymmetric adjustment patterns following positive and negative shocks to the dependent variables. This study thus adopts the NARDL methodology.

Although the NARDL model produces valid estimates regardless of whether the variables are I(0), I(1) or a combination of both, it however becomes ineffectual in the presence of variables integrated of orders higher than I(1) (Ouattara, 2004). We thus begin by carrying out the DF-GLS unit root test of Elliot et al. (1996) and the KPSS unit root test proposed by Kwiatkowski et al. (1992) to determine the order of integration of the variables. The choice of the DF-GLS unit root test is on the basis of its superiority to other widely used tests such as the augmented Dickey Fuller test and the Phillips-Perron test. The DF-GLS test has been shown to produce the best overall performance in terms of power and small sample size. The KPSS test on the other hand is simply used as a confirmatory test because of its null of stationarity.

The augmented DF-GLS test is conducted by estimating a standard ADF test equation using the generalized least square detrended y_t in place of original y_t.

$$\Delta y_t^d = \alpha y_{t-1}^d + x_t'\delta + \beta_1 \Delta y_{t-1}^d + \cdots + \beta_p \Delta y_{t-p}^d + v_t \qquad (1)$$

And evaluated using the t-ratio for $\hat{\alpha}$ under a null of unit root. The KPSS test statistic is based on the residuals obtained from the regression equation below:

$$y_t = x_t'\delta + u_t \qquad (2)$$

And the LM test statistic is given as: $LM = \sum_t \frac{s(t)^2}{(T^2 f_0)}$.

Although the DF-GLS and KPSS unit root tests are commonly used in determining the order of integration of variables, their results are subject to errors when structural breaks are present in the series. Not properly accounting for structural breaks may result in falsely failing to reject the null of unit root (Perron 1986). We therefore also carry out unit root testing with structural breaks. Following Perron (1989), the general Dickey-Fuller test equation which accommodates structural break is estimated and the t statistic is used to compare α to 1.

$$y_t = \mu + \beta t + \theta Du_t(T_b) + \gamma DT_t(T_b) + wD_t(T_b) + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + u_t \qquad (3)$$

To examine the impacts of monetary policy and income level on insurance premiums per capita, the following model is specified.

$$TIPPC_t = \alpha_0 + \alpha_1 MPU_t + \alpha_2 GDPPC_t + \varepsilon_t \qquad (4)$$

Where; $TIPPC_t$ refers to the log of total insurance premium per-capita, MPU_t represents the log of monetary policy uncertainty, $GDPPC_t$ is the log of gross domestic product per-capita, α_0 is the constant term, α_k(k = 1, 2) are the coefficients on independent variables and ε_{it} stands for an iid process with zero mean and constant variance.

To capture the effect of positive and negative changes in monetary policy uncertainty, the series is decomposed around a zero threshold value into 2 (positive and negative) series thus:

$$MPU_t = MPU_0 + MPU_t^+ + MPU_t^- \qquad (5)$$

where:

MPU_t is log of monetary policy uncertainty, MPU_0 is initial value of monetary policy uncertainty $MPU_t^+ = \sum_{j=1}^{t} \Delta MPU_j^+ = \sum_{j=1}^{t} \max(\Delta MPU_j, 0)$ is partial sum process of positive changes in log of monetary policy uncertainty. $MPU_t^- = \sum_{j=1}^{t} \Delta MPU_j^- = \sum_{j=1}^{t} \min(\Delta MPU_j, 0)$ is partial sum process of negative changes in log of monetary policy uncertainty.

In line with Schorderet (2003) and Shin et al. (2014), an asymmetric long run regression equation is next specified:

$$TIPPC_t = +\alpha_1^+ MPU_t^+ + \alpha_1^- MPU_t^- + \alpha_2 GDPPC_t + \varepsilon_t \qquad (6)$$

Where:

'+' and '-' superscripts = positive and negative changes

α_1^+ and α_1^- = associated asymmetric long run parameters

Next we specify the NARDL model in an error correction form to give an NARDL-ECM model:

$$\Delta TIPPC_t = \rho_0 + \rho_1 TIPPC_{t-1} + \beta_1^+ MPU_{t-1}^+ + \beta_1^- MPU_{t-1}^- + \beta_2 GDPPC_{t-1} +$$
$$\sum_{i=1}^{p} \gamma_i \Delta TIPPC_{t-1} + \sum_{i=0}^{q} \Pi_i^+ \Delta MPU_{t-1}^+ + \sum_{i=0}^{r} \Pi_i^- \Delta MPU_{t-1}^- + \sum_{i=0}^{s} \theta_i \Delta GDPPC_{t-1} + \varepsilon_t \qquad (7)$$

where,

ρ_0 = Intercept

ρ_1 = Coefficient of error correction term (feedback coefficient)

Π_j^+ and Π_j^- = measures of short run adjustments to changes in oil prices

$\alpha_1^+ = -\beta_1^+/\rho_1$ and $\alpha_1^- = -\beta_1^-/\rho_1$ represent the long run elasticities

Equation 8 is then estimated using ordinary least squares regression. The short-run and long-run symmetry given as ($\sum_{j=0}^{q-1} \Pi_j^{+}$=$\sum_{j=0}^{q-1} \Pi_j^{+}$) and ($\beta_1^{+} = \beta_1^{-}$) respectively, are tested through the Wald tests. We afterwards test for asymmetric cointegration between the variables using bounds testing approach. This is done by applying the non-standard F_{PSS} test of Pesaran et al. (2001) in which a null of no cointegration ($\rho_1 = \beta_1^{+} = \beta_1^{-} = \beta_2 = 0$) is tested against an alternative of cointegration ($\rho_1 \neq \beta_1^{+} \neq \beta_1^{-} \neq \beta_2 \neq 0$). Failure to reject the null hypothesis reduces the NARDL-ECM model to a regression model in only first differences. This is an indication of the absence of a long-run relationship between $TIPPC_t MPU_t^{+}$, MPU_t^{-} and $GDPPC_t$. Finally, the asymmetric dynamic multiplier impact of unit changes in MPU_t^{+} and MPU_t^{-} on $TIPPC_t$ is captured thus:

$$M_{mpu,h}^{+} = \sum_{j=0}^{h} \frac{\partial TIPPC_{t+j}}{\partial MPU_t^{+}} \quad \text{and} \quad M_{mpu,h}^{-} = \sum_{j=0}^{h} \frac{\partial TIPPC_{t+j}}{\partial MPU_t^{-}}$$

and by construction: $M_{mpu,h}^{+} \rightarrow \beta_{1,MPU}^{+}$ and $M_{mpu,h}^{-} \rightarrow \beta_{1,MPU}^{-}$

To determine the asymmetric impact of monetary policy uncertainties on total insurance premium per-capita, we construct an annual time-series data set of Japanese total insurance premiums per-capita, monetary policy uncertainty and gross domestic product per-capita. The data set covers the period 1987-2016. Several studies have confirmed real income as the most important driver of the insurance sector performance (Beck and Webb 2003, Li et al. 2007, Lee et al. 2010). We therefore include real income as a control variable in our analysis.

Data on Japanese total insurance premium per-capita was obtained from 'Swiss Re, Sigma database'. The monetary policy uncertainties indexes are downloaded from http://www.policyuncertainty.com/japan_monthly.html.12-month averages were taken to convert the economic policy uncertainty monthly values into yearly values. Gross domestic product per-capita data was sourced from the 'World Development Indicators' (http://data.worldbank.org).

Figure 1 graphs the pattern of monetary policy uncertainty in Japan for the period studied. Some important highpoints are visible from the graph. First is the period of the First Gulf War (1990-1992). Another highpoint is visible around 1995. This corresponds to a period of financial crisis in

Japan when thirteen Japanese financial institutions went effectively bankrupt. A spike is also noticeable around the period of the Asian financial crisis of 1997. Another spike is detectible around the period of the Asian financial crisis of 2002 when a meltdown of the Tokyo and Hanseong Stock Exchanges was witnessed. The highpoint around 2008 corresponds to the period of global financial crisis and the highpoint around 2011 corresponds to the period of the great tsunami in Japan. Figure 2 shows the trend of total insurance premium per-capita in Japan. An upward trend was witnessed between the late 80s and mid 90s, a downward trend was experienced between the mid 90s and late 2000s, with the lowest point visible around the period of the global financial crisis. Beyond this point, an upward trend is again visible.

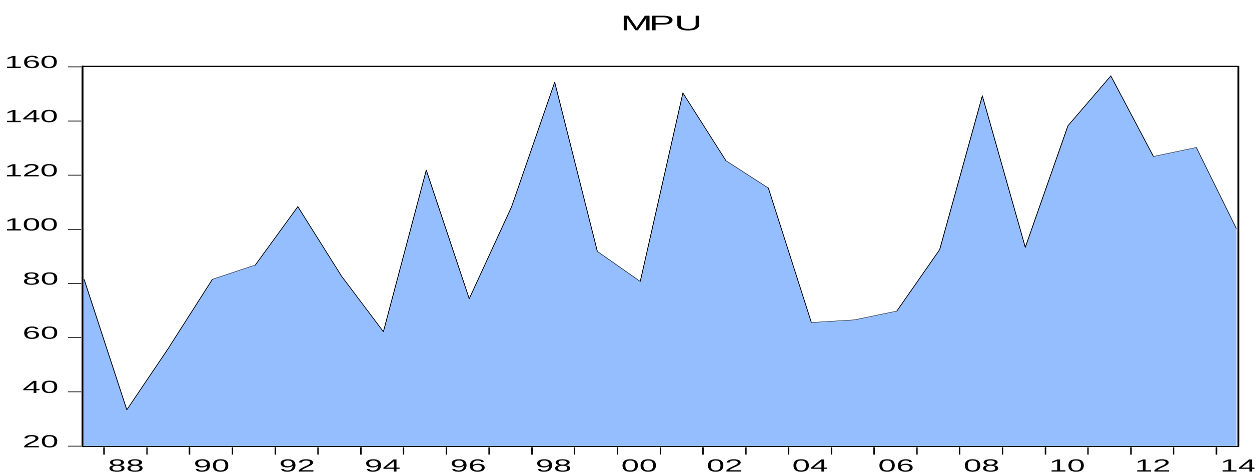

Figure 1. Graph of monetary policy uncertainty index in Japan

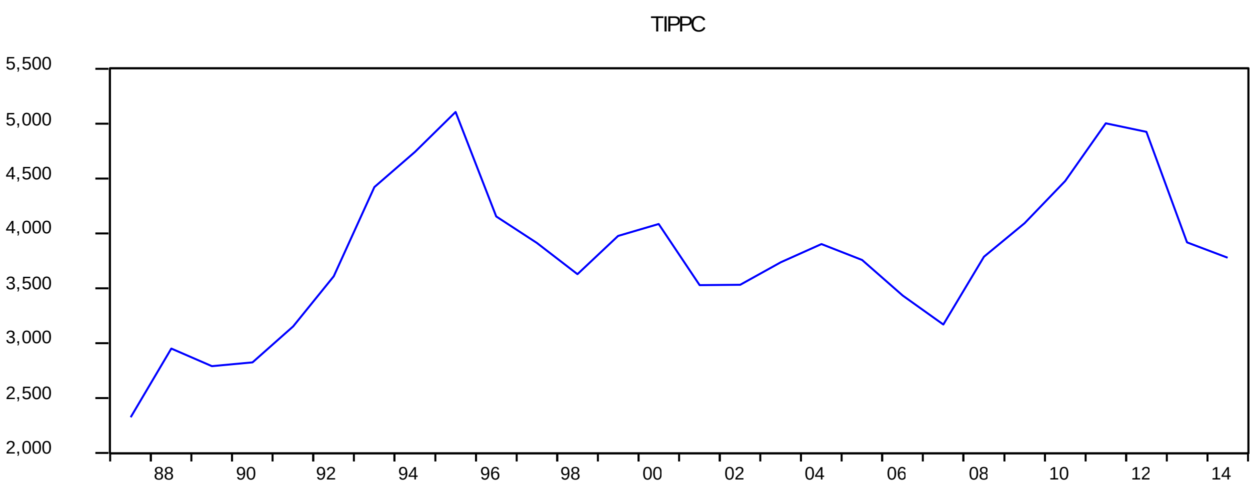

Figure 2. Graph of total insurance premium per-capita in Japan

III. Empirical Results

Although the NARDL methodology does not require all the variables to be integrated of the same order, thus allowing the mixture of I(0) and I(1) variables, the computed F_{pss} statistics however become invalid when any of the variables is integrated of an order higher than I(1). There is thus the need to confirm the order of integration of our variables. Table-1 reports the results from the DF-GLS and KPSS unit root tests. The test results indicate that none of the variables are integrated of an order higher than one. Total insurance premium per capita and gross domestic product per capita are both stationary after first difference while monetary policy uncertainty is stationary at level.

Table 1. Conventional unit root test results

	LEVELS				FIRST DIFFERENCES			
	Constant		Constant & Trend		Constant		Constant & Trend	
	DF-GLS	KPSS	DF-GLS	KPSS	DF-GLS	KPSS	DF-GLS	KPSS
TIPPC	-1.609	0.347*	-2.585	0.146**	-3.616***	0.200	-3.986***	0.074
GDPPC	-0.686	0.400*	-2.596	0.148**	-3.622***	0.320	-4.502***	0.099
MPU	-3.467***	0.427*	-4.353***	0.119*	-2.665***	0.101	-5.358***	0.092

*Note: *, ** and *** mean statistic relationship significant at 10%, 5%, 1%, respectively*

Results of the conventional unit root tests like DF-GLS and KPSS are prone to errors in the presence of structural breaks. To guard against this problem, following Phillip Perron (1986), we further apply unit root testing that is robust to structural break. The results are presented in Table 2. The results again confirm that none of the variables are integrated of an order higher than one. Both total insurance premium per-capita and gross domestic product per-capita are again shown to be stationary at first difference and monetary policy uncertainty again turns out as stationary at level.

Table 2. Unit root tests with structural breaks

Variables	Levels: Constant	Levels: Constant & Trend	First differences: Constant	First differences: Constant & Trend
TIPPC	-3.173	-3.578	-4.683**	-4.667*
GDPPC	-3.578	-4.051	-6.238***	-6.849***
MPU	-4.253*	-5.356***	-7.325***	-7.198***

*Notes: (1) *, ** and *** mean statistic relationship significant at 10%, 5%, 1%, respectively ; (2) The break type is innovation outlier (3) Break point selection is Dickey-Fuller min-t (4) Lag length method is F-statistic.*

To determine if long-run relationships exist between the variables, we also test for asymmetric cointegration amongst total insurance premium per-capita, monetary policy uncertainty and gross domestic product per-capita. The results are reported in Table-3. The F_{pss} statistic is larger than upper boundaries at 5% significance level, thus leading to the rejection of the null-hypothesis of no cointegration. We thus conclude that cointegration exists amongst the variables.

Table 3. Bounds test for cointegration in the non-linear specification

		10%		5%		1%		
Dependent variable	F-Statistics	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	Conclusion
TIPPC	$F_{PSS} = 5.364$	3.17	4.14	3.79	4.85	5.15	6.36	Cointegration

Notes: (1)F_{PSS}-Nonlinear denote the PSS F-statistic testing the null hypothesis: $\rho_1 = \beta_1^+ = \beta_1^- = \beta_2 = 0$; (2) K=2: (3) I (0) represents lower bound and I (1) represents upper bound.

After confirming the order of integration of the variables and establishing the presence of asymmetric cointegration in all cases, we proceed to selecting the best specification of the NARDL model for the insurance market. Table-4 presents the Wald test statistics for the null hypothesis of long- and short-run symmetries in the NARDL-ECM. The results from the long-run asymmetry tests show that monetary policy uncertainty affects total insurance premium per-capita in an asymmetric way. The result is significant at 5%. No short-run asymmetric effect is however detected from monetary policy uncertainty to total insurance premium per-capita.

Table 4. Long-run and short-run asymmetry tests

	W_{LR}	W_{SR}	Conclusion
TIP			
MPU	4.984** (0.047)	1.195 (0.298)	NARDL with LR asymmetry

*Notes: (1) WSR and WLR refer to the Wald statistics for the short- and long-run symmetry null hypotheses. (2) The numbers in the brackets are the p-values. (3) ***, **, and * indicate rejection of the null of symmetry at the 1%, 5%, and 10% levels, respectively.*

Having found evidence of asymmetry, we next analyze the long-run and short-run dynamics. Table 5 reports a summary of outcomes of the NARDL estimation. A non-linear ARDL (3, 2) model with MPU long-run asymmetry was estimated. The asymmetric long-run coefficients [L^{+}_{MPU} and L^{-}_{MPU}] are both positive and significant. Specifically, a 1% increase in monetary policy uncertainty will increase total insurance premium per-capita by 0.408% and a 1% decrease in monetary policy uncertainty will decrease total insurance premium by 0.481%. Negative changes in monetary policy uncertainty significantly affect total insurance premium per-capita more than positive changes, and results are significant at 5%. This is in consonance with the conclusion reached by Gupta et al. (2016) that total insurance premiums increase with increases in uncertainty. This finding suggests that because actual returns may differ from expected returns when monetary policy uncertainty increases, Japanese insurers will charge higher premiums in order to keep profit level constant. Also, in order to assume higher risks as a result of increased uncertainty, Japanese insurers will charge a risk premium.

The results also indicate that a positive relationship exists between real income per-capita and total insurance premium per-capita. The result further shows that insurance is a necessary good in Japan. Specifically, a percentage increase in GDPPC will result in 0.769% increase in total insurance premium per-capita. Since insurance is a necessary good in Japan, it is less sensitive to price changes. Thus, insurance demand will not fall enough to cause a decline in total volume of insurance premium in response to higher premiums being charged. Overall, the total volume of insurance premiums in Japan will rise. The opposite happens when monetary policy uncertainty decreases in Japan.

The insignificant short-run coefficients for monetary policy uncertainty confirm the absence of short-run asymmetry in our data-series. Results from the diagnostic tests conducted provide no evidence of any of the following problems: error normality, serial-correlation, functional misspecification and heteroscedasticity at 10% significance level. This is an indication that the model does not suffer from error normality, serial-correlation, functional misspecification and heteroscedasticity.

Table 5. Nonlinear ARDL estimation results and diagnostic checks.

$TIPPC_{t-1}$	-0.670[0.007]
MPU_{t-1}^{+}	0.274[0.056]
MPU_{t-1}^{-}	0.322[0.019]
$\Delta TIPPC_{t-1}$	0.513[0.047]
$\Delta TIPPC_{t-2}$	0.225[0.374]
ΔMPU_{t-1}^{+}	0.168[0.193]
ΔMPU_{t-2}^{+}	0.082[0.510]
ΔMPU_{t-1}^{-}	-0.007[0.964]
ΔMPU_{t-2}^{-}	-0.149[0.333]
LGDPPC	0.769[0.067]
$Constant$	-2.627[0.085]
L_{MPU}^{+}	0.408[0.021]
L_{MPU}^{-}	0.481[0.054]
R^2	0.590
χ_{SC}^2	9.116[0521]
χ_{HET}^2	0.887[0.346]
χ_{FF}^2	0.224[0.378]
χ_{NORM}^2	0.751[0.687]

Notes: (1) The p-values of statistical tests are in brackets. (2) L^{+}_{X} and L^{-}_{X} indicate the positive and negative long-run coefficients respectively. (4) NARDL models are selected according to the Akaike and Schwarz information criteria. (5) χ_{SC}^2 is the Breusch-Godfrey serial correlation test statistic, χ_{HET}^2 is theBreusch-Pagan heteroscedasticity test statistic, $\chi_{FF}^2$is the RESET test in Ramsey's test for functional misspecification, χ_{NORM}^2 is the Jarque-Bera test on normality.

The short-run adjustment to positive/negative shocks in monetary policy uncertainty is examined through the dynamic multipliers. First, we check the dynamic multipliers for the asymmetric adjustment of total insurance premium per-capita from its initial long-run equilibrium to new long-run equilibrium overtime after positive (negative) shocks to monetary policy uncertainties. As a robustness check, we again check the dynamic multipliers for total insurance premium per-capita when disaggregated into life and non-life insurance premium per-capita. Figures 3-5 present the predicted asymmetric dynamic multipliers for total, life and non-life insurance premiums per-capita respectively. The predicted asymmetric path in figure 3 indicates a bigger impact of a unitary decrease in monetary policy uncertainty after the 4th period as shown by the confidence bands. Figures 4 and 5 show that the patterns of adjustment of both life and non-life insurance premiums per-capita closely follow the pattern revealed for total insurance premium per-capita.

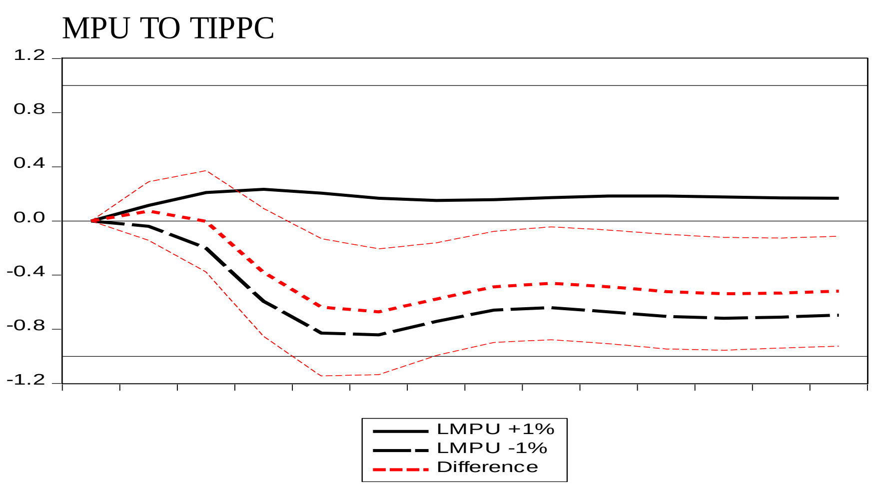

Figure 3. Response of total insurance premium per-capita to shock in MPU.

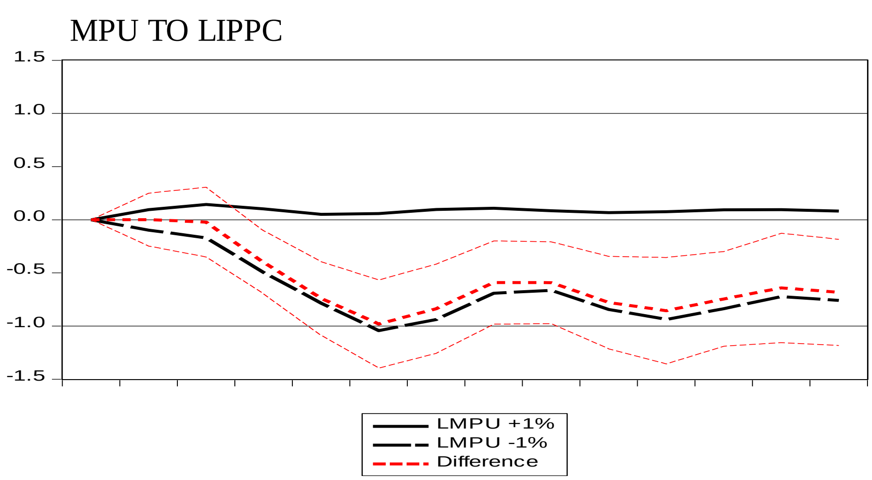

Figure 4. Response of life insurance premium per-capita to shock in MPU.

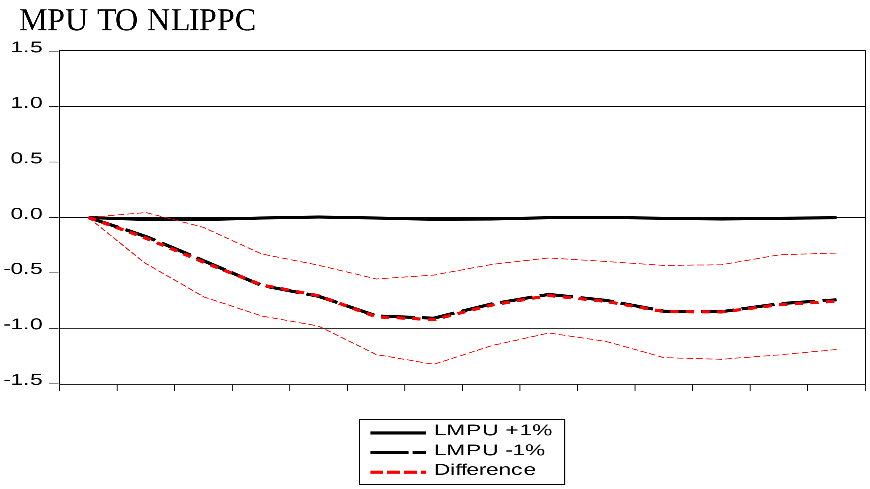

Figure 5. Response of non-life insurance premium per-capita to shock in MPU.

IV. Conclusion and Policy Implications

This research examines the asymmetric interactions between monetary policy uncertainties and insurance premiums in the Japanese economy for the period of 1987-2016. The investigation of this interaction is crucial especially for a country like Japan which has the second biggest insurance market in the world.

Moreover, extant literature on the insurance sector has predominantly adopted conventional linear estimation techniques, whereas by accounting for possible intrinsic asymmetries/nonlinearities, greater insight may be gleaned. More importantly, a failure to take asymmetry into consideration when it in fact exists could lead to misleading inference.

To address these issues, we employ the recently introduced NARDL methodology in determining the asymmetric short- and long-run inter-linkages between monetary policy uncertainty and insurance premiums in the Japanese economy between the periods 1987 and 2016.

Our findings reveal the following:

First, cointegration was confirmed between monetary policy uncertainty, gross domestic product per-capita and total insurance premium per-capita. We therefore provide evidence that economic policy uncertainty shares a long-run relationship with insurance premium per-capita in Japan.

Second, we discovered that a positive relationship exists between monetary policy uncertainty and insurance premium per-capita in Japan. This shows that when economic policy uncertainty increases (decreases), insurance premiums increase (decrease) in response.

Third, we found that the long run elasticity of insurance premium per-capita with gross domestic product per-capita is smaller than unit. Since insurance premiums represent expenditure on insurance policy, this implies that insurance is a necessity and not a luxury in Japan.

Fourth, the dynamic adjustments of Japanese insurance premiums contain some level of asymmetry. We found that monetary policy uncertainty affects total insurance premium per-capita in an asymmetric way. Specifically, negative changes in monetary policy uncertainty have a bigger effect on total insurance premium per-capita than positive changes. This means that declining uncertainties in economic policy induce a greater reaction in total insurance premiums per-capita than increasing uncertainties.

Fifth, with the dynamic multipliers, we are able to establish the pattern of after-shock (positive/negative) adjustments from an initial long-run equilibrium position to a new long-run equilibrium position. We again confirmed the asymmetric nature of adjustment dynamics in insurance premiums.

For research and policy implications; (i) asymmetry is important for insurance sector analysis. Conventional linear estimation techniques are not sufficient for modeling activities in the insurance sector. This is in agreement with the conclusion reached by Gupta et al. (2016). (ii) Central Bank communication with the financial markets needs to be well managed. Use of communication strategies has gained momentum as a policy instrument of central banks in monetary policymaking.

If properly managed, it can make significant contributions to the effectiveness of the financial sector by lowering monetary policy uncertainty; however, it also has the potential to introduce widespread uncertainty into the financial sector if misused. Therefore, the paths through which the central bank communicates with the financial markets (channels and messages) need to be prudently used and carefully thought out.

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