

NATURE OF PRICES AND ITS IMPLICATIONS ON MONETARY POLICY IN INDIA

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**DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY DELHI**

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NATURE OF PRICES AND ITS IMPLICATIONS ON MONETARY POLICY IN INDIA

by

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DEPARTMENT OF MANAGEMENT STUDIES

Submitted

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CERTIFICATE

This is to certify that the thesis titled “**Nature of Prices and its Implications on Monetary Policy in India**”, being submitted by Ms. Juhi Lohani to the Indian Institute of Technology Delhi for the award of the degree of Doctor of Philosophy is a record of bonafide research work carried out by her. She has worked under my guidance and supervision and has fulfilled all the requirements for the submission of the thesis, which has attained the standard required for a Ph.D. degree of this institute. The results presented in this thesis have not been submitted in part or full to any other university or institution for any degree or diploma.

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ABSTRACT

The behavior of individual prices is crucial for the effectiveness of monetary policy, as it can indicate underlying economic imbalances requiring policy measures. Over the past two decades, numerous studies have examined price rigidity using micro-level CPI and PPI data. Examples include research by Bils and Klenow (2004) and Nakamura and Steinsson (2008) focusing on the US, studies by the Inflation Persistence Network (IPN) analyzing country-level data for the Euro area (Dhyne et al. 2006 and Vermeulen et al. 2007), and work by Bunn and Ellis (2011, 2012a, 2012b) pertaining to the UK. Additionally, Alvarez and Burriel (2010), Alvarez and Lippi (2014), Costain and Nakov (2011), Vavra (2014), Kara (2015), and Dixon and Tian (2017) have contributed further insights into the study of price behaviour. Prices can be termed as sticky or rigid if they take time to adjust. Due to nominal rigidity, prices show stickiness and do not freely adjust to changes in demand and supply. It has a great impact on economic workings and creates changes in the monetary policy that impact real variables. This study examines the frequency of price changes in India, using the Consumer Price Index (CPI) and Wholesale Price Index (WPI), to understand price adjustment dynamics. It also analyzes hazard functions related to consumer prices. The findings suggest that prices in India are less sticky or rigid compared to other developed countries, which impacts the efficacy of monetary policy. Consumer Price Index (CPI) is instrumental in targeting inflation and monitoring price stability by central banks around the globe. The adoption of Inflation Targeting (IT) in India in 2015 underscores the importance of controlling inflation and maintaining price stability. High inflation can distort the price system, leading to production inefficiency and significant welfare costs (Nakamura et. al. 2018). This thesis explores the impact of Inflation Targeting on the nature of prices. The study also evaluates the effects of Demonetization which was announced in 2016 on CPI item-wise prices, noting its impact on various macroeconomic variables. It also reveals that in India, Inflation Targeting has led to a decline in the frequency of price increases and an increase in the frequency of price decreases. In contrast, Demonetization has led to a decline in the dispersion of price increases and a rise in the spread of price decreases. Furthermore, the research highlights the significant impact of monthly inflation on the frequency of

price changes, compared to the role of output growth. We have also assessed the repercussions of shifts in inflation expectations on price volatility, explored the intricate relationship between these variables and other pivotal macroeconomic factors. We have studied the relationship between inflation expectations, monetary policy, and price volatility, noting that unanchored inflation expectations can complicate the central bank's efforts to achieve its inflation objectives. The findings reveal that alterations in inflation expectations and related variables significantly impact the frequency of price adjustments. Specifically, an increase in inflation expectations corresponds to heightened occurrences of price increases and reduced instances of price decreases, ultimately contributing to an overall inflationary trend. Our study recommends implementing a contractionary monetary policy in response to an increase in inflation expectations, based on empirical findings. In conclusion, the thesis emphasizes the importance of understanding price dynamics for effective monetary policy formulation and economic stability. It provides insights that can inform policymakers in India and other countries facing similar challenges.

सार

व्यक्तिगत मूल्यों का व्यवहार मौद्रिक नीति के प्रभावकारिता के लिए महत्वपूर्ण है, क्योंकि यह नीति के लिए आवश्यक उपायों की आवश्यकता बता सकता है। पिछले दो दशकों में, साक्षात्कार मूल्य रिज़िडिटी का विश्लेषण करने वाले कई अध्ययन हुए हैं जो माइक्रो स्तरीय सीपीआई और पीपीआई डेटा पर आधारित हैं, जैसे बिल्स और क्लेनो (2004) और नकामुरा और स्टेइन्सन (2008) अमेरिका के लिए, इन्फ्लेशन पर्सिस्टेंस नेटवर्क (आईपीएन) कन्ट्री-स्तर अध्ययन यूरो क्षेत्र के लिए (धीन एट एल । 2006 और वर्मूलेन एट एल । 2007) और बन और एलिस (2009, 2012a, 2012b) ब्रिटेन के लिए। अल्वारेज और बुरिएल (2010), अल्वारेज एट एल। (2013), अल्वारेज एट एल। (2014), कॉस्टेन और नाकोव (2011), वाब्रा (2014), कारा (2015) और डिकसन और टियान (2017) जैसे अन्य औद्योगिक कामों ने मूल्य व्यवहार के अध्ययन में अधिक विविधताएं जोड़ी हैं। मूल्यों को स्टिकी या रिज़िड कहा जा सकता है अगर उन्हें समय लगता है समायोजित होने में। मौद्रिक रिज़िडनेस के कारण, मूल्यों में स्टिकी होता है और मांग और आपूर्ति में परिवर्तनों के लिए स्वतंत्र रूप से समायोजित नहीं होता है। यह आर्थिक कामों पर महत्वपूर्ण प्रभाव डालता है और मौद्रिक नीति में परिवर्तनों को उत्पन्न करता है जो वास्तविक परिस्थितियों पर प्रभाव डालते हैं। यह अध्ययन मूल्य परिवर्तनों की आवधिकता की आवधिकता को समझने के लिए भारत में कोष्ठक मूल्य सूचकांक

(सीपीआई) और होलसेल मूल्य सूचकांक (डब्ल्यूपीआई) का उपयोग करता है। यह सामान्यतः उत्पादक और उपभोक्ता मूल्यों संबंधित हाज़ार्ड फंक्शन का विश्लेषण करता है। इसके परिणाम साबित करते हैं कि भारत में मूल्य अन्य विकसित देशों की तुलना में कम स्टिकी या रिजिड हैं, जो मौद्रिक नीति की प्रभावकारिता पर प्रभाव डालता है। उपभोक्ता मूल्य सूचकांक (सीपीआई) मूल्य स्थिरता को लक्ष्य बनाने और मौद्रिक नीति के माध्यम से कीमत स्थिरता की निगरानी करने में केंद्रीय बैंकों द्वारा महत्वपूर्ण है। भारत में इन्फ्लेशन निश्चित करने की (आईटी) के अपनाने ने 2015 में भारत में इन्फ्लेशन को नियंत्रित करने और मूल्य स्थिरता बनाए रखने के महत्व को जटिलित किया है। उच्च इन्फ्लेशन मूल्य प्रणाली को विक्रेता अक्षमता की ओर ले जा सकता है, जिससे उत्पादन अक्षमता और महत्वपूर्ण कल्याण लागतें (नकामुरा एट. एल. 2018)। यह थीसिस मूल्यों की प्रकृति पर इन्फ्लेशन निश्चित करने के प्रभाव की जांच करती है। अध्ययन यह भी मूल्यों के सीपीआई आइटम-वार मूल्यों पर नोटिंग इसके असर का मौजूदा मौद्रिकात्मक उत्पादन और विभिन्न मैक्रो-आर्थिक संकेतकों पर प्रभाव का निरीक्षण करता है। यह पाया जाता है कि इन्फ्लेशन निश्चित करने ने मूल्य वृद्धि की आवृत्ति को कम किया है और मूल्य घटनाओं की आवृत्ति को बढ़ा दिया है भारत में। उल्टे, नोटबंदी ने मूल्य वृद्धि के विस्तार को कम किया है और मूल्य घटनाओं के विस्तार को बढ़ा दिया है। इसके अतिरिक्त, शोध मासिक इन्फ्लेशन के शिफ्ट के परिणामों का मूल्य अस्थिरता पर प्रभाव आकलन करता है, और इन मामूली संबंधित तत्वों

और अन्य महत्वपूर्ण मैक्रो-आर्थिक कारकों के बीच जटिल संबंध का अन्वेषण करना। हमने मूल्य स्थिरता, मौद्रिक नीति और मूल्य अस्थिरता के बीच संबंध का अध्ययन किया है, नोट किया है कि अनाक्रमित इन्फ्लेशन आशाएँ केंद्रीय बैंक के इन्फ्लेशन उद्देश्यों को प्राप्त करने के लिए इसके प्रयासों को जटिल बना सकती हैं। अध्ययन के फलस्वरूप प्रकृतियों में परिवर्तनों के प्रति मूल्य समायोजन के उच्च घटनाओं के साथ और मूल्य से कम घटनाओं के घटनाएँ, आखिरकार समग्र मुद्रास्फीति की एक यायावर रुझान में योगदान करते हैं। हमारा अध्ययन प्रायोगिक फिंडिंग्स पर आधारित उचित मौद्रिक नीति के उत्तरदायी के रूप में एक संकुचित मौद्रिक नीति का कार्यान्वयन सुनिश्चित करने की सिफारिश करता है। समापन में, थीसिस मौद्रिक नीति निर्माण और आर्थिक स्थिरता के लिए मूल्य गतिविधियों को समझने के महत्व को जोर देती है। यह उन अंतर्निहित प्रणालियों को प्रदान करता है जो भारत और अन्य समान चुनौतियों का सामना कर रहे देशों के नीतिकर्मियों को सूचित कर सकते हैं।

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ABBREVIATIONS

ADF	:	Augmented Dickey Fuller
AIC	:	Akaike Information Criteria
AR	:	Autoregressive
CMR	:	Call Money Rate
CPI	:	Consumer Price Index
EME	:	Emerging Market Economy
EMEs	:	Emerging Market Economies
EXR	:	Exchange Rate
F_CHA	:	Frequency of Price Changes
F_DEC	:	Frequency of Price Decreases
F_INC	:	Frequency of Price Increases
FDI	:	Foreign Direct Investment
FPE		Final Prediction Error
FX	:	Foreign Exchange
GDP	:	Gross Domestic Product
GRO	:	Output growth
HQ	:	Hannan-Quinn
INF	:	Inflation
INT	:	Weighted Average Call Money Rates
IPN	:	Inflation Persistence Network
IQR	:	Inter Quartile Range
IRF	:	Impulse Response Function
IPN	:	Inflation Persistence Network
IT	:	Inflation Targeting

IV	:	Instrument Variable
M3	:	Money Growth
MOSPI	:	Ministry of Statistics and Programme
MP	:	Monetary Policy
OLS	:	Ordinary Least Square
OP	:	Oil Price
p	:	Probability value
PP	:	Phillips Perron
Prob	:	Probability
RBI	:	Reserve Bank of India
SVAR	:	Structural Vector Autoregressive
UK	:	United Kingdom
US	:	United States
VECM		Vector Error Correction Model
WPI	:	Wholesale Price Index