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Does monetary policy pass through differ across the liquidity regimes in Nepal?

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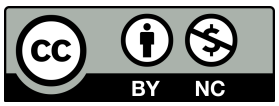


Abstract
This study aims to answer whether monetary policy pass-through varies in the liquidity regime in Nepal. Using monthly data and a layered empirical strategy (dynamic pass-through modelling, Markov-switching, threshold/STAR tests, rolling validation, local projections, and a 20 A class bank's base-rate panel), this study shows that the pass-through is present (but incomplete), persistent, and has state dependence on the banking sector. Baseline estimates suggest a high pass-through with persistence in the retail rates (0.69 for deposits and 0.49 for lending). The regime-based results show a stronger pass through in the states of tight liquidity. The post-IRC period improves the base-rate anchoring. The 12-month base-rate response rises from 0.17 before IRC to 0.56 after. In addition, the regime persistence is also backed up by predictive validation. It shows the inclusion of lagged state information boosts model performance (AUC: 0.324 to 0.904). The results imply that there's an incomplete transition of money-market signals into retail-rate and credit adjustment, rather than the absence of the rate effects in Nepal. Overall, the regime-specific nature of the monetary transmission in Nepal is not captured by a single average pass-through coefficient.

Keywords
Pass through, liquidity, Markov Switching, IRC, monetary policy, macroeconomic dynamics, Nepal

JEL Classification
E43, E51, C24, E58

1 Introduction

Modern monetary policy frameworks commonly use short-term interest rates as a primary operating instrument. This is the reason why the monetary policy transmission runs through interest rate channel to the retail bank rates and affects the broader financial decisions (saving, investment, and borrowings) (Walsh, 2010; Woodford, 2003). In the economy where the banking system is prominent, the policy impulse passes through policy stance to the money market rates, and to deposit and lending rates eventually affecting those decisions. This is why the interest rate pass-through is one of the crucial elements of monetary transmission mechanism (de Bondt, 2002). However, this pass through is not only represented by a short-term interest rate movement. It also encompasses the transmission of short rate signal to the deposit and lending rates affecting the financial decisions of households/firms over the short/long run (Mishkin, 2019).

Studies show that the interest rate pass through is generally incomplete because the deposit and lending rates seem to adjust with lag and are affected by market structure, funding conditions of banks, and other financial frictions (ECB, 2017). In addition, de Bondt (2002), Sørensen and Werner (2006), Mishra et al. (2014), and ECB (2017) also infer that the pass through is not only insufficient to impact the targets, but can also act stronger over the longer periods and sensitive to specific market structures, funding conditions of banks, and the monetary regime of the central bank. Recent study from Mexico also refers the pass-through estimates can hide significant heterogeneity. This occurs because the response of the lending rate can differ across the segments of loan size (it can be small, asymmetric, or statistically insignificant) (Cotler & Carillo, 2024). Thus, we not only ask, how is the movement of the policy stance. We also ask how quickly and far the movement has been and how does it adhere to the deposit and lending rates that affect financial decisions.

Nepal has a compelling economic setting to examine this mechanism. As of December 2025[2], the macroeconomic situation of Nepal appears to be satisfying. Inflation is at ease, external sector is comforting (foreign exchange reserves adequacy is ample to sustain the imports), remittances inflow is surging, and central bank has been indulging an active OMOs to maintain liquidity in the system. Similarly, the liquidity in the banking system has been piling up and the short-term interest rates are lower, leading to a decline in lending and deposit rates. Despite low interest rates, the demand for credit and capital formation is weak. We suspect a weak monetary transmission mechanism and the presence of structural difficulties[3] in this situation. Despite structural difficulties which hinder credit flow and demand creation, the central bank must manage the excess liquidity so that the short-term market does not separate from the monetary stance intended by the central bank. For the communication of monetary stance to the short-term rates, the Interest Rate Corridor (IRC) mechanism is very crucial (Bindseil, 2004). In it the SDF is a floor rate and the SLF is a ceiling rate. The essence of IRC is to anchor the operating target, the weighted average interbank rate to the policy rate (for the communication of the monetary stance to the money market rates to strengthen the pass through to the retail rate). But for a year the weighted average interbank rate has been aligning towards floor of the IRC (Nepal Rastra Bank, 2025a, 2025b). Diagnosing the cause for this situation, we do not attempt to analyze the structural difficulties but focus on the cause of a weak pass through across the regimes of liquidity. As IMF working papers by Gigineishvili (2011) and Myrvoda and Reynaud (2018) also focus on intuition that the pass-through appears to vary across the funding conditions (liquidity crunch and abundant periods), it is important to analyze the dependence of liquidity regimes in it. We do this because analyzing a single average pass through cannot portray the episodes of liquidity and the friction of balance sheets of banks. It can thus possibly misinterpret the transmission mechanism.

[2] Refer to Current Macroeconomic and Financial Situation (December 2025, Nepal Rastra Bank).

[3] The aggregate demand (as well as credit demand) has remained weak, the private consumption and investment have been low, the capital spending has not been to the mark (delay in payments to the contractors have weakened capital spending) and the over indebted private sectors and rising NPLs have made both the borrowers and banks to be cautious.

The literatures specific to Nepal are relevantly few for analysis of this mechanism. Studies by Maskay and Pandit (2010), Budha (2015), Mishra et al. (2012, 2014, 2016) confer the pass through of the interest rate is relatively small and imperfect to hit the target. They also examine the cause of the delayed or the incomplete transmission is due to the frictions in the financial system. A study by Pokhrel and Upreti (2025) analyzes the pass-through using base and lending rates concluding the pass through seems to be quick when the repo rate and CRR shocks work in unison. Similarly, Byanjankar (2025) focuses on the dynamic responses of the weighted average base rate to monetary policy shocks, using post July 2017's data. However, these papers do not explicitly examine the state dependent transmission from the short-term rates to the deposit and lending rates. They barely discuss the pass-through changes across the hidden and observed liquidity states and whether balance sheets of the banks (A, B, and C class) help explain those changes.

Leaving these gaps unaddressed appear to weaken the theoretical and practical outlook of monetary transmission. It also makes policy decisions fragile especially when the shift in liquidity conditions changes the strength of pass through. This fragility matters because the transmission channel works through retail deposit and lending rates, rather than only through a pricing benchmark (the base rate). A study by ECB (2017) reinforces this point by highlighting the rigidity and changing pass-through regularities in the retail deposit and lending rates. Similarly, Heckmann and Moertel (2020) also emphasize that banks transmit a part of market rate changes to loan and deposit rates. Accordingly, the retail rates need not mirror a pricing benchmark, be it in magnitude or in timing. This perception is relevant for remittance-financed system, where excess domestic liquidity is injected into the economy through foreign exchange intervention. In this situation, the pass-through appears to be fundamentally state dependent. Thus, an average pass through can conceal the significant regime shifts between tight and loose liquidity conditions (ECB, 2017). Similarly, the liquidity sensitive and bank based monetary environment added with the presence of pressure at bank's balance sheet in Nepal make an analysis of regime based empirical design appropriate. Because of which, we are motivated to indulge into a layered methodology that seems to capture both the average pass through and its variation in the hidden and observed states of liquidity.

Pertaining to this backdrop, we ask four major questions. The first one is, what is the average short run and long run pass through from the 91 days T bills rate to the deposit and lending rate in Nepal? The second one is, does the strength of such pass through vary across the hidden regimes related to different liquidity and funding conditions? The third one is, do the observed regime non-linear model and the bank level base rate evidence cooperate with the same underlying explanation? And the fourth one, do the rolling validation and the local projections show the persistence, state dependence, and meaningfulness about the transmission process over the relevant horizons of the policy?

To answer these questions, we use monthly bank level balance sheet data and relevant macro level financial data (to omit the omitted variable bias). After screening the stationarity for each series, we estimate a dynamic linear benchmark, followed by a 2 state Markov switching specification that allows pass through to differ across the regimes[4]. It is cross validated with the threshold and the STAR models, the rolling and predictive validation, the state dependent and local projections, followed by a complementary panel local projections based on the base rate of the 20 commercial banks of Nepal (Hamilton, 1989; Jordà, 2005). We chose a multi model technique because[5] only a single model cannot answer the research questions credibly.

[4] Financial time series data are subject to the structural instability which are in the form of shift in breaks and in regimes. A regime shift is a behavioral change of a particular time series data which could/could not revert to its original behavior, and this is known as the regime shift (Hamilton, 1994).

[5] Leamer (1983) has emphasized the importance of the sensitivity analysis and cautioned against overconfidence in any single empirical specification, that is why, this paper rests on a layered strategy rather than just placing all the inferences onto one model only. At the other side, Hamilton (1989) introduced the Markov switching framework to model changes in the regimes. This made possible to estimate different behavioral states especially when the regime is not directly observed. Therefore, we took this as a foundation of our paper's hidden pass-through analysis. In the same way, Hansen (1999) also developed a threshold regression method which allows coefficients to change once an observed variable reaches the cutoff range supporting our analysis's observed regime robustness tests based on the liquidity

The rest of the paper is structured as follows. Chapter 2 describes Data and Methodology, Chapter 3 captures the Results, Chapter 4 entails Discussions, and chapter 5 provides Conclusions followed by Limitations and Further Scope. Rest are the Appendix (Raw Results and Data source) and the Reference list.

2 Data and Methods

Data

We use monthly[6] data in the form of bank's level balance sheet and other macro-financial variables. Table 2.1 has narrowed down the discussions of datasets used with their descriptions, frequency, and motivations to use them. Due to heterogeneity in the availability of data, the differences in the sample sizes rose due to mechanical lags, transformations, the adjustment of the missing values, and the horizon specific estimations. The differences in the frequency do not potentially tend to weaken the inference. For clarity, the samples are reported clearly in Table 2.1 and placed in Appendix as well.

Table 2.1 *Data sources, Frequency, and Motivation*

Data	Description	Frequency	Motivations	Source
WALR and WADR	Used as one of the retail rate outcomes.	Monthly (2003 Aug – 2024 June)	de Bondt (2002), Sørensen and Werner (2006), and Mishra et al. (2014)	NRB
T Bill rate (TRB) (91 days)	The market rate (proxy) for monetary stance, it serves as a major pass-through signal. We could have used the WAIBR, however, the available frequency of it is relatively smaller.	Monthly (2003 Aug – 2024 June)	de Bondt (2002), ECB (2017), and Mishra et al. (2014)	
CRR	A quantity side policy variable which captures the tightening of the reserve requirement and the liquidity restraint.	Monthly (2003 Aug – 2024 June)	Mishra et al. (2014; 2016), Pokhrel and Upreti (2025)	
Liquidity ratios	Constructed from the balance sheets, liquid funds to deposit ratios, the loan to deposits ratios, borrowing from NRB to the deposits. Used as proxy for the funding stress and liquidity conditions.	Monthly (A-class – 2002 Feb onward and B and C from 2007 Jul onward) The threshold/STAR effective samples are A=80, B=84, and C=28.	ECB (2017), Heckmann-Draisbach (2020)	
OMO Proxy	The monthly change in the bank's balances with NRB and used as a liquidity absorption/injection proxy.	Monthly and are aligned to the empirical block.	ECB (2017), Heckmann-Draisbach (2020).	
Macro financial control variables	CPI growth, REER growth, Remittance inflow growth, Import growth. Reveal the pass through on inflation, external competitiveness, and the liquidity demand factors.	Monthly and are aligned to the empirical block.	Mishra et al. (2014; 2016)	

conditions. And Jordà (2005) is pioneer to introduce the local projections to estimate the impulse responses, horizon by horizon without relying fully on the multivariate dynamic system. This is the reason we chose to study the policy relevant transmission over time.

[6] Hamilton (2014) clarifies that monthly data could be appropriate for Markov-Switching analysis because the mean, persistence, and volatility can shift across the recurrent regime evident in monthly time series data.

Data	Description	Frequency	Motivations	Source
Base rate	Base rate of 20 A class banks[7] (Panel data). Better for the panel local projections, benchmark pricing, and analyzing post IRC shift, and the low liquidity interactions in Nepal.	Monthly (2014 Jul – 2025 Dec)	de Bondt (2002), ECB (2017), Heckmann-Draisbach, (2020).	Commercial Bank's Annual Report on bank level data.

Note. Author's Analysis

Methodology

To answer the research questions, this study follows quantitative and empirical time-series inferential research design. The analysis moves from the preliminary treatment of data to the benchmark estimation, regime-based modelling, robustness checks (non-linear) and validation, and complementary tests using the bank level data. Doing this, it allows us to study the average pass through, the variation of it through several liquidity regimes, the persistence over time, and the relevance of it in the bank level pricing behavior.

Econometric Strategy

Following a layered econometric approach, we initially determine the average short-run and long-run pass-through via dynamic linear benchmark. We examine the strength of transmission between hidden liquidity and funding states using a two-state Markov-switching model. Further, we map the mechanism with threshold and STAR models to evaluate the persistence, time variation, policy-horizon relevance followed by rolling validation, and local projections. Lastly, we conduct a bank-level exercise which acts as a complementary to the first one, using the base rates of 20 commercial banks to check whether the same logic of transmission is applied in the pricing behavior at the institutional level.

Transformation, Stationarity, and Notations

We employ stationary tests as a decision rule for the admissible transformations. The operational form of estimation has been reported in the main body of text, the ADF test, KPSS test, and break test robust outputs are placed in Appendix (Dickey & Fuller, 1979, 1981; Kwiatkowski et al., 1992; Zivot & Andrews, 1992). The resultant vector of regressor is equation 1. The notations of these equations are also in the Appendix.

$$xrv_t = \begin{bmatrix} TRB_t \\ TRB_{t-1} \\ \Delta \mathrm{CRR}_t \\ LS_t \\ OMO_t \\ CPI_t \\ REER_t \\ \Delta lnREM_t \\ \Delta lnIMT_t \end{bmatrix}, LS_t \in \{LIQ_t, LDR_t\} \quad \text{.....Equation (1)}$$

Equation 1 is the empirically admissible vector after the screening for the stationarity tests of the related variables. This is the transformed form vector used in the analysis.

Benchmark of the Dynamic Pass-through – Baseline

The initial model is a dynamic benchmark estimated to use HAC inference. We do this to ensure that the serial correlation and heteroskedasticity do not bias the standard errors since the data frequency is

[7] Since 2014 Jul till 2025 Dec, many A class banks have gone into merger/acquisitions. We take 20 banks (of present) for past reference as well (for researcher's convenience).

monthly (Newey and West, 1987). At this benchmark, entire regressor vector is linearly reflected whereas the lagged dependent variable reflects the strong persistence, which is typically found in the retail bank rates[8].

$$rbr_t = \alpha + \gamma rbr_{t-1} + xrv_t'\Psi + \epsilon_t, \qquad \Psi = \begin{pmatrix} \Psi_{TRB,0} \\ \Psi_{TRB,1} \\ \lambda \\ \vartheta \\ \sigma \\ \eta_{CPI} \\ \eta_R \\ \eta_{REM} \\ \eta_{IMT} \end{pmatrix} \quad \text{..... Equation (2)}$$

Equation 2 represents the benchmark of dynamic pass through in a matrix form. Likewise, the long run pass through which is implied by the dynamic benchmark is represented in equation 3. The variables such as the Treasury Bill rate and other retail rates are justified by diagnostic tests, and these variables are used in their raw form whereas the balance sheet variables are used in the ratios or in the growth rate form.

$$LNPT = \frac{\Psi_{TRB,0}+\Psi_{TRB,1}}{1-\gamma} \text{.....Equation (3)}$$

Equation 2 is a linear reference point for the rest of the paper and equation 3 reports the long run pass through; since the short run responses can be technically small when the persistence (represented by γ) is large.

Markov Switching Model – Two-state

In two state Markov-switching specifications, the retail rate is assumed to respond linearly to the Treasury bill rate and is permitted to have higher variance across the latent regimes. Thus, this is the model which converts the constant-coefficient benchmark into a particular state-dependent pass-through system (Hamilton, 1989, Kim & Nelson, 1999). The coefficient of Treasury Bill pass through term is Ψ_{st}, which is of our interest and is allowed to vary by regime. The other control variables are kept fixed so that the model becomes easier to interpret.

$$rbr_t = \delta_{st} + \gamma rbr_{t-1} + \Psi_{st} TRB_t + \Phi TRB_{t-1} + \Omega_t'\xi + \nu_t, \quad \nu_t|s_t \sim \mathcal{N}\left(0, \sigma_{var_{st}}^2\right), s_t \in \{1,2\}$$

$$\Omega_t = \begin{bmatrix} \Delta CRR_t \\ LS_t \\ OMO_t \\ CPI_t \\ REER_t \\ \Delta REM_t \\ \Delta IMT_t \end{bmatrix} \text{..... Equation (4)}$$

Equation 4 is the regime dependent observation equation represented by the two state Markov Switching Model.

$$TPM = \begin{bmatrix} tp_{11} & 1-tp_{11} \\ 1-tp_{22} & tp_{22} \end{bmatrix}, tp_{ij} = TPM_r(s_t = j|s_{t-1}) \text{..... Equation (5)}$$

Equation 5 represents the transition probability matrix (TPM) which governs the regime persistence and switching. This equation shows how likely the banking system is to remain in the same pass-through regime. It also concerns whether it switches to another regime from one month to the next one (Hamilton, 1989; Kim & Nelson, 1999). This section also yields two major outputs which are very crucial for the interpretation. One is the regime specific pass-through coefficients, and the other one is the smoothened regime probabilities through time.

[8] The reason that the constant coefficient benchmark is retained because results based on the regime become most interpretable when compared with a linear pass-through estimate, or else, it becomes cumbersome to separate the state dependence from the overall transmission effect (Hamilton, 1989).

Threshold and STAR Analysis – Under Observed Liquidity Regimes

The result of the Markov analysis is cross verified with the observed regime non-linear models where the mechanism of transition is directly driven by the liquidity state variable. The threshold model captures an abrupt change in the regime whereas the STAR models capture the gradual transition between the regimes (Hansen, 1999; Teräsvirta, 1994)[9].

$$\Delta rbr_t = \varpi + \Psi_L \Delta TRB_t \, 1(LS_t \leq \varsigma) + \Psi_H \Delta TRB_t 1(LS_t > \varsigma) + \xi' \Xi_t + \upsilon_t \text{.....Equation (6)}$$

Equation 6 is the threshold pass through model with the observed liquidity cutoff. The $1(LS_t \leq \varsigma)$ represents the indicator function (switch for the low regime) which equals to 1, if $LS_t \leq \varsigma$, otherwise 0 and the $1(LS_t > \varsigma)$ represents that the indicator function (switch for the high regime) which equals to 1 if $LS_t > \varsigma$, otherwise 0.

$$\Delta rbr_t = \varpi + [\Psi_0 + \Psi_1 K(LS_t; \varsigma, \Pi)] + \Delta TRB_t 1(LS_t > \varsigma) + \xi' \Xi_t + \upsilon_t$$
$$K(LS_t; \varsigma, \Pi) = [1 + \exp\{-\Pi(LS_t - \varsigma)\}]^{-1} \text{.....Equation (7)}$$

Equation 7[10] is the smooth transition pass through model where the pass-through effect of the 91 Days Treasury bill is allowed to change gradually, as the liquidity state variable moves around the estimated threshold. The transition function $K(LS_t; \varsigma, \Pi)$ takes the value of 0 and 1, such that the coefficient ΔTRB_t shifts smoothly from Ψ_0 to $\Psi_0 + \Psi_1$. In this equation, the parameter Π entails how sharp or smooth the transition is, and the ς is the point, around where the change in the behavior occurs.

Time Variation and Predictive Proof – Robustness

We use rolling estimator as practical time varying parameter proxy. It is utilized to determine whether the monetary pass through remains fixed or varies over time. The rolling method periodically re-estimates the same relationship on moving subsamples, such that it indicates whether the pass-through coefficient is stronger or weaker at different times. The predictive validation then asks whether weak-pass-through episodes are one-time or are more likely to be recurrent in one period-to-period. These two steps put together indicates whether the transmission in Nepal is stable or whether there is something that varies over time and is also of economic significance (Hamilton, 1989; Kim & Nelson, 1999; Jordà, 2005).

$$\Delta rbr_t = \delta_\tau + \sum_{j=0}^{2} \Psi_{j,\tau} \Delta TRB_{t-j} + \xi'_{t-1} \kappa_\tau + \epsilon_{t,\tau},$$
$$RPT_\tau = \textstyle\sum_{j=0}^{2} \Psi_{j,\tau} \text{.....Equation (8)}$$

Equation 8 represents the rolling window benchmark and the statistics for the cumulative pass through. Further, the predictive validation equation for the weak pass through is represented by.

$$P_r(\mathrm{Z}_{\tau+1} = 1|\mathrm{X}_\tau) = \Lambda(\varrho_0 + \varrho_1 LS_\tau + \varrho_2 LDR_\tau + \varrho_3 \Delta CRR_\tau + \varrho_4 REER_\tau + \varrho_5 \Delta lnREM_\tau + \varrho_6 RPT_\tau \text{...Equation (9)}$$

This predictive validation is used as a supporting check. It does not analyze the structural root cause of pass-through. Instead, it is employed to assess whether weak-pass-through periods are likely to persist in the longer run. And this would suggest that transmission is different across the regimes.

Local projections – State Dependent

The final step of the methodology is to track the horizon-specific responses using local projections. This step converts the story of the regime into an impulse-response narrative which is simple to convey as the

[9] The Markov Model discovers the hidden regimes from the data, whereas a threshold and STAR models use an observe liquidity variable to define the change in the regime. We use both the models, so that the result does not seem that it is driven by one single model (Hansen, 1999; Teräsvirta, 1994).

[10] This model answers the question that does the regime dependent pass through can survive when the state is anchored to an observed liquidity measure rather than a Markov process only? This represents a complementary analysis but does not tend to replace the Markov specification.

main results of this paper (Jordà, 2005). State dependence is retained by keeping the same liquidity threshold to divide the response path.

$$rbr_{t+h} - rbr_{t-1} = \chi_h + \theta_{h,L}\Delta TRB_t 1(LS_t \leq \varsigma) + \theta_{h,H}\Delta TRB_t 1(LS_t > \varsigma) + \Pi_h'\Xi_t + \mu_{t+h},$$
$$h = 0,1, \dots, H \text{.....Equation (10)}$$

Equation 10 is a state-dependent local projection which is estimated by specific horizons. The full diagnostics for the local projections, tables for confidence bands, and the horizon specific coefficient outputs are presented in Appendix.

Base Rate Complementary Analysis

We add a complementary bank level assessment, without disrupting the system level sequence. In this section, the monthly base-rate panel data of 20 A class commercial banks of Nepal are used. This analysis is to study the responsiveness of the pricing benchmark of the individual banks to the short-rate signal. This is done to facilitate the analysis, not merely to displace the previous block of analysis. It aims to assess whether the pricing benchmark reflects the same post-IRC and liquidity-conditioned transmission logic from the perspective of A class commercial banks. Moreover, the two blocks of analysis entail a different story of the same margins of the transmission mechanism (de Bondt, 2002, ECB, 2017).

$$BSR_{i,t+h} - BSR_{i,t-1} = \chi_{i,h} + \Psi_h \Delta TRB_t + \Pi_h'\Omega_{t-1} + u_{i,t+h},$$
$$i = 1, \dots, 20; h = 0, \dots, H \text{.....Equation (11)}$$

Equation 11 is a local bank-level prediction which poses a question, 'Does the 91-day Treasury bill rate alter this month and by which amount (on an average) does the base rate of a given bank alter in the next 'h' months?' The bank specific effect captures the time invariant variation across the banks, that includes the average pricing system, business model or the structural funding cost. Therefore, the coefficient Ψ_h can be read as the average horizon specific pass through in the panel model (Jordà, 2005).

$$BSR_{i,t+h} - BSR_{i,t-1} = \chi_{i,h} + \Psi_h(\Delta TRB_t \times PTIRC_t) + \psi_h(\Delta TRB_t \times LWLIQ_t) + \Pi_h'\Omega_{t-1} + u_{i,t+h},$$
$$i = 1, \dots, 20; h = 0, \dots, H \text{.....Equation (12)}$$

Equation 12 has the same panel local projection extended in the two directions. On one side, the post IRC interaction determines whether the corridor's framework enhanced the short-end market to the internal pricing benchmark of banks. On the other, the interaction of low liquidity tests higher sensitivity of the base rates when liquidity is tight. These are considerable because the base rates tend to adjust first since there are pressures on the funding costs and liquidity management even when final lending rates seem to be sticky.

$$INQR_t = Q_{0.75}(BSR_{i,t}) - Q_{0.25}(BSR_{i,t}),$$
$$SDV_t = \sqrt{[\tfrac{1}{N} - 1]\sum_{i=1}^{N}(BSR_{i,t} - \overline{BSR})^2} \text{.....Equation (13)}$$

Equation 13 represents the cross-bank dispersion metrics as the average pass-through analysis alone does not present the heterogeneity among the banks. The measure of the standard deviation and the interquartile range depict whether the banks tend to move together in the same direction, or they move differently with respect to their benchmark pricing. These dispersion statistics are presented along with the post-IRC comparison so that the analysis can capture the average strengthening of the signal from the short-term interest rate as well as the remaining heterogeneity between the banks.

The complete sequence of the econometric strategy is concise. The tests for the stationary determine the admissible point of the data. The linear benchmark provides the estimate of the baseline pass through. Similarly, the Markov model presents the latent state dependence, the TAR and STAR models check whether the similar mechanism is repeated when the regimes seem to be observed rather than hidden. Likewise, the rolling and the predictive validation are used for the testing of the time variation and the persistence of pass through, the local projections plot the regime mechanism by horizon wise responses,

and the complementary panel level A class banks base rate analysis shows whether the pricing benchmark of the banks exhibit the ad-hoc post IRC and the liquidity subjected logic of transmission.

Tools of Data Analysis

A Python programming language (v 3.11) is used to perform statistical analysis. We use statsmodels, *pandas*, *numpy*, and other libraries (Seabold and Perktold, 2010) to approximate the Markov-switching parameters and other transition probabilities[11].

3 Results

Preliminary Empirical Context

We analyze[12] the descriptive statistics to show the retail rate is more persistent, posing a smoother profile, rather than the short-term market rate. The 91-day Treasury bill rate has greater volatility than the WADR and WALR. Both the liquidity indicators indicate a tight-liquidity and surplus liquidity periods. This facilitates us to analyze the linear benchmark model at first and then regime dependent models. Summary statistics for WADR, WALR, T-bill rate, and liquidity ratios are presented in Appendix.

Baseline Dynamic Pass Through

This model asks if 91 days Treasury Bill rate moves today, how much does the deposit and the lending rate move on an average prior allowing for any hidden regime or the non-linearity? This model is crucial because the pass-through is usually incomplete in the short run (de Bondt, 2002) but is usually more informative in the long run when the retail rates seem to be highly persistent.

Table 3.1 *Summary of Pass-through Based on HAC regressions (Equation 3)*

Models used	Lagged rate coefficient (γ)	Current Treasury Bill	Lagged Treasury Bill	Long-run pass-through (implied)	Remarks
Deposit rate	0.957***	0.028**	0.001	0.69	Short-run response seems small, but the long-run pass-through seems meaningful.
Lending rate	0.952***	0.013	0.010	0.49	Response of average lending-rate exists but is weaker and slower than the response of deposit-rate.
Control variables	CRR, liquidity ratio, OMO proxy, CPI growth, REER growth, remittance growth, and import growth.				

Note. Author's Analysis (** and *** represent significant at 5 % and 1 % respectively).

First, both retail rates are high in persistence (both have lag coefficients above 0.95), and due to which the banks do not change their prices in a month, they tend to smoothen the adjustments over time[13] (Table 3). Secondly, the equation of deposit rate presents a statistically visible concurrent effect of the Treasury Bill. At the same time, the lending equation tends to look weaker in the immediate month. The third one is that once persistence is taken into consideration, the long run pass through (implied) is non-zero for both outcomes, however, the deposit rate appears to be responsive compared to the lending rate. This pattern is sensible for Nepal because the deposit rate reacts quicker since banks experience the funding pressure when the need for the building of deposit base occurs. On the other hand, the lending rates are

[11] The script for Python (used for data processing and model estimation) is available by author upon request.

[12] The retail bank rates often adjust slowly compared to the short-term market rates, this is why, only a brief descriptive context has been used to provide an orientation to the reader prior analyzing pass through in different liquidity regimes.

[13] We should not understand the high lag coefficients as an absence of transmission. But it should be understood as a smoothening of the retail rates. So, the deposit and lending rates are not only influenced by one-month market rates, but by the balance sheets of banks, interest rate spreads, and stickiness of the fixed loan terms. (de Bondt, 2002; ECB, 2017).

not only affected by the funding costs, but also by the portfolio composition of loans, risk-based pricing, stickiness of the adjustments of lending rates due to contracts, and weakness in the credit demand. So, the results (baseline estimation) should not be read as the situation where the lending rates do not move, but it should be read as lending rates do move, but, more gradually and less mechanically.

Two-state Markov Switching

The baseline model provides one average pass-through coefficient. The Markov-switching model assumes that if the 91-Day Treasury bill) rate is passed on with varying intensity in the unobserved pricing states. It simply enquires as to whether banks convey the short period rate signal powerfully during certain time frames and weakly during other time frames. This is because the banking systems of many countries are seldom subjected to one fixed transmission rule (in most countries the pass-through varies depending on the different stress and non-stressed events[14]).

Table 3.2 *Model-implied Pass-through Estimates[15] (regime specific) (Equation 4)*

Models used	Regime of Higher pass-through	Regime of Lower pass-through	Remarks
Deposit rate (level form)	0.144	0.124	The pricing of deposit is stronger in one state. The regime gap is moderate.
Lending rate (level form)	0.166	0.114	The state gap is more pronounced among the lending rates. This supports the idea of credit pricing on a regime-dependent basis.
Control variables	Same control variables as Table 3.1, but the Treasury Bill is allowed to vary across regimes.		

Note. Author's Analysis

Table 3.2 indicates that the intensity of pass-through varies between the latent pricing states determined by Markov switching model. Thus, we interpret these two regimes as the high and low pass-through states, but not as an exact calendar-based policy event. Table 3.3 explains the latent regimes relating them to the conditions of liquidity and borrowing from NRB ratio, which is likely to occur.

Table 3.3 *The balance sheet conditions[16] (probability-weighted) around the Markov regimes (Equation 4 and 5)*

Models used (Markov Switching)	Liquidity ratio (high pass through)	Liquidity ratio (low pass through)	Borrowing from NRB ratio (high pass through)	Borrowing from NRB ratio (low pass through)
Deposit	0.151	0.176	0.011	0.005
Lending	0.170	0.148	0.009	0.006

Note. Author's Analysis

The balance sheet conditions (probability weighted) help interpret the economic meaning of latent regimes (Table 3.3). The higher pass-through regime for the deposit rates appears during tighter funding conditions (which is reflected by the lower liquidity ratios and high dependence on the borrowing from NRB). This is like scenario where the banks and financial institutions intensely compete to attract deposits in the tightening funding conditions. But it shows a mixed pattern in case of the lending rates. The higher pass-through regime in it shows a slightly higher liquidity ratio and a higher dependence on the

[14] There are literatures which are quite robust in terms of regime-switching pass-through. Evidence in the Euro area also shows that transmission is impaired or modified in times of crisis and financial distress (Aristei and Gallo, 2014; Holton & Rodriguez d'Acri, 2018).

[15] The table reports model implied regime specific estimates. We interpret these on the basis on joint evidence from the regime probabilities and compare relative transmission intensity across the states. We further test for robustness using threshold and STAR models, rolling validation, local projections, and evidence from the bank level data (Hamilton, 1989; Kim & Nelson, 1999).

[16] We present a descriptive analysis, not inferential. The interpretation of p-values and standard errors are not applicable over here because the probability weighted balance sheet conditions (around the Markov regimes) assist us to interpret the latent states and its economic meaning (Kim & Nelson, 1999).

borrowing from central bank (NRB). Therefore, the interpretation should be cautiously done for lending rates (as compared to deposit rate). To this we can evaluate that a single balance sheet ratio does not technically describe each regime. An explanation would be that the changes in the pricing state along with the shift in the funding conditions and the adjustment of the deposit rates seem to be more correlated with balance-sheet stress, rather than with the adjustment of the lending-rate[17].

Figure 1. Smoothened probability of high pass-through regime (deposit and lending rate).

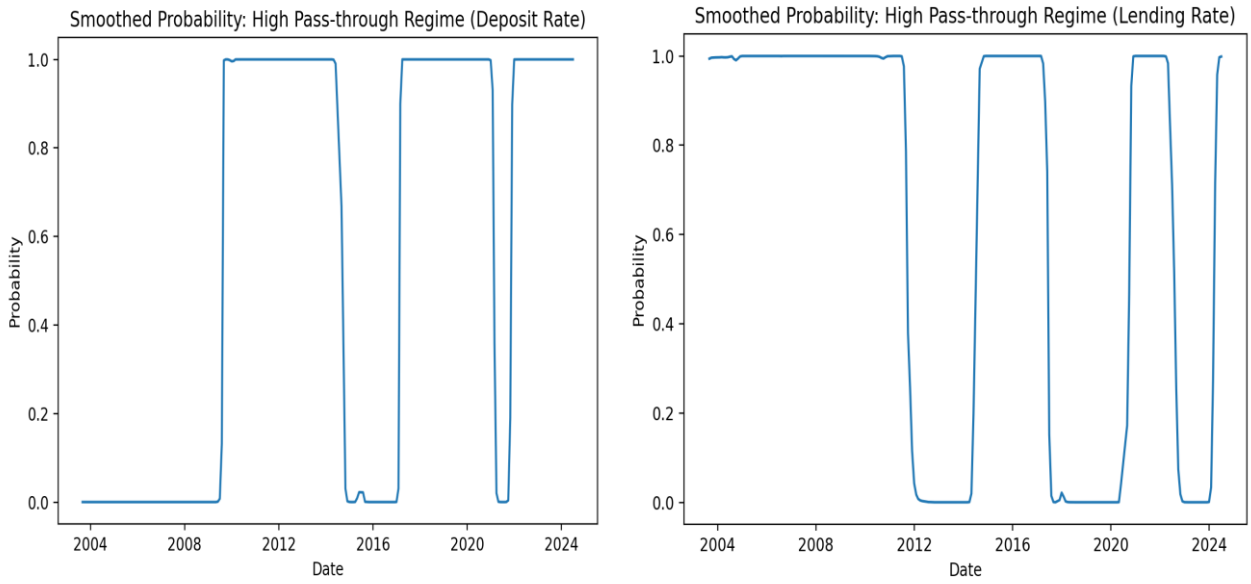


Figure 1 indicates smoothened-probability plots, showing a strong regime persistence[18]. The economy remains in a particular pass-through regime for longer periods and switches to the alternative states or the regimes occasionally. This pattern implies that analyzing only a model with a single constant (coefficients) is inadequate, because the model would be only an average of the different transmission mechanisms. Basically, the change in the smoothed probability is not presumed mechanically. However, it is due to a systematic change in the data which the model reflects in different states of transmission. And this is consistent with state-dependent pass-through in practical terms.

Nonlinear Robustness (Observed Regimes)

Now we ask an important question, which is, whether the regime that we analyzed is based upon an observed variable (not on the hidden variable) or not. To analyze this, we estimate two models. These are the pass-through models, viz., threshold and STAR models. In these models, we determine the state (tight versus the loose liquidity situation) using the liquidity ratio. We do this to make our interpretation more credible, because when we observe same pattern in both approaches, (in latent-state Markov and observed-state threshold/STAR approach), we make our interpretation credible.

We deduce promising results. The state of low liquidity repeatedly shows a large, short-run transmission coefficient, particularly concerning the lending-rate analysis[19]. We affirm that the main empirical result is not simply dependent only on a single estimator. Regardless of whether the state is deduced by the Markov filter or enforced with the help of the observed liquidity cutoff, the data represents that retail-rate transmission is state-dependent. Basically, we also entail that the results of class A banks as an intuitive

[17] The research by central banks (in the pass through) are usually determined to be interconnected with the arrangement of the bank balance sheet and the cost of funds as opposed to examining the policy rates alone (ECB, 2017; Heckmann-Draisbach, 2020).

[18] We must understand that the dates of Markov regimes are not policy dates. These are summaries of the statistical characteristics of the recurring pricing states. We use it to demonstrate that their contribution is an average over different regimes of transmission.

[19] We should understand that the coefficient in low liquid conditions should be understood as a marginal funding-cost effect. When there is a binding funding, banks have less time to observe the short-rate movement internally. Consequently, the changes in market rates transmits aggressively to the pricing of deposit, base, or the lending-rate (Gigineishvili, 2011; Heckmann-Draisbach & Moertel, 2020).

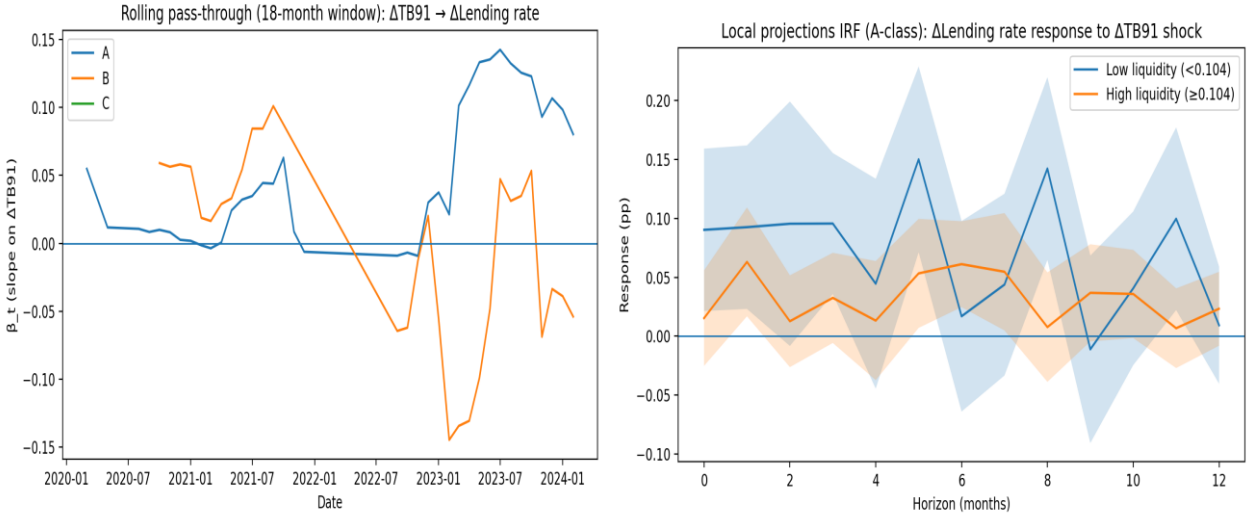
one. It denotes us that a shock to Treasury bill yields, induces a large near-term response to the lending rate when liquidity situation is tight.

Table 3.4 *Liquidity state robustness*

Banks (class)	Pass through (low liquidity state)	Pass through (high liquidity state)	Remarks
A (threshold)	0.090*	0.015	The lending pass-through appears to be stronger in low-liquidity regimes.
B (threshold)	0.079*	-0.026[20]	A stronger pass through under tight liquidity regime.
C (threshold)	0.256*	0.086**	This has a noise. But the low-liquidity coefficient is larger.
A (STAR)	0.258	0.018	Same ordering is there in the transition is smooth and discrete models.
Controls variables	The liquidity and macro-financial controls.		

Note. Author's analysis (* and ** represent significant at 10% and 5 % respectively).

Figure 2. Rolling pass through (18 months) (left) and state dependent local projections for A class (lending rates) (right).



We assess two additional findings in Figure 2. In the figure to the left, we see the pass-through coefficient is not flat, but it tends to move gently over time. This is shown by the rolling slopes. Similarly, from the local-projection responses, we can see that the horizon profile is also state-dependent. At short horizons, the response is stronger in the low liquidity state than in the state of high liquidity. In other words, we can assume that the banking system does not just move between the states. Rather, the impact of a short-rate shock also spreads differently over time depending on the state where the shock hits.

Validation and Diagnostics

After analyzing the rolling pass through and the local projections, we ask if the estimated mechanism is stable, persistent, and explainable. For this, we test for the rolling validation and the out-of-sample tests. These tests appear to demonstrate that the pass-through is not simply a month-to-month noise, but it also has a memory in it.

[20] We interpret the negative/statistically weak coefficient (high liquidity) as evidence of weak and unstable pass through (during surplus liquidity conditions). We do not claim it as an economically meaningful reverse transmission (Kim & Nelson, 1999).

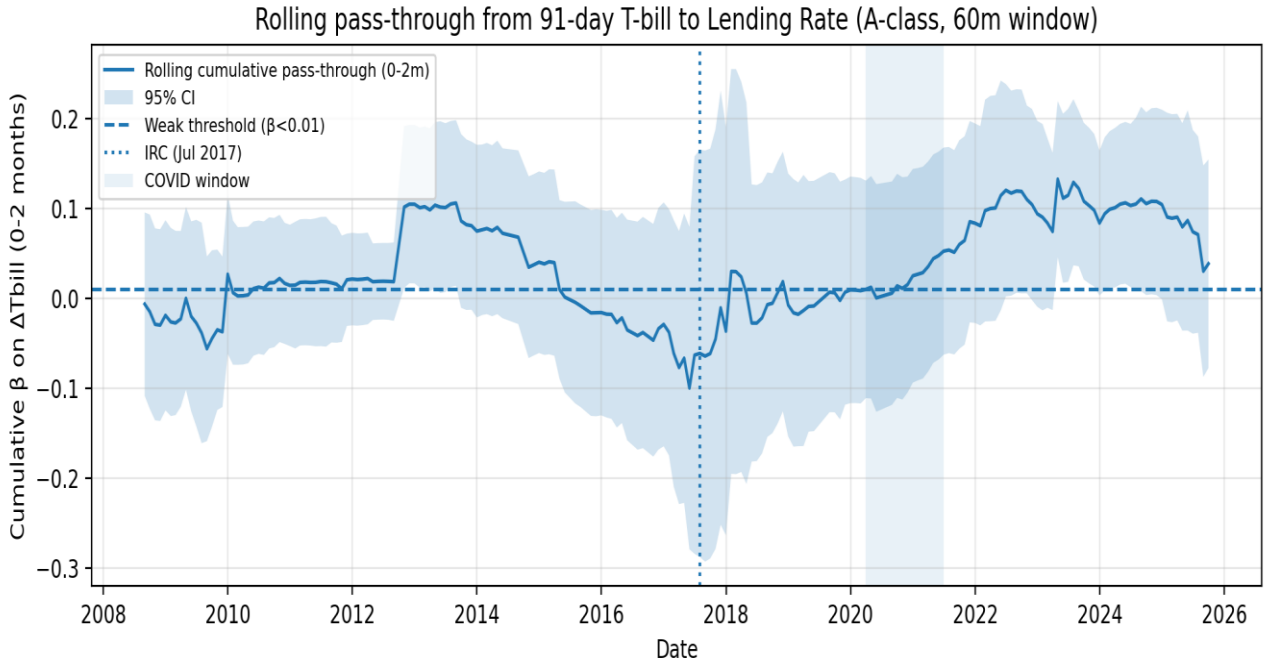
We run an OOS test around the major policy windows to test if there is in-sample validity of the regime-dependent interpretation. We perceive that the pre-IRC regime estimate suggests a relatively weak pass-through when compared to the post IRC regime which suggests a stronger pass-through regime. Though, during COVID-19 stress window, we obtain the transmission is becoming softer. Importantly, a fundamentals-only OOS model appears to be weak to identify the weak pass-through months (AUC = 0.324). This result suggests that macro variables are not effective at identifying the weak pass-through months. When we allow for state persistence (as expected by a regime framework), however, the predictive performance appears to be significantly enhanced (AUC = 0.904)[21]. We assume this contrast reveals that pass-through is truly state-dependent and that there are no random month-to-month fluctuations seeming in the regimes.

Table 3.5. *The rolling and out of sample validation*

Output for validation	Estimates	Remarks
Before IRC#	0.015	The pass-through was relatively weak prior July 2017 in IRC regime.
After IRC#	0.051	The pass-through became strong after the implication of IRC regime.
COVID 19 window#	0.023	Transmission softened again during the pandemic-related stress phase.
OOS model&	AUC = 0.324	The fundamental model does not predict the weak-pass-through months.
OOS model%	AUC = 0.904	The persistence of state abruptly improves the predictive performance.

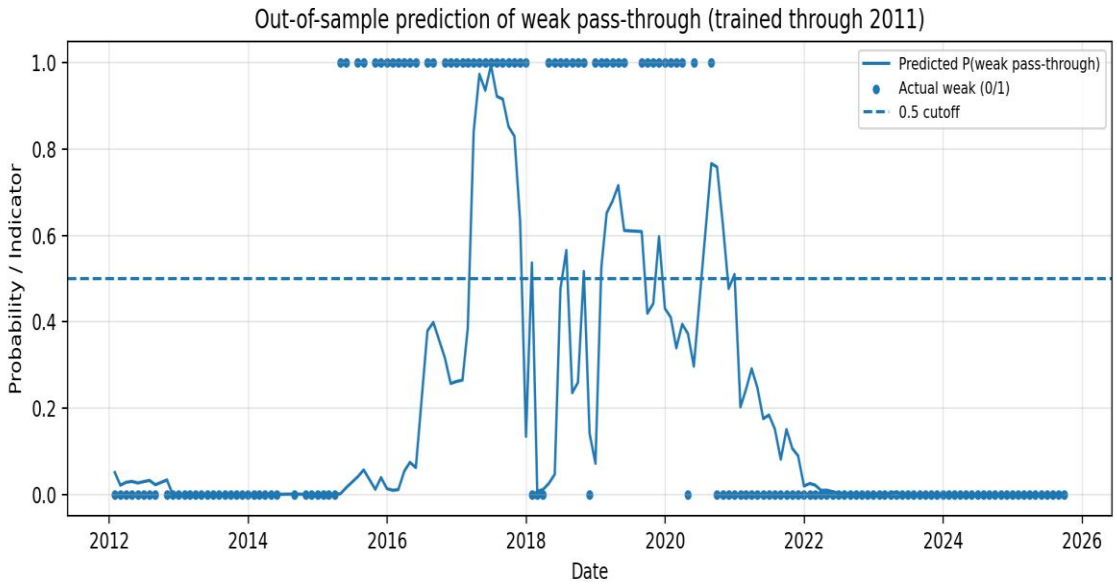
Note. Author's Analysis (# is average rolling sum of β, & is the fundamental state model, % is fundamental and lagged state model, OOS is out of sample validation, and AUC is area under the ROC curve).

Figure 3. The rolling pass through (A class banks)



[21] We assess that weak pass through is not only a macroeconomic event after we incorporate the enhanced predictive performance with the inclusion of state persistence. However, it also has a memory. This is the reason that only monitoring the inflation, credit, or liquidity is insufficient because it would not be able to capture the persistence of a weak-transmission regime (Hamilton, 1989; Kim & Nelson, 1999).

Figure 4. An OOS prediction of the weak pass-through months



Corresponding Analysis – Base Rate of A-Class Banks

We employ the base-rate analysis[22] of the A class (20 commercial) banks. This analysis helps us to bring a new dimension to the pricing discussion. We assess the perspective of the money-market conditions which affect the benchmark rate that is employed in banks' internal loan pricing. We examine whether the money-market conditions can influence the benchmark rate and assess whether it is going in the same direction. It's important to analyze this because the base rate is closely tied to internal costs of funds of the banks. This could be opposed to the final lending rates in terms of delaying the existing contracts, risk reclassifications, and the borrower specific pricing.

Table 3.6. *Base rate analysis (20 A class banks)*

Blocks	Estimates	Remarks
Baseline model (Panel LP)	Base-rate response to a 1pp change in ΔTRB - 0.04 (h=0), 0.34 (h=6), and 0.51 (h=12).	Though the benchmark repricing appears to be gradual, it is also economically rational. Therefore, the intent of pricing can be seen even when the final retail rates seem to adjust slowly.
Pre- vs post-IRC	At h=6, the cumulative response rises from 0.09 before IRC to 0.38 after the IRC's implementation. At h=12, it rises from 0.17 to 0.56.	The period of IRC implementation seems to have improved the pass through from the short end of the market to the internal benchmark pricing.
Normal vs low liquidity	At h=0 the response is 0.01 (in normal months of liquidity) and 0.124 (in low-liquidity months). At h=12 it is 0.46 versus 0.66.	During the tight liquidity states, the banks revise the benchmark pricing with aggression. They do this because the marginal funding conditions appear to be more binding.
Cross-bank dispersion	The average dispersion falls after IRC's implementation. The mean IQR declines from 1.49 to 1.35 and means standard deviation from 1.49 to 1.09.	The pricing benchmarks get synchronized on average. Although the spikes (on episodes of liquidity) still point to persistent heterogeneity of banks.
Bank fixed effects and control variables	The panel local projections use bank fixed effects. The interaction structure and detailed horizon tables are in Appendix D.	

Note. Author's Analysis

[22] We opt for a complementary analysis. We intend to convey the same message, but through a different lens. We place the detailed horizon tables in the Appendix section to make the findings compact.

We estimate the baseline panel's local projections (Figure 5 represents the impulse response of base rate bank's base rate to the shock in the 91 Days T bill). We observe the 91-day Treasury bill rate has a base-rate response of 0.04 at the impact, 0.34 at 6 months, and 0.51 at 12 months (Table 3.6). We can assess that if the final lending rates appear to be sticky in the short term, the internal pricing benchmark of banks seems to be already changing its direction (though with an adjustment lag across the credit portfolio). We also split the IRC's analysis. Analyzing it, the pass-through from the Treasury bill rate to the base rate appears to be weak and unstable prior July 2017 (Table 3.6; Figure 5). This remains positive and substantial at the intermediate horizons after the IRC period.

Figure 5. The pre versus and post IRC implementation

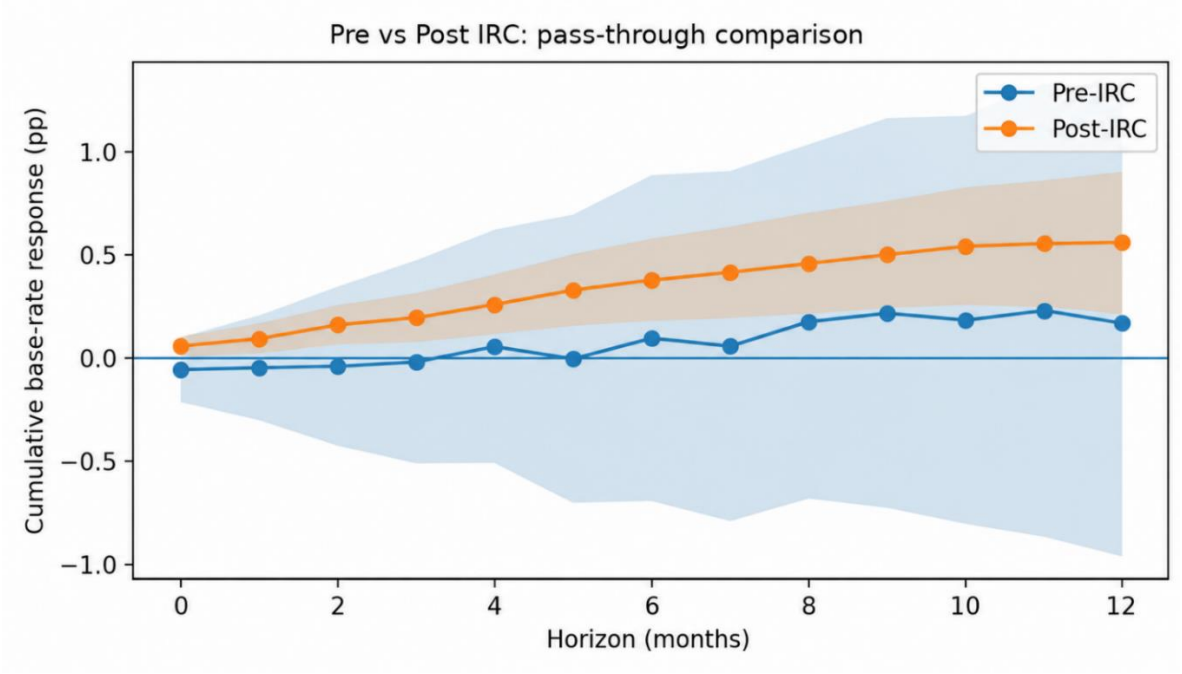
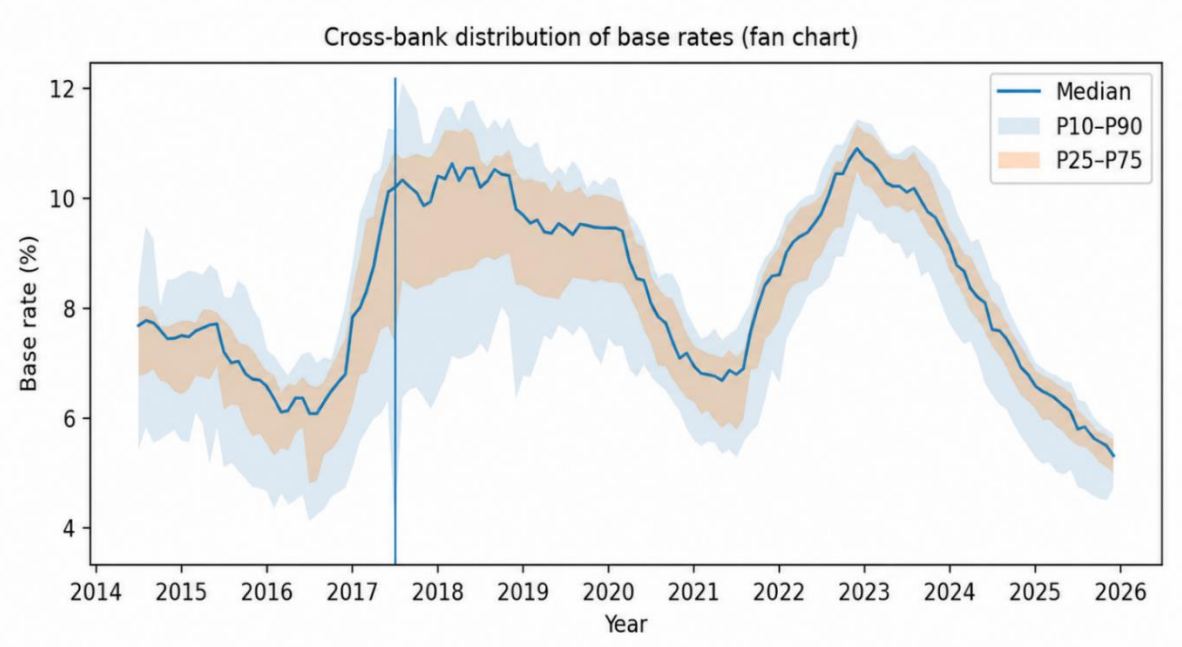


Figure 6. The cross-bank distribution of the base rate



We compare both pass-throughs and observe that there is a significant increase after the introduction of the IRC regime. The data ranges from 0.09 (pre-IRC) to 0.38 (post-IRC), and from 0.17 (pre-IRC) to 0.56 (post-IRC), respectively, for the responses of 6 and 12 months' cumulative responses. We entail; the IRC implementation appears to be effective at the short-end rate signaling. Also, the bank pricing

benchmarks seem to be more responsive to the policy environment[23]. We inspect that the response to the base rate is systematically larger in the low liquidity months compared to the normal liquidity months (the immediate response is 0.01 in the former months versus 0.12 in the latter months, and the 12-month response is 0.46 in the former versus 0.66 in the latter months). In overall, by using a cross-bank dispersion as a third measure, we deduce the average dispersion decreases following the IRC (mean IQR 1.49 to 1.35, mean SD 1.49 to 1.09), however, the episodic increases do not seem to be absent (Table 3.6; Figure 6). This finding suggests us about the increased common anchoring and continued bank-specific dispersion (Figure 6).

Diagnostics

We provide a detailed output of the diagnostics (provided to strengthen the stability of the main findings) in Appendix. We observe a weaker pass-through before the IRC, stronger pass-through after the IRC, and softer transmission during the COVID 19 window (average rolling β-sum: pre-IRC = 0.015, post-IRC = 0.051, COVID = 0.023) (Table 3.5; Appendix). The out-of-sample exercise also confirms poor performance of the fundamentals-only model. It also shows a jump in the predictive performance when the state persistence is added (AUC: 0.324 versus 0.904). We also observe some serial correlation at longer horizons (suggested by the residual diagnostics), implying that HAC/Newey-West standard errors are used for inference. The residual plots, autocorrelation diagnostics, Q-Q plots, and stationarity/transformation summary are also reported in the Appendix.

3 Discussions

We have attempted to analyze a transmission puzzle in Nepal. Despite characterizing the pass through as a fixed variable, our results indicate that pass through is state dependent. This means that the same impulse in the price of the market may be strong in one period of the month and can be weak in another. In this backdrop, we present the discussions section digging into these matters in the following.

Answers to Research Questions

We attempt to discuss the answers to the research questions. For the first question, we attempt to answer whether the linear benchmark model is appropriate for the pass through of the deposit and lending rates. And the answer is, it's still unsuitable. We discover that the impact of a change on the 91-day Treasury-bill rate is relatively small, but the impact is more evident over the next few months. However, we also assess that the long-run pass-through has still not been fully realized in line with the literature that indicates that retail prices are rigid and tend to move with a lag (ECB, 2017; de Bondt, 2002; Heckmann-Draisbach, 2020).

To answer the second question, the Markov-switching results indicate the pass-through has not appeared to be constant. The estimated regime probabilities suggest that there are extended periods of time spent in each state. We assess that the transitions between states seem to be abrupt. This shows that a constant-coefficient model obscures an important variation in the transmission environment. We thus observe the regime classification appears to be economically interpretable. The months which have the funding pressures in it (lower liquidity ratios or higher central bank funding dependence) show a weaker pass through in at least one section of the retail rates. While in a normal condition, we obtain cleaner and stronger responses. This is consistent with the notion that bank funding conditions influence the timing of market signals to the retail pricing decisions (Gigineishvili, 2011; Myrvoda & Reynaud, 2018).

[23] We should treat the improvement of post IRC in the base rate as the evidence of the stronger anchoring of first stage. But it does not reflect full transmission. We include the base rate as internal pricing benchmark. The final lending rate can be sticky due to the borrower's risk, contracts of loan, quality of collateral and, sector wise credit demand (de Bondt, 2002; ECB, 2017; Mishra et al., 2014; Heckmann-Draisbach & Moertel, 2020).

Answering the third question, we observe the robustness of the ranking of pass through across liquidity states, which is based on the threshold and STAR specification. Both analyses provide the same message. The class A banks base-rate panel provides a cross-bank alternative in parallel. In the post-IRC, response of the base rate to the short rate shocks is more stable and larger at policy relevant horizons. On average, we observe the cross-bank dispersion appears to be smaller. This indicates the common anchoring is stronger after the implementation of the IRC framework. The episodic dispersion peaks continue to occur. And this suggests that the bank-specific constraints and the heterogeneity remain important for transmission mechanism.

Similarly, we also assess the answer to the fourth question. With respect to the local-projection estimates (in addition to post-IRC interactions) we found clearer medium-horizon responses during the corridor regime (though the impact response is small). We also found the state persistence is communicated in rolling and out-of-sample checks. And they appear to be relevant for monitoring and communicating monetary stance. Thus, these horizon-wise and predictive checks seem to minimize the risk of the Markov outcome to be the spurious product with only one specification.

Prior Studies and Value Added

We inspect relevant literature and compare the findings with our study's findings. This is necessary to evaluate the value added to our study.

Table 4.1. *Prior studies and value added*

Study	Contribution	Gaps identified	Value addition of this study
de Bondt (2002)	The study is definitive evidence which the retail bank rates respond incompletely and with lags to movements of the market rate.	Is silent to address the structural liquidity cycles and corridor implementation. Also, there is no discussion about the regime-switching or validation problems.	We keep the incomplete and delayed benchmark. But we also add the key Nepal insight. The pass-through varies systematically.
Gigineishvili (2011)	Presents cross-country evidence. Provides analysis on macro financial structure and excess liquidity can weaken the pass-through.	No identification of within-country when the regime changes over time.	The regime results are within the time-series counterpart. The excess liquidity/funding conditions indicate a state-dependent pass-through.
Budha (2015)	Presents Nepal-specific macro identification and narrative. Uses SVAR on monetary policy transmission in the pre-IRC era.	The analysis on corridor-era evidence has been left outstanding. Silent to model the liquidity-regime dependence of retail-rate pass-through using bank-balance-sheet liquidity indicators.	We extend into the corridor-era transmission and explicitly test regime dependence using liquidity proxies (using multiple nonlinear checks and validation).
Das (2015)	Shows policy-to-bank-rate pass-through can be slow and asymmetric. It is useful for regional benchmark for the bank-based systems.	Only discuss the operating framework and market depth differences.	We provide evidence where liquidity regimes and corridor-floor conditions matter for the strength of pass-through.
Dias and Scott (2025)	Explains the sluggishness of deposit rates' adjustment. The deposit and competition, and non-deposit funding channels model the pass-through.	The study is silent to map the pass-through into a corridor/floor-binding context with persistent liquidity surplus.	We connect the intuition to corridor reality. When the WAIBR is floor-bound and liquidity is abundant, the policy signal can lose traction in retail pricing.

Study	Contribution	Gaps identified	Value addition of this study
Pokhrel and Upreti (2025)	Provides corridor-regime SVAR evidence on repo and CRR effects on the bank rates. It aligns with a policy-to-retail transmission concept.	The average dynamics can hide state dependence. Is silent on the classification of the liquidity regimes or validate the regime predictions.	We generalize beyond the linear SVAR.
Bhatta and Nepal (2026)	Discuss on the rule design. Focus on how a reaction function could incorporate foreign rates and an external wedge under a peg.	The empirical justification on whether implied stance becomes necessary for the retail bank rates is left open ended. The pass-through may weaken even if the rule is well-designed and implemented.	We answered the question of operational traction. The short-end signals transmit unevenly to deposit/base/lending rates. The mapping is regime-dependent and improves after IRC implementation.

Note. Author's Analysis

Policy Discussions

We interpret the empirical results as a policy-regime outcome, rather than only a pass-through coefficient. We know that Nepal has officially attempted shifting to a price-based monetary system. The advent of the IRC, the policy rate, and the WAIBR as an operating target supports the mechanism of it. IRC, basically, is an institutional step, the implication of which was needed then. So, when we inspect today's problem (concerning the anchoring of the WAIBR to the policy rate), the problem lies not only in the rate channel. Because, whenever the rate channel was weak, our country resorted to quantity-based liquidity operations, reserve requirements, refinancing procedures, regulatory forbearance, and the sectoral credit measures. So, we entail that the problem is not the presence of an IRC[24], but it's in the lack of an ex-post evaluation of the effect of each instrument on the transmission mechanism.

The pre-corridor period demonstrated the challenges of an organized interest-rate channel. After 2015's earthquake, the central bank lowered the bank rate (by one percent) to 7 percent and introduced interest-free refinance to BFIs (for the affected households to the housing loan at 2 percent). This support was provided because we faced a loss of Rs.706 billion in the earthquake. However, this shifted the credit pricing from the market to the narration of the administrative relief. Although it was a correct step for the disaster response, a pattern was established after that. The pattern was, during the stress period, central bank relied on the credit and refinance aggressively rather than targeting on the price signal itself.

This phenomenon was attempted to be corrected by the introduction of the IRC in FY2016/17. But the first introduction of IRC was not a fully price-based mechanism, it was a hanging corridor regime[25]. Due to its effect, the policy signal was only partly set by the market[26]. The revision of the IRC (the full-fledged corridor) was done later. In FY 2017/18 the ceiling rate, the policy rate, and the floor rate of the IRC were set at 7 percent, 5 percent, and 3 percent. We assess that this conceptually appeared to be correct because it assigned the policy rate a distinct role. However, after the regular implementation of IRC, the policy effects from the corridor were not only transmitted by the price of loans. We deduce, it is also transmitted through the quantity of liquidity and the pressure on bank balance sheets (from real estate and share lending and prudential concerns about consumption-oriented lending).

[24] We assess the problem is not the adoption of the IRC. A price-based operating framework can only be an effective corridor system if the operating target can be maintained within the corridor with a minimum of the ad hoc quantity-based interventions. In Nepal, the repeated liquidity absorptions and strengthening the SDF floor represents the progress in the operating discipline. However, it also represents the dependence of the quantity-based liquidity management.

[25] The effectiveness of an IRC is when the operating target is kept within the band using standing facilities and liquidity operations (Bindesil, 2004). In Nepal, the introduction of SDF shows that the credibility of floor does not depend on the corridor rates. It also depends on the operating design and facility as well (NRB, 2026c).

[26] See also, Bindseil (2004), Borio and Disyatat (2009), and Brandão-Marques and Ratnovski (2024) for detailed information.

During COVID 19, we perceive the hybrid framework appeared to be implicative. The central bank lowered CRR to 3 percent (from 4 percent), bank rate to 5 percent (from 6 percent), repo rate to 3 percent and the floor rate to 1 percent. Meanwhile, during and the period thereafter, the refinance, moratorium, restructuring, rescheduling, and the working capital guidelines emerged as the key instruments. This was quite right for contingent crisis management. But we should not understand the muted pass through during this period as the result of weakness of the policy[27]. The relief instruments deliberately reduced the rate signal[28]. Generally, in a price-based mechanism, the lower rates would (in strict price-based framework) impact on the lending primarily via the marginal cost of funds. So, we confer that the measures taken during COVID 19 had a directed relief dimension, a regulatory forbearance, and a protection against balance sheets deterioration.

However, we identify the tightening period during the FY 2021/22-2022/23 reacted in opposite direction. The central bank increased the rates of IRC by 1.5 percentage points. The bank rate rose by 8.5 percent, policy rate by 7.0 percent, and the deposit collection rate by 5.5 percent. The CRR of commercial banks and development banks/finance companies were increased to 4 percent and 10 percent respectively, and the SLR to 12 percent. This tightening appeared to be correct because there was a stress on the economy from imported goods, foreign exchange reserves, imported inflation, and the liquidity under a peg. IMF also assessed that the implementation of monetary tightening, bank regulation, and COVID 19's measures helped overcome the pressure of external sector. However, this should not be understood as proof of smooth functioning of the rate channel. The pass-through during the period was strengthened due to collective action of prices and quantities tightening in unison[29]. We comprehend that the stronger pass through did not stem from the policy rates alone. It comprehended to the tightening where the banks adjusted their balance sheet.

During the easing periods thereafter, we align with those asymmetries connecting our empirical results. During the first 11 months of FY2024/25, NRB absorbed Rs.2,785 billion using deposit collection auctions and Rs.18,559 billion using the SDF operations. The net liquidity absorbed then was Rs.2,134 billion. The weighted average interbank rate of commercial banks decreased from 10.15 percent in mid-June 2024 to 7.99 percent in mid-June 2025. Meanwhile, WAIBR averaged to 2.99 percent, which seemed close to the SDF rate (endorsed from May 2024). These suggest improvements in the first stage of transmission. The corridor appeared to bring the money-market rate within the IRC band. However, we entail a weakness in it as well. If a huge amount of liquidity absorption is needed to keep the meaning of the price signal, then we confer that the country is not only relying on the price channel only. The quantity operations are also helping to maintain the price-based mechanism.

We further discover that the policy of FY2025/26 brushes up this criticism. The upper rate of the corridor was cut from 6.5 percent to 6.0 percent, the floor rate was cut from 3.0 to 2.75 percent, and the policy rate was lowered from 5.0 to 4.5 percent. The policy also projected broad money growth to 13 percent and private-sector credit growth to 12 percent. So, we see, though the country expresses the operating target in the rate form, it appears to be operating with monetary and credit quantities. Thereafter, the SLF rate was lowered to 5.75 per cent and the policy rate to 4.25 per cent, with the SDF rate at 2.75 per cent. This reduced the size of the IRC band and appeared to increase the symmetry of the corridor. This step seemed to be sensible. However, the central bank also increased the personal overdraft limit to Rs.10 million (from Rs.5 million), increased in the ceiling on microfinance loan on collateral basis to Rs.1.5 million (from 0.7 million), and relaxed the share-collateral related restrictions. Aligning to empirical results, these changes did not seem to be neutral price signals. They were simply the regulatory mechanisms for providing access

[27] We should not treat the COVID 19 period as a normal pass-through episode.

[28] We understand that the inflation during COVID 19 in the U.S is the complete phenomenon combining the monetary policy instruments, fiscal support, and the household constraints. It is not only the cause of the monetary policy alone (Andolfatto and Martin, 2026). In line with this, we assess that the pass-through in Nepal should be read in line with the pass-through in the form of refinancing, repayment relief, regulation forbearance, and balance sheet protection measures.

[29] We should understand that the stronger pass through is not only caused by the policy rate alone. It is also caused by a comprehensive tightening strategy. This includes the higher corridor rates, the tighter reserve requirements, crunch in the liquidity, and prudence in the external sector.

to credit and utilizing excess liquidity. We, therefore, deduce that whenever the interest rate channel appears to be weak, the policy moves (sooner or later) to quantity and eligibility levels.

In the third-quarter review of the Monetary Policy FY2025/26, it reinforces the same. By the time, (of FY2025/26), average inflation stood at 2.39 percent, the reserves were sufficient to cover imports of goods and services for 18.4 months while the excess liquidity remained in surplus (as remained for 2 years). The central bank is seen to have refrained from changing the existing policy rates, CRR, and SLR, however, review the SDF's arrangement. The announcement that the SDF would be available on all the banking days is also a change towards liquidity management. We analyze it is a pragmatic solution to a floor-based surplus/liquidity situation. This can possibly increase the integrity of the corridor floor. We evaluate that it may minimize the noise in WAIBR. However, we presume that we're still technically bewildered to choose between a pure price corridor and a quantity-based floor system as a monetary policy stance.

If we see India's case, it has implemented rate cuts, CRR reduction, moratorium, and liquidity measures during COVID 19. The other central banks around the globe also resorted to asset purchases, refinancing operations, emergency liquidity facilities, and other quantitative easing instruments. The difference is not that Nepal is using a lot of instruments comparing to other central banks. Unlike the well-developed financial systems (where the policy rate transmits through market channels, not only through banks), the central bank typically makes clear what instrument it is using to set the price of reserves, what it is using to set the quantity of liquidity, and what it is doing for support of the financial stability (even in temporary terms). In Nepal, we put this into a conjecture because, it is difficult to distinguish if a rate change is due to either a policy rate adjustment, liquidity volume, regulatory relaxation, or it is due to the credit-risk repricing for a given sector only.

Finally, we assess the public-debt channel as well. The Monetary Policy of FY2025/26 puts a focus on the cautious accommodative stance which seems to support capital formation by assisting the cost of mobilizing the internal debt. This appears to be sensible during the period of low inflation and comfortable levels of foreign exchange reserves. However, it also can establish an alternative transmission route. When banks experience greater risk in the private sector, they focus on government securities, central bank instruments, deposit collection instruments or the SDF. Therefore, monetary easing can be easily passed on to public-sector borrowing than to the private sector's productive credit. We can, thus, understand that money-market anchoring can have a positive effect even in the presence of partial private credit transmission.

4 Conclusions

From this study, we entail the interest-rate pass-through in Nepal is incomplete, persistent, and highly regime-dependent. This implies that the interest rate transmission problem in Nepal is not due to failure of the policy rate transmission, but a two-stage transmission problem between money-market anchoring and retail-rate and credit transmission[30]. We assess the regime-based model, which shows the transmission from the 91-day treasury bill rate to deposit and lending rates is not always stable. Also, the linear benchmark indicates that the effect of the same is relatively slow. This indicates a positive sign of the corridor in enabling short-end anchoring and it is also not fully translated into retail rates during the post-IRC period.

From these empirical results, we identify that the effectiveness of monetary transmission is not only dependent on the setting of the short-term interest rate, but it is also about the management of regime sensitive liquidity. The issue is not only about the policy rate, also about promoting the operating

[30] We do not suggest to understand the IRC as a direct instrument for credit transmission and control. Primarily, it is an operating framework for alignment of short-term interest rate (Kahn, 2010; Bindseil, 2014).

architecture of the IRC. We discover that a narrow[31] and credible IRC band should be maintained to ensure that the WAIBR is not allowed to stay off the policy rate (for extended periods of time). The SDF should be implemented as a genuine bank-initiated standing facility, rather than as an episodic liquidity-absorption operation. It also should be available on a daily and rule-based basis, to enable banks to take the corridor floor as an enforceable price of reserves in surplus-liquidity periods. We also suggest a systematic and well-designed liquidity forecast. This can be possibly done by the identification of all interbank transactions (on an automated basis) in real time and by setting a clear outline between short-term liquidity smoothing. We can do this short-term smoothening by SDF/deposit collection and structural liquidity absorption (using longer tenor NRB bonds or by other OMOs). Therefore, we suggest that Nepal needs to shift from discretionary liquidity management to a corridor compatible, rule-based real time automated operating framework. With this, the corridor width, SDF access, and the OMOs, can perhaps anchor the policy rate to short-term money-market rates leading to a higher pass-through to retails rates and base rates responses.

Limitations and Further Scope

While conducting this study, we encountered several limitations. We employ the 91-day Treasury bill rate as a short-term market signal. But the policy stance of Nepal also works through the CRR, SDF, refinance, deposit collection and other macroprudential regulations. Similarly, we have used monthly data (which is indeed suitable to work on the regime analysis). However, it may not adequately reflect the short-term movements in liquidity in the daily money market. We analyze the bank level data, only using with the base rates of A-class commercial banks instead of the loan-level or sector-wise lending rates. However, all these limitations come through clear data inaccessibility, not due to our personal choices. We did our best to make the study as scientific as possible. Similarly, for further research, we suggest that this study may use the daily interbank, SDF/OMO data and borrower-level lending rates. In addition, it could incorporate the policy-event identification around the corridors, CRR, and the macroprudential changes as well.

Appendix

The Appendix section is available on the following link,

https://docs.google.com/spreadsheets/d/1voxtWWaWy47AxVZOMXDNzBL5Gacja4I/edit?gid=1658199090#gid=1658199090

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[31] We should not assume that a narrow IRC band is often good for pass through. In a very narrow IRC band, banks possibly rely on the other liquidity facilities provided by central banks, weakening the essence of interbank transactions. The IRC band should be in line with the depth of money market, volatility in liquidity, and operational capacity of the standing facilities (Kahn, 2010).

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