



The Impact of Central Bank Actual Intervention on Corporate Foreign Exchange Exposure: Evidence from China

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Abstract. Under the backdrop of deepening exchange rate marketization and capital account liberalization in China, central bank foreign exchange interventions remain a critical tool for stabilizing currency volatility. This study investigates how the People's Bank of China's (PBOC) actual interventions influence corporate foreign exchange (FX) risk exposure using quarterly data from 2005Q3 to 2022Q4 for 4,028 A-share listed firms. By constructing a dynamic FX risk exposure metric and employing a fixed-effects panel model, we find that actual interventions significantly reduce corporate FX risk exposure by mitigating exchange rate volatility. However, this effect weakens post the 2015 "8·11 Exchange Rate Reform" due to enhanced marketization. Furthermore, interventions exhibit asymmetric effects, showing stronger efficacy during depreciation crises. These findings provide policymakers with insights into optimizing intervention strategies in transitional economies.

Keywords: Actual intervention; Foreign exchange exposure; Asymmetric effects; Marketization reform

1 Introduction

The progressive liberalization of China's foreign exchange (FX) regime, marked by the 2005 managed float reform and the landmark 2015 "8·11 Reform," has transformed the renminbi (RMB) into a more market-driven currency. While these reforms enhanced exchange rate flexibility, they also amplified corporate exposure to FX risk, particularly for firms engaged in cross-border trade and financing. In this context, the People's Bank of China (PBOC) has relied heavily on actual FX interventions—direct purchases or sales of foreign reserves—to stabilize currency volatility (He et al, 2024) ^[1]. However, the effectiveness of such interventions in mitigating corporate FX risk exposure remains contested, especially given China's dual transition toward marketization and its unique "fear of floating" tendencies.

Existing studies on central bank interventions predominantly focus on advanced economies, where sophisticated derivatives markets and transparent policy frameworks dampen corporate sensitivity to FX shocks (Bartram & Bodnar, 2012) ^[2]. For

instance, Dominguez (1998) ^[3] demonstrates that interventions in the U.S. and Germany reduce short-term exchange rate volatility through signaling and portfolio rebalancing effects. However, emerging markets like China face distinct institutional constraints, including capital controls, limited hedging instruments, and asymmetric policy responses to appreciation versus depreciation pressures (Bonga, 2025) ^[4]. While recent work acknowledges the PBOC's stabilizing role, few studies isolate the impact of actual interventions from other policy tools (e.g., verbal guidance), nor do they explore how the 2015 reform reshaped intervention efficacy in a more market-oriented regime.

Using quarterly data from 4,028 A-share listed firms (2005Q3–2022Q4), we employ fixed-effects panel regressions to disentangle these dynamics. This study addresses three critical gaps. First, it quantifies the direct effect of PBOC's actual interventions—proxied by quarterly changes in foreign reserves—on corporate FX risk exposure, measured as stock return sensitivity to a trade-weighted RMB index. Second, it tests for asymmetric effects across appreciation and depreciation regimes, a key concern for policymakers in economies with managed floats. Third, leveraging the 2015 "8·11 Reform" as a structural breakpoint, it examines how reduced direct intervention and enhanced marketization altered the intervention-exposure relationship.

This research contributes to both theory and policy. Theoretically, it extends the portfolio balance and signaling frameworks to transitional economies, highlighting how institutional shifts—such as reduced direct intervention—reshape policy outcomes. Practically, it offers actionable insights for central banks balancing stability mandates with market-driven reforms. For instance, targeted interventions during depreciation crises could maximize stability gains while minimizing moral hazard

2 Theory and empirical literature

Exchange Rate Exposure refers to the sensitivity of a company's cash flows or market value to fluctuations in exchange rates (Adler & Dumas, 1984) ^[5]. This directly impacts cross-border transactions of multinational enterprises and indirectly affects purely domestic firms through competitive effects. Theoretically, firms can hedge this risk using foreign exchange derivatives. However, in emerging markets, due to limited financial instruments, high reliance on external debt, and specific exchange rate regimes, corporate exchange rate exposure is significantly higher compared to developed markets. Early studies primarily focused on developed economies found insignificant exchange rate exposure (Jorion, 1990) ^[6]. Recent research in emerging markets, however, indicates that approximately 30%-50% of enterprises exhibit significant exposure (Hutson et al., 2019) ^[7], highlighting the need for particular attention to risk exposure among emerging market enterprises.

Foreign exchange intervention serves as a core tool for emerging market central banks to stabilize exchange rates, indirectly influencing corporate risk exposure. Existing studies indicate that intervention operates through three main channels: firstly, interventions exacerbate exchange rate volatility, increasing hedging costs and inhib-

iting corporate risk management (Salomao & Varela, 2021) ^[8]; secondly, non-sterilized interventions alter exchange rates through monetary channels, while sterilized interventions affect market expectations through portfolio balance and signal transmission; thirdly, enterprises may perceive interventions as implicit government guarantees, reducing hedging incentives and leading to moral hazard. Sikarwar (2020) ^[9] further finds asymmetric effects of central bank forex interventions on risk exposure, with sell interventions during depreciation periods having a more significant impact, confirming emerging market central banks' preference for defensive operations during currency crises (Avein, 2024) ^[10].

The literature on exchange rate exposure is extensive. Although there is some debate about whether firms are exposed to exchange rate risk, most scholars agree that enterprises in emerging markets experience significant exposure. Regarding the determinants of corporate exchange rate exposure, numerous studies have explored these factors from exogenous perspectives—both at the firm and macroeconomic levels—as well as from the endogenous perspective of corporate hedging behavior.

In studies of central banks' actual foreign exchange interventions, the vast majority have focused on assessing the effectiveness of such interventions—that is, their impact on exchange rate levels and volatility. In recent years, a portion of the literature has also investigated the spillover effects of these actual interventions on financial markets. However, research on the direct impact of foreign exchange interventions on corporate exchange rate exposure remains limited, having examined only a few emerging market countries with relatively small sample sizes. Given that China is the largest emerging market in the world and, with increasing globalization, its capital accounts are gradually opening and integrating more deeply into the global economy, it is of significant importance to investigate whether corporate exchange rate exposure at the firm level is influenced by actual foreign exchange interventions.

3 Research Design

3.1 Data Sources and Sample Selection

The sample comprises all A-share companies listed on the Shanghai and Shenzhen Stock Exchanges from Q3 2005 to Q4 2022, excluding financial firms (such as banks, securities, and insurance companies), ST companies, and those with substantial missing data, yielding a final sample of 4,028 enterprises. All data utilized in this study were sourced from the People's Bank of China, the China Statistical Yearbook, the RESSET Financial Database, the Wind Database, the CSMAR Database, and the Bloomberg Database.

3.2 Estimating exchange rate exposure

Based on the models proposed in the existing literature (He and Ng, 1998) ^[11], exchange rate exposure is measured as:

$$S_{i,t} = c_{i,t} + \beta_{i,t}S_{m,t} + \delta_{i,t}EX_t + \varepsilon_{i,t}$$

In this model, $S_{i,t}$ represents the excess return of firm i 's stock on day t . It is calculated as the return based on the closing price on day t relative to the closing price on day $t-1$, minus the risk-free rate, where the risk-free rate is the benchmark three-month deposit rate. $S_{m,t}$ represents the corresponding market excess return, which is measured using the return on the CSI 300 Index and is calculated in the same manner as the individual stock's excess return. c denotes the change in the RMB exchange rate index over the same time interval, serving as the error term. A quarterly regression is then conducted, and the estimated coefficient on EX_t is interpreted as firm i 's exchange rate exposure for that quarter.

3.3 Model Specification

To investigate whether actual central bank interventions affect the exchange rate exposure of Chinese firms, we regress the exchange rate exposure on the actual intervention variable, along with firm-specific and macroeconomic control variables. The model is specified as follows:

$$|exposure_{i,t}| = \beta_0 + \beta_1 \cdot IA_{t-1} + \beta_2 \cdot Controls_{t-1} + \delta_i + Quarter + \varepsilon_{i,t}$$

In this model, $|exposure_{i,t}|$ represents the absolute value of exchange rate exposure. Based on previous studies, macro-level factors are assumed to affect only the magnitude of exchange rate exposure, not its direction. IA_{t-1} denotes the lagged (by one period) measure of actual central bank intervention, while $Controls_{t-1}$ represents the lagged firm-specific and macroeconomic control variables. δ_i captures individual fixed effects, $Quarter$ represents seasonal fixed effects, and $\varepsilon_{i,t}$ is the random error term. All t -values are computed using robust standard errors clustered at the firm level.

4 Empirical Analysis

Based on the data of listed companies in China from Q3 2005 to Q4 2022, this study employs a fixed effects panel model to systematically examine the impact of actual central bank interventions on corporate exchange rate exposure. The results are presented in the table 1 below. The first row of the regression results indicates a negative relationship between the actual intervention variable and corporate exchange rate exposure, i.e., when foreign exchange reserves increase, the level of corporate exchange rate exposure decreases, and vice versa. Specifically, when the central bank intervenes in the market by purchasing foreign exchange reserves, the pressure for RMB appreciation is partially offset, reducing exchange rate volatility and, in turn, lowering the uncertainty in corporate cash flows caused by severe exchange rate fluctuations. Furthermore, as companies in emerging markets such as China generally face constraints such as an underdeveloped derivatives market and a scarcity of hedging instruments, actual interventions that directly dampen exchange rate volatility

may partly substitute for firms' active hedging efforts, thereby reducing their exchange rate exposure.

Table 1. The impact of actual central bank interventions on corporate exchange rate exposure

	(1)	(2)	(3)	(4)
	exposure	exposure	exposure	exposure
IA	-3.088*** [0.2084]	-3.936*** [0.2216]	-3.629*** [0.2756]	-4.124*** [0.2886]
Size		-0.100*** [0.0149]		-0.085*** [0.0154]
Leverage		0.860*** [0.0872]		0.872*** [0.0872]
Gpm		-0.409*** [0.0941]		-0.463*** [0.0941]
Quick		1.290*** [0.4564]		1.384*** [0.4561]
BM		0.483*** [0.0420]		0.401*** [0.0434]
REER			-3.654*** [0.2786]	-3.357*** [0.2870]
FGDP			-0.103 [0.0666]	0.395*** [0.0688]
CPI			-25.435*** [0.9263]	-28.916*** [0.9442]
Exloan			0.585*** [0.0494]	0.689*** [0.0510]
_cons	2.222*** [0.0062]	3.948*** [0.3165]	2.388*** [0.0399]	3.545*** [0.3292]
Quarter FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
<i>N</i>	145743	139108	145743	139108
<i>R</i> ²	0.094	0.099	0.099	0.106

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the further analysis, to examine whether different directions of actual intervention have asymmetric effects on corporate exchange rate exposure. At the same time, to examine whether actual interventions have asymmetric effects on corporate exchange rate exposure during periods of RMB index appreciation and depreciation. This study constructs the following model:

$$|exposure_{i,t}| = \beta_0 + \beta_1 \cdot IA_{t-1} + \beta_2 \cdot IA_{t-1} \cdot IA_{t-1} + \beta_3 \cdot Controls_{t-1} + \delta_i + Quarter + \varepsilon_{i,t}$$

$$|exposure_{i,t}| = \beta_0 + \beta_1 \cdot IA_{t-1} + \beta_2 \cdot IA_{t-1} \cdot ex_10_{t-1} + \beta_3 \cdot Controls_{t-1} + \delta_i + Quarter + \varepsilon_{i,t}$$

In the regression results, if β_2 is significantly different from zero, it indicates that actual intervention has asymmetric effects on corporate exchange rate exposure both when the direction of intervention differs and during periods of RMB appreciation and depreciation.

In the table 2 below, the first column presents the baseline regression results, the second column reports the regression results examining whether the direction of actual intervention has an asymmetric impact on corporate exchange rate exposure, and the third column shows the regression results testing whether actual intervention has asymmetric effects on corporate exchange rate exposure during periods of RMB index appreciation and depreciation.

Table 2. The asymmetry in the impact of actual central bank interventions on corporate exchange rate exposure.

	(1) exposure	(2) exposure	(3) exposure
IA	-4.124*** [0.2886]	-10.978*** [0.5665]	-7.134*** [0.3609]
IA_d*IA		10.064*** [0.7659]	
ex_10*IA			6.124*** [0.3935]
Size	-0.085*** [0.0154]	-0.043*** [0.0164]	-0.081*** [0.0154]
Leverage	0.872*** [0.0872]	0.823*** [0.0883]	0.860*** [0.0869]
Gpm	-0.463*** [0.0941]	-0.417*** [0.0938]	-0.465*** [0.0941]
Quick	1.384*** [0.4561]	1.184*** [0.4567]	1.546*** [0.4546]
BM	0.401*** [0.0434]	0.467*** [0.0449]	0.343*** [0.0440]
REER	-3.357*** [0.2870]	-2.232*** [0.3089]	-3.369*** [0.2910]
FGDP	0.395*** [0.0688]	0.451*** [0.0689]	0.581*** [0.0699]
CPI	-28.916*** [0.9442]	-37.841*** [1.0405]	-33.122*** [0.9614]
Exloan	0.689*** [0.0510]	1.043*** [0.0540]	0.838*** [0.0524]
_cons	3.545*** [0.3292]	2.305*** [0.3547]	3.282*** [0.3293]
Quarter FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	139108	139108	139108
R ²	0.106	0.111	0.108

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Based on the key policy event of the "8·11" Exchange Rate Reform in 2015, this study conducts a subsample regression to reveal the profound impact of exchange rate marketization reform on actual interventions. As shown in the table 3, the regression

results before and after the reform exhibit significant differences, reflecting a structural shift in firms' risk management strategies and policy transmission mechanisms under the reformed exchange rate formation system. The findings indicate that the negative effect of actual foreign exchange intervention is relatively strong, suggesting that the central bank's foreign exchange reserve operations effectively mitigate corporate exchange rate exposure. However, after the reform, the coefficient decreases to -1.354, indicating that the increased exchange rate flexibility has weakened the marginal effect of direct interventions. Consequently, firms gradually adapt to a more volatile exchange rate environment, reducing their reliance on policy support.

Table 3. The impact of actual central bank interventions on corporate exchange rate exposure before and after the exchange rate reform.

	before exposure	after exposure
IA	-2.100*** [0.5142]	-1.354*** [0.4993]
Size	-0.149*** [0.0412]	-0.630*** [0.0346]
Leverage	0.628*** [0.1550]	1.321*** [0.1258]
Gpm	-0.526*** [0.1697]	-0.224* [0.1217]
Quick	0.198 [0.6136]	6.005*** [0.9072]
BM	0.566*** [0.0864]	0.118** [0.0565]
REER	-10.850*** [0.5950]	-0.083 [0.4915]
FGDP	3.998*** [0.1882]	-2.841*** [0.0967]
CPI	-19.967*** [1.8571]	-31.264*** [1.3761]
Exloan	-0.147 [0.0972]	0.823*** [0.0772]
_cons	3.067*** [0.8183]	17.402*** [0.7839]
Quarter FE	Yes	Yes
Firm FE	Yes	Yes
<i>N</i>	53846	85172
<i>R</i> ²	0.160	0.161

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5 Conclusions

This study, based on data from listed companies in China from Q3 2005 to Q4 2022, systematically examines the impact of actual central bank interventions on corporate exchange rate exposure from three dimensions: baseline regression, asymmetry testing, and policy effects before and after the exchange rate reform. The findings indicate that actual foreign exchange interventions significantly reduce corporate exchange rate exposure by suppressing exchange rate volatility. When the central bank

intervenes in the market by purchasing foreign exchange reserves, the pressure for RMB appreciation is partially offset, leading to lower exchange rate volatility and reduced cash flow uncertainty for firms caused by sharp exchange rate fluctuations. However, the effectiveness of interventions has gradually weakened after market-oriented reforms, and the impact of increasing reserves is weaker than that of reducing reserves. This suggests that firms perceive "foreign exchange purchase interventions" as a policy backstop, which may give rise to moral hazard. Additionally, the intervention effect is stronger during periods of RMB depreciation.

For the central bank, actual interventions can be used to address short-term crises, particularly in phases of exchange rate overshooting, by leveraging foreign exchange reserves to quickly stabilize market panic. However, it is crucial to define intervention thresholds and disclose operational details afterward to mitigate moral hazard. At the same time, strengthening long-term mechanisms is essential—linking foreign exchange reserves to cross-border capital flow indicators, setting dynamic intervention ranges, and reducing distortions in market mechanisms caused by regular interventions. Firms should also establish a multi-tiered foreign exchange risk management system to navigate the complex and volatile international financial environment.

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