The Effects of Inflation on Banks' Balance Sheets: Evidence from Emerging Markets

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Abstract

We study the impact of inflation on bank asset allocation. Utilizing a Distributed Lag Non-linear Model (DLNM) within a panel data framework, we analyze a comprehensive dataset of commercial banks across 63 emerging and developing economies from 2000 to 2021. Our empirical strategy isolates the marginal effects of country-standardized inflation on the share of investments relative to total assets, while controlling for bank heterogeneity and macroeconomic cycles via a two-way fixed effects specification. Results show a remarkable asymmetry in bank portfolio dynamics following low and high relative inflation. While asset allocation remains relatively insensitive to mild business cycle fluctuations and moderate deflationary environments, extreme positive inflationary environments trigger a severe, compounding structural effect. Specifically, when inflation exceeds two standard deviations above the domestic historical mean, banks persistently reallocate their portfolios toward investments. Crucially, this effect does not quickly dissipate but accelerates over time, reaching its maximum magnitude at a five-year lag horizon. These findings suggest that extreme inflation inadvertently crowds out traditional private sector lending and impairs monetary policy transmission, underscoring the need for macroprudential oversight by central banks and proactive asset-liability management by financial institutions to mitigate long-tail duration risks.

Keywords: Bank Asset Allocation; Inflationary Shocks; Emerging Markets; Distributed Lag Non-linear Models; Monetary Transmission

JEL Classification: E31, G21, E44, C23

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Content

1. Introduction

The allocation of bank resources between private sector lending and investment in government debt is a key determinant of overall economic performance. Previous research has examined this portfolio choice primarily through the lens of sovereign risk and the sovereign–bank nexus (Gennaioli et al., 2014). While this literature has highlighted the institutional incentives shaping banks' asset allocation, its emphasis on sovereign risk has largely overlooked the role of the broader macroeconomic environment. In particular, the influence of inflation on banks' portfolio decisions remains underexplored, despite its potential to fundamentally alter the relative attractiveness of private lending and government debt.

As macroeconomic conditions become volatile and inflation rises, the risk-reward calculus of financial intermediation changes significantly. A well-established strand of literature demonstrates that inflation directly disrupts credit markets; for instance, Boyd et al. (2001) argue that even perfectly anticipated inflation amplifies informational asymmetries between lenders and borrowers. As inflation increases, declining real returns and heightened economic uncertainty elevate the risk profile of private sector lending. In response to this increasingly opaque and risky credit environment, banks are incentivized to retreat from corporate lending, gravitating instead toward the relative safety and liquidity of government securities.

This inflation-driven reallocation is further magnified by its direct impact on internal bank balance sheets, particularly regarding capitalization. Inflationary pressures, and the corresponding monetary policy adjustments they necessitate, frequently erode the real value of assets and can lead to capital depletion within the banking sector. This dynamic is crucial because, as Crosignani (2021) highlights, bank capitalization dictates how institutions respond to market stress. While well-capitalized banks generally maintain diversified portfolios and sustain private lending, undercapitalized banks tend to exhibit a pronounced 'home bias'. Driven by risk-shifting incentives, these capital-constrained banks disproportionately reduce corporate credit and reallocate their portfolios toward domestic government bonds.

Consequently, inflation is better understood not merely as a passive backdrop, but as an active catalyst shaping banks' asset portfolios. It simultaneously degrades the quality of the private lending market through informational frictions while potentially depleting the capital buffers required to absorb such risks. By centralizing the role of inflation within this framework, this paper bridges the gap between macroeconomic price instability and the micro-level portfolio decisions of banks, illustrating how inflationary environments systematically drive the crowding-out of private credit in favor of investment in government debt.

We examine the dynamic relationship between inflation and banks' portfolio allocation using an unbalanced panel of commercial banks in emerging market economies covering the period 2000–2021. Our baseline specification models the share of investment assets in total assets as a function of standardized country-level inflation using a Distributed Lag Nonlinear Model (Gasparrini et al., 2010, 2011) adapted to a panel-data setting. The model employs a bi-dimensional cross-basis function that simultaneously captures nonlinear responses across the distribution of inflation and their dynamic propagation over time. Identification relies on a rich set of bank- and country-level controls within a two-way fixed-effects framework.

Our findings reveal that bank portfolio allocation responds asymmetrically to inflation. Around normal macroeconomic conditions (defined as inflation within one standard deviation of a country's historical average) changes in inflation have little effect on banks' investment shares. The response becomes markedly different, however, when inflation moves into the tails of its distribution. Deflationary shocks generate a modest decline in investment holdings, with the strongest effects emerging after two to four years. By contrast, large inflationary shocks induce a substantial and persistent increase in banks' investment portfolios relative to total assets. Once inflation exceeds roughly two standard deviations above its historical mean, the effect grows steadily over subsequent years, reaching its maximum at the five-year horizon. Rather than reflecting a temporary portfolio adjustment, these dynamics point to a sustained reallocation of bank assets toward investment holdings during prolonged inflationary episodes. This persistence suggests that inflation can have lasting consequences for financial intermediation and highlights an important channel through which inflationary environments may reshape bank balance sheets and influence the transmission of monetary policy.

2. Related Literature

Previous literature has examined how banks allocate their resources between government securities and private sector lending. A central insight is that this portfolio decision is closely tied to sovereign default incentives through the banking sector's role in financing the domestic economy. In countries with strong institutions and financial systems, where firms rely heavily on bank credit, governments face weaker incentives to default because doing so would inevitably damage domestic banks and, in turn, the broader economy. By contrast, in weaker institutional environments, banks tend to hold larger shares of government debt while supplying less credit to the private sector, increasing governments' incentives to default (Gennaioli et al., 2014). Sovereign risk and banks' portfolio allocation are therefore jointly determined rather than independent phenomena.

Extending this framework, Crosignani (2021) highlights the role of bank capitalization in shaping these allocation choices by banks. Well-capitalized banks diversify their sovereign bond holdings across domestic and foreign issuers while maintaining greater exposure to private lending. Undercapitalized banks, however, display a pronounced home bias, reallocating their portfolios toward domestic government securities at the expense of corporate credit. This behavior reflects a risk-shifting incentive: domestic sovereign bonds generate high returns in favorable states, whereas limited liability and supranational deposit insurance protect bank shareholders if the sovereign defaults in adverse states. Consequently, rising sovereign risk induces undercapitalized banks to reduce lending and increase their holdings of domestic government debt, effectively positioning them as buyers of last resort for the sovereign (Crosignani, 2021).

A complementary strand of the literature focuses on how macroeconomic conditions—and inflation in particular—affect financial intermediation. Boyd et al. (2001) argue that even perfectly anticipated inflation amplifies informational asymmetries in credit markets. As inflation increases, declining real returns discourage lending while simultaneously stimulating borrowing, attracting a larger pool of lower-quality borrowers. The resulting deterioration in borrower quality, together with a contraction in the supply of loanable funds, intensifies adverse selection and credit rationing. Over time, these distortions reduce financial intermediation, depress private sector lending, and impair the efficiency of capital allocation (Boyd et al., 2001). Earlier theoretical contributions similarly associate higher inflation with more severe credit market frictions (Huybens and Smith, 1998, 1999).

Importantly, these effects are unlikely to be linear. Boyd et al. (2001) argue that informational frictions become substantially more severe once inflation exceeds critical thresholds, producing abrupt declines in financial sector performance. Similar nonlinear predictions emerge from Azariadis and Smith (1996), Choi et al. (1996), and Boyd and Smith (1998), suggesting that the consequences of inflation depend not only on its direction but also on its magnitude.

Taken together, these two strands of research imply that banks' portfolio decisions are shaped by both sovereign risk and the macroeconomic environment. Yet the interaction between these mechanisms remains largely unexplored. While sovereign risk and bank capitalization influence the relative attractiveness of government securities, inflation simultaneously alters the quality of private lending opportunities by increasing informational frictions. Our study bridges these literatures by examining whether inflation affects banks' incentives to substitute private lending with government bond holdings.

The interaction between these mechanisms gives rise to an important theoretical tension. On the one hand, higher inflation increases credit rationing by making it more difficult for banks to distinguish high-quality from low-quality borrowers (Boyd et al., 2001). On the other hand, Crosignani's (2021) framework predicts that undercapitalized banks are already predisposed to reduce private lending in favor of domestic government bonds. If inflation further deteriorates the quality of the private borrower pool, these incentives may reinforce one another, leading banks (particularly those with weaker capital positions) to shift even more aggressively toward sovereign debt. By acknowledging the consequences of these two perspectives, i.e., inflation-induced credit frictions and capitalization-driven portfolio choice, our study provides a unified perspective on how inflation reshapes bank balance sheets.

To the best of our knowledge, no previous studies directly assess the effect of inflation on bank asset composition, particularly, the expected substitution between credit and investments. Nevertheless, prior literature offers relevant directions regarding the flow of this substitution when inflationary pressures arise. Furthermore, several complementary mechanisms have been extensively studied. Beyond direct credit rationing, the relationship between inflation and balance-sheet composition is mediated by how effectively bank management anticipates inflationary shocks and adjusts interest rates. The extent to which inflation affects bank profitability and returns depends heavily on whether these inflationary expectations are fully anticipated (Athanasoglou et al., 2008). When banks accurately forecast inflation, they can adjust lending rates upward faster than deposit rates and operating expenses, thereby preserving or even expanding their net interest margins. In an empirical examination of Greek commercial banks, Athanasoglou et al. (2008) confirm that expected inflation and long-term interest rates exert a positive, statistically significant impact on the return on assets (ROA). Similarly, in an emerging market context, Batten and Vo (2019) observe that inflation positively influences commercial banks' net interest margins, as institutions rapidly pass inflation-related funding costs onto both depositors and borrowers by adjusting nominal rates.

The policy adjustments that accompany inflation, specifically central bank shifts in policy rates and yield curves, further shape bank income components and portfolio allocations. Borio et al. (2017) examine how short-term interest rates and the slope of the yield curve impact key balance-sheet components across major international banks. They establish a positive, concave relationship between short-term interest rates and net interest margins, alongside a positive link with overall ROA. While higher short-term rates increase debt-servicing burdens (elevating loan loss provisions) and reduce non-interest income through valuation losses on securities portfolios, the positive impact on net interest income ultimately prevails. This dynamic underscores that environments characterized by higher nominal rates and steeper yield curves generally enhance bank asset yields relative to liabilities, whereas prolonged ultra-low interest rates compress margins and erode overall profitability.

When macroeconomic or regulatory shocks compel banks to restructure their balance sheets, the resulting asset reallocations depend heavily on intra-portfolio diversification and available credit substitution channels.

Examining loan portfolio structures, Shim (2019) finds that commercial banks actively diversify their lending across primary sectors, such as commercial real estate, industrial, residential, consumer, and agricultural loans, to significantly reduce insolvency risk and enhance financial stability. Furthermore, when the credit supply from domestically regulated commercial banks contracts due to macroeconomic or capital constraints, substitution does not occur evenly across financial markets. Aiyar et al. (2014) demonstrate that reductions in regulated bank loan supply are only partially offset by substitute credit from foreign bank branches. Public bond and equity markets often fail to act as effective substitutes during non-crisis periods due to informational and transactional frictions. Finally, as banks navigate post-shock environments, their holdings of liquid assets and capital buffers interact directly with credit risk management. Abbas et al. (2019) reveal that holding appropriate liquid asset buffers supports profitability across international banking systems, whereas unmitigated credit risk and loan loss provisions exert a strong drag on returns.

All in all, the existing literature suggests that while rising inflation intensifies credit rationing and reduces overall bank lending, banks actively adjust their balance sheets through loan repricing, portfolio diversification, and liquid asset management to preserve their margins and stability. Building on these findings, we expect that as inflation risks increase, banks will respond by expanding their holdings of government securities and other liquid assets, thereby increasing the investment component of their balance sheets. However, we also anticipate this relationship to be non-linear, as the incentives to reallocate assets may weaken or reverse once inflation stabilizes at sufficiently low levels.

3. Methodology

Before estimating the baseline models, our data undergoes some pre-processing steps to ensure robustness in our longitudinal setting. First, the dataset comprises an unbalanced panel of commercial banks across multiple emerging market economies, spanning the years 2000 to 2021. To ensure comparability and isolate domestic inflationary shocks relative to each country's historical norm, the primary variable of interest, inflation, is standardized at the country level to have a mean of zero and a standard deviation of one. Furthermore, to mitigate the potential influence of extreme outliers, all continuous microeconomic (bank level) and macroeconomic (country level) variables are winsorized at the 1st and 99th percentiles.

3.1. Panel Distributed Lag Non-linear Model of Banks' Investment Share

To measure the nonlinear effects over time and according to the specific level of standardized inflation, we estimate a distributed lag nonlinear model (DLNM) drawing inspiration from Gasparrini et al. (2010, 2011). Our adapted framework is able to simultaneously estimate a nonlinear exposure-response dependency of the share of investments in bank assets on inflation, using our longitudinal dataset, as well as considering the delayed effects that persist several years after an inflation realization has been observed.

Let us consider a general model specification adapting the DLNM framework to a panel data setting. The equation describing the share of investments in total assets for bank i in country c at year t, denoted as $Y_{i,c,t}$, is given by:

$$Y_{i,c,t} = \alpha_i + \delta_t + s(x_{c,t}; \eta) + \sum_{k=1}^{K} \gamma_k \, u_{i,c,t,k} + \epsilon_{i,c,t}. \tag{1}$$

In this equation, α_i and δ_t represent bank and year fixed effects, respectively, which control for unobserved bank-level heterogeneity and global macroeconomic shock varying in time. The function $s(x_{c,t}; \eta)$ describes the smoothed relation between the primary independent variable—standardized inflation, denoted as $x_{c,t}$—and the linear predictor. The term $u_{i,c,t,k}$ represents a vector of additional control variables beyond the non-linear regressors (including bank-level indicators like the current ratio, return on assets, total assets, solvency ratio, and liquidity ratio, alongside country-level variables such as GDP growth and unemployment). The linear effects of these controls are denoted by the coefficients γ_k. Moreover, to account for arbitrary correlation of the error term $\epsilon_{i,c,t}$ within countries over time, standard errors are clustered at the country level.

3.2. Cross-Basis Specification

The function $s(x_{c,t}; \eta)$ relies on a parametric approach utilizing basis functions. A basis is a space of functions composed of known transformations of the original variable x, which produce a new set of basis variables.

Because macroeconomic shocks such as inflation entail dynamic effects that occur with certain lags rather than only contemporaneously, we add a temporal coordinate to the analysis to consider past values of the covariates, $x_{c,t-l}$. Here, l designates the lag, denoting the time interval elapsed between the inflation impulse and the response in bank asset allocation.

Following the generalization of distributed lag models, we employ a bi-dimensional space of functions known as a cross-basis (Gasparrini et al., 2010). This cross-basis describes simultaneously the shape of the relationship along the predictor space x and its distributed effects at different time periods after the realization of the variable. The cross-basis function is defined by:

$$s\left(x_{c,t};\eta\right) = \sum_{j=1}^{v_x}\sum_{k=1}^{v_l} r_{t,j}^{T}\, c_{.k}\eta_{j,k} = w_t^T\eta. \tag{2}$$

Where $r_{t,j}$ is a vector of lagged impacts associated with time t converted by the basis function $j.$ $c_{.k}$ represents the constituent vectors of a matrix of basis variables resulting from applying specific basis functions to the lag vector $l.$ w_t^T is a vector resulting from the application of the cross-basis functions to $x_{c,t}.$ η is a vector of unknown parameters that need to be estimated.

For our specific empirical strategy, the maximum lag is set to 5 years. The exposure-response dimension (the inflation space) is modeled using natural cubic splines, incorporating three internal knots placed at equal percentiles of the global standardized inflation distribution, bounded by the global minimum and maximum. The lag-response dimension (the temporal space) is strictly modeled using a second-degree polynomial function.

4. Data

We construct an unbalanced panel dataset of commercial banks operating in emerging market economies. The final sample spans a 22-year period from 2000 to 2021. The dataset integrates microeconomic bank-level data with macroeconomic country-level indicators. Bank-specific characteristics, such as the share of investments over total assets, current ratio, return on assets, total assets, solvency ratio, and liquidity ratio, are primarily sourced from BankFocus. Macroeconomic variables, including raw inflation, GDP growth, and unemployment, are drawn from international financial institutions such as the International Monetary Fund (IMF) and the World Bank.

To ensure our empirical results are not driven by extreme data anomalies, all continuous microeconomic and macroeconomic variables are winsorized at the 1st and 99th percentiles. Furthermore, because raw inflation levels differ vastly across emerging markets, we standardize the inflation variable at the country level. This standardization centers each country's inflation at a mean of zero with a standard deviation of one, effectively isolating the impact of localized inflationary shocks relative to a country's own macroeconomic history.

After accounting for missing values across the dependent, independent, and control variables, as well as removing singletons to ensure a robust panel for the fixed-effects lag structure, the final effective sample used in the distributed lag non-linear model (DLNM) estimations consists of 17,882 bank-year observations.

This final estimation encompasses a diverse sample of 63 emerging market and developing economies. The specific countries effectively included in the baseline model are: Albania, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Bhutan, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Cambodia, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Fiji, Georgia, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Jamaica, Kazakhstan, Kyrgyz Republic, Lao PDR, Malaysia, Maldives, Mexico, Moldova, Mongolia, Montenegro, Myanmar, Nepal, Nicaragua, North Macedonia, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Romania, Russian Federation, St. Lucia, Samoa, Serbia, Sri Lanka, Suriname, Tajikistan, Thailand, Turkey, Turkmenistan, Ukraine, Uruguay, Uzbekistan, Vanuatu, Venezuela, and Vietnam.

Table 1 provides a statistical summary of the dependent, independent, and control variables used in the panel regressions. The dependent variable, the share of bank investments to total assets, exhibits a mean of 15.51% and a median of 12.05%, with a standard deviation of 14.75. This indicates considerable heterogeneity in asset allocation strategies among the sampled emerging market banks. The macroeconomic data highlights the highly volatile environment inherent to the sample: raw inflation has a mean of 64.86% and reaches extreme maximum values. This high variance justifies the methodological choice to use standardized inflation, which effectively normalizes the distribution to a mean of 0 and a standard deviation of 0.98. Furthermore, bank-level controls such as the current ratio (ranging from 100.31 to 1587.41) and the solvency ratio (ranging from 0.67 to 93.92) demonstrate that the dataset shows a highly diverse cross-section of banking institutions.

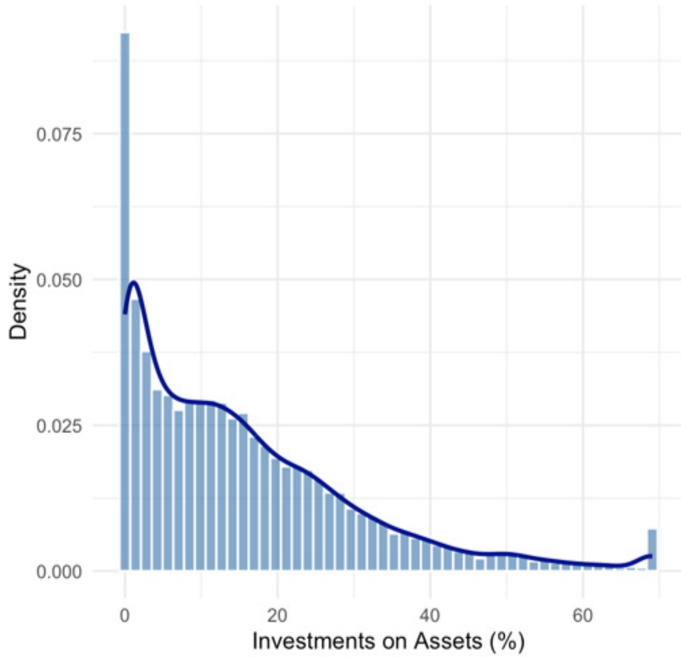
Table 1. Descriptive Statistics

Indicator	*Abbreviation*	*Source*	*Mean*	*Median*	*Std.Dev*	*Max.*	*Min.*
Bank Investment / Assets	bank_inv	BankFocus	15.51	12.05	14.75	69.08	0
Standardized Inflation	inf_std	Constructed	0	-0.24	0.98	3.32	-1.72
Inflation	inf	IMF	64.86	5.4	1730.09	65374.1	-19.8
GDP Growth	gdp_gr	IMF	4.49	5.03	4.17	14.01	-9.96
Unemployment	unemploy	World Bank	6.61	5.61	4.44	27.31	0.5
Current Ratio	curr_rat	BankFocus	150.33	115.26	171.02	1587.41	100.31
Return on Assets	roa	BankFocus	1.18	1.07	2.55	10.37	-11.27
Log Total Assets	log_ta	BankFocus	13.02	13.02	2.36	18.37	7.58
Solvency Ratio	solv_rat	BankFocus	19.08	13.21	17.27	93.92	0.67
Liquidity Ratio	liq_rat	BankFocus	13.79	10.21	12.9	66.04	0

Note: This table presents the summary statistics for the primary bank-level and country-level variables analyzed in the panel spanning from 2000 to 2021. To mitigate the influence of extreme outliers, all continuous variables have been winsorized at the 1st and 99th percentiles. Standardized Inflation is constructed at the country level to have a mean of 0 and a standard deviation of 1.

Figure 1 illustrates the empirical density distribution of the dependent variable, the share of investments over total assets. The distribution is distinctly right-skewed, with the highest concentration of observations falling between 0% and approximately 15%. This shape suggests that for the vast majority of bank-year observations, investments constitute a relatively small fraction of the total asset portfolio. However, the presence of a long right tail shows that a subset of banks maintains highly investment-heavy portfolios, reaching up to nearly 70% of total assets.

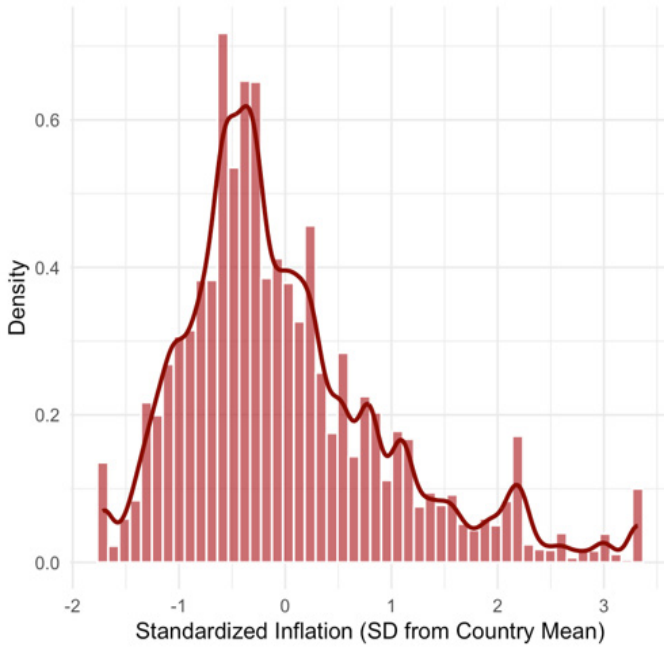
Figure 1. Distribution of Bank Investment Share



Note: Figure 1 illustrates the density distribution of the dependent variable, representing the share of investments over total assets for the analyzed banks. The data spans from 2000 to 2021 and has been winsorized at the 1st and 99th percentiles to handle outliers. Sample runs from 2000 to 2021.

Figure 2 displays the density distribution of our main independent variable, standardized inflation. By construction, the variable is centered around zero, representing a country's historical average inflation rate. The plot reveals a slightly right-skewed distribution with a high peak just below zero. While the left tail drops off near -1.7 standard deviations, the right tail exhibits a longer extension, capturing positive inflationary shocks that exceed 3 standard deviations from the domestic mean. This asymmetric behavior implies that in the sampled emerging markets, extreme positive inflationary shocks are more prevalent and severe than equivalent deflationary shocks.

Figure 2. Distribution of Standardized Inflation

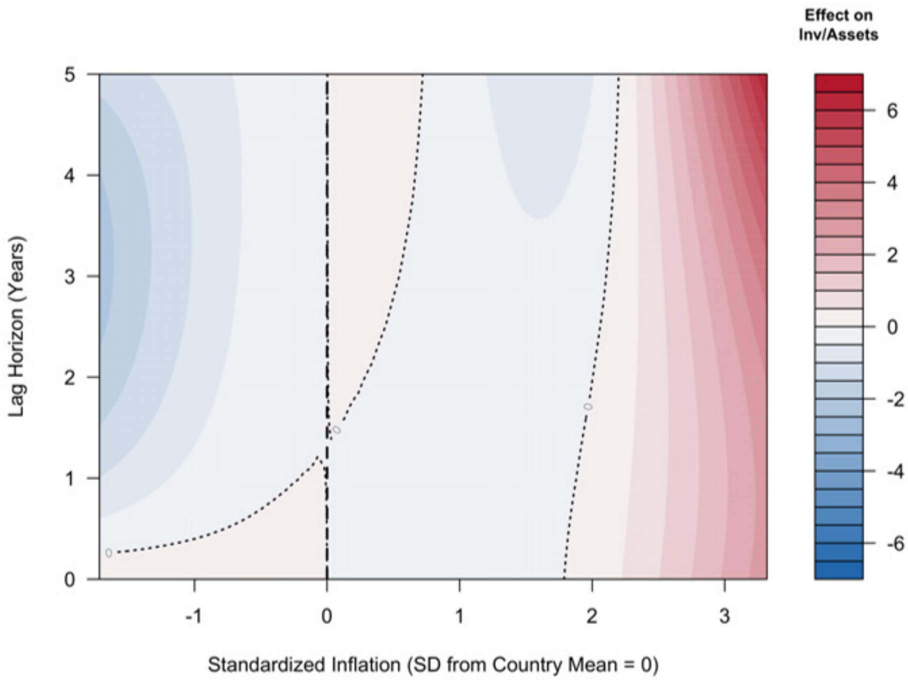


Note: Figure 2 displays the density distribution of our main independent variable, Standardized Inflation. The raw inflation rates were standardized at the country level to have a mean of 0 (representing the country's historical average) and a standard deviation of 1, allowing for the comparable measurement of inflationary shocks across different economies. Sample runs from 2000 to 2021.

5. Results

Figure 3 and Table 2 contain our main results. First, to visualize the non-linear and delayed effects of inflation on the share of bank investments, Figure 3 plots the reconstructed DLNM contour surface. The x-axis represents standardized inflation relative to the country's historical mean (centered at 0), while the y-axis tracks the temporal lag horizon up to 5 years. The color gradient illustrates the magnitude and direction of the effect, where deeper red indicates a positive effect on the investment-to-assets ratio, and blue represents a negative effect.

Figure 3. Non-Linear and Lagged Effects of Inflation on Banks Investment



Note: Figure 3 displays the predicted contour surface of the exposure-lag-response relationship between standardized inflation (x-axis) and the lag horizon in years (y-axis) on the share of investments over total assets. The predictions are centered at a standardized inflation of 0, representing the country's historical mean. The color gradient shifts from blue (negative effect) to red (positive effect), with dotted lines denoting the boundaries where the estimated effect is exactly zero.

The contour mapping reveals a notable asymmetry in bank asset allocation dynamics. For inflation levels near the domestic historical average (between -1 and +1 standard deviations), the effect on bank investments is relatively muted, bounded by the dotted zero-effect contour lines. Deflationary environments (shocks exceeding -1 standard deviation) trigger a moderate reduction in the share of investments, an effect that peaks visually around the 2-to-4-year lag horizon.

Conversely, and more interestingly, extreme positive inflationary shocks prompt a severe and persistent shift in bank portfolios. As standardized inflation exceeds 2 standard deviations, banks significantly increase the share of investments relative to total assets. Notably, the vertical gradient on the right side of Figure 3 indicates that this positive effect compounds over time, becoming strongest at the maximum 5-year lag horizon.

Table 2 quantifies these visual findings by extracting the exact point estimates and confidence intervals at specific extremes of the inflation distribution. Looking at severe positive inflationary shocks (at 3.32 standard deviations above the mean), the delayed cumulative effect is strictly positive and highly statistically significant across all periods. The immediate contemporaneous response (Lag 0) corresponds to a 2.84 percentage point increase in the investment share, with a 95% confidence interval of [0.1017; 5.5820]. Over time, this effect heavily accelerates. By Lag 5, the marginal effect of the initial shock reaches a 6.55 percentage point increase. The confidence interval for this 5-year horizon [2.6369; 10.4654] remains strictly above zero, confirming that severe inflationary environments induce a highly significant, long-term structural reallocation of bank assets toward investments.

Table 2. Reconstructed Marginal Effects of Standardized Inflation on Bank Investments

	Inf: -1.72	Inf: -1.26	Inf: -0.24	Inf: 2.1	Inf: 3.32
Lag 0	0.3977 (-2.5176; 3.3130)	0.3202 (-1.3271; 1.9675)	0.0766 (-0.1401; 0.2932)	0.3261 (-1.8938; 2.5459)	2.8419 (0.1017; 5.5820)
Lag 1	-0.9962 (-2.8736; 0.8811)	-0.5610 (-1.6181; 0.4961)	-0.0021 (-0.1458; 0.1417)	0.2269 (-1.7169; 2.1707)	2.7276 (0.7959; 4.6594)
Lag 2	-1.8642 (-3.3134; -0.4150)	-1.1270 (-1.9495; -0.3044)	-0.0635 (-0.1912; 0.0643)	0.1143 (-1.7610; 1.9897)	3.0414 (0.7002; 5.3827)
Lag 3	-2.2062 (-3.5143; -0.8980)	-1.3778 (-2.1558; -0.5998)	-0.1076 (-0.2387; 0.0235)	-0.0116 (-1.6468; 1.6237)	3.7833 (1.0447; 6.5219)
Lag 4	-2.0222 (-3.2940; -0.7505)	-1.3135 (-2.1205; -0.5064)	-0.1346 (-0.2829; 0.0138)	-0.1509 (-1.3014; 0.9996)	4.9532 (1.8986; 8.0078)
Lag 5	-1.3123 (-3.0012; 0.3766)	-0.9339 (-1.9805; 0.1127)	-0.1443 (-0.3565; 0.0679)	-0.3036 (-1.3432; 0.7361)	6.5512 (2.6369; 10.4654)

Note: This table presents the reconstructed marginal point estimates of standardized inflation on bank investment shares at specified lag horizons (0 to 5 years) and specific levels of the inflation distribution. Values in parentheses represent the 95% confidence intervals derived from the variance-covariance matrix of the main regression. Intervals that do not contain zero indicate statistical significance at the 5% level.

Figure 4 shows the non-linear and delayed effects of standardized inflation on the share of bank investments. Unlike figure 3, this figure presents two-dimensional exposure-response curves. The x-axis measures standardized inflation relative to the country's historical mean, while the y-axis tracks the marginal effect on the investment-to-assets ratio.

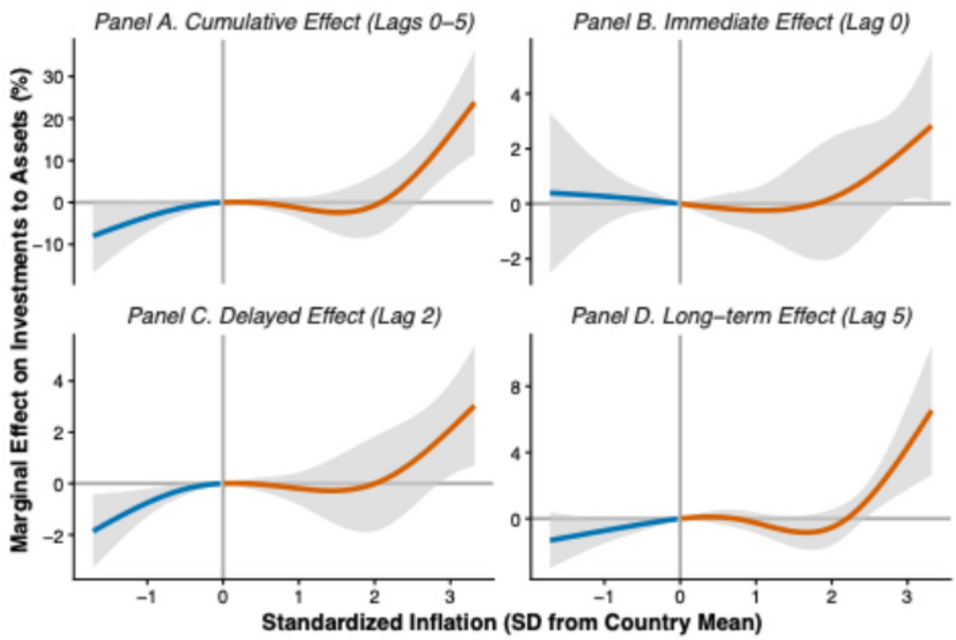
The estimated effects are color-coded, distinguishing between below-average deflationary environments in blue and above-average inflationary shocks in orange, with the shaded grey area representing 95% confidence intervals.

Panel A shows the total cumulative impact aggregated over the entire five-year horizon. While deflationary shocks exert a mild and statistically insignificant impact on asset allocation, extreme positive inflationary shocks (specifically those exceeding two standard deviations above the mean) generate a massive and highly significant structural increase in the investment share, peaking near a 30-percentage point cumulative effect.

The subsequent panels decompose this cumulative effect as to reveal the underlying temporal dynamics of the inflation shock. Panel B shows the immediate, contemporaneous response (Lag 0), which is largely flat with confidence intervals entirely overlapping the zero-effect baseline, indicating that inflation has virtually no immediate impact on bank asset allocation. However, as the time horizon runs to two years post-shock (Panel C), a significant positive portfolio reallocation begins to emerge in severe inflationary environments. This delayed structural shift becomes notoriously steep five years after the initial shock (Panel D). Crucially, while Panel D isolates the strong, persistent point-in-time marginal effect five years out, the magnitude of the overall cumulative effect in Panel A is substantially larger because it adds together these compounding positive impacts across the entire sequence of the lag horizon.

Further exploration of the temporal dynamics of extreme inflationary or deflationary environments is allowed by Figure 5, which presents lag-response curves that trace the trajectory of specific inflation shocks over a five-year horizon. Rather than evaluating the effect across the entire continuous distribution of inflation, this analysis holds standardized inflation constant at two extremes: the 1st percentile (representing a severe deflationary shock of -1.72 standard deviations) and the 99th percentile (representing a severe inflationary shock of +3.32 standard deviations). The figure plots the resulting marginal effect on the investment-to-assets ratio at each subsequent year.

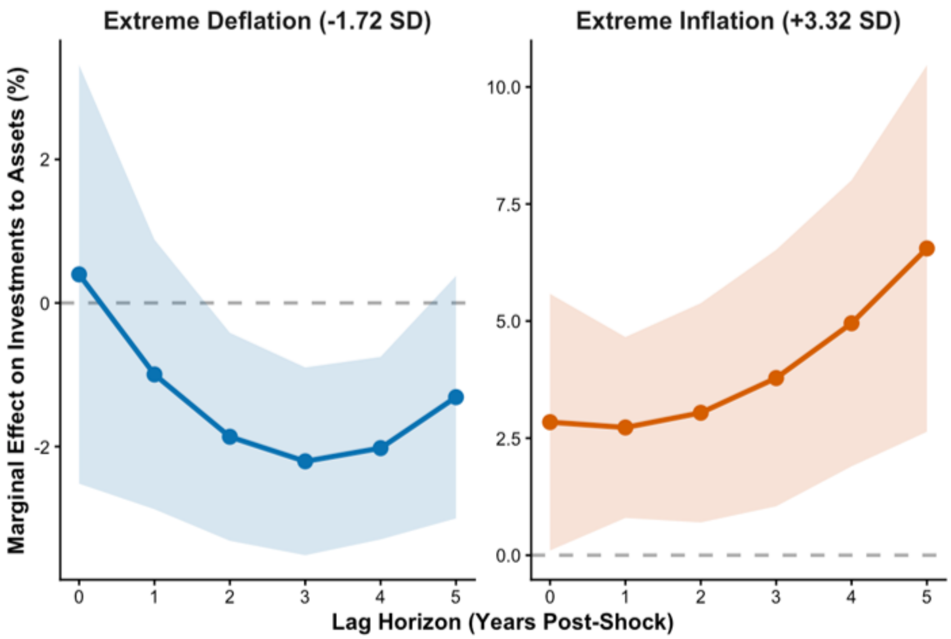
Figure 4. Effects of Inflation on Banks Investment Share at Different Lags



Note: This figure illustrates the estimated marginal effects of standardized inflation on the bank investment-to-assets ratio across specific time horizons. Panel A presents the overall cumulative effect aggregated over the entire five-year lag period, while Panels B, C, and D isolate the point-in-time effects at 0, 2, and 5 years post-shock, respectively. The solid line represents the central estimate, split by color to distinguish below-average (blue) from above-average (orange) standardized inflation relative to the country's historical mean (centered at zero). Shaded grey areas indicate the 95% confidence intervals. Note that the y-axes are scaled independently across panels to appropriately accommodate the differing magnitudes of the cumulative versus individual lag effects.

The left panel shows that a severe deflationary shock (or with inflation considerable bellow the historical average for a given country) induces a moderate, albeit statistically insignificant, reduction in the share of bank investments. The point estimate becomes increasingly negative over the first three years post-shock, bottoming out near a -2 percentage point reduction at Lag 3, before slowly beginning to revert toward zero in years 4 and 5. However, the wide confidence intervals, encompass the zero-effect for lags 0, 1 and 5, suggesting that at such lags emerging market banks do not systematically or significantly alter their asset allocation in response to extreme deflation, but they do affect their investments in two to three years after the deflationary shock.

Figure 5. Lag-Response Curves with the Trajectory of Inflation Shocks on Banks' Investment Over Time



Note: This figure displays lag-response curves illustrating the marginal effect of extreme standardized inflation shocks on the bank investment-to-assets ratio over a five-year horizon. The left panel traces the trajectory of a severe deflationary shock fixed at the 1st percentile of the sample distribution (-1.72 standard deviations from the country mean), while the right panel traces a severe inflationary shock fixed at the 99th percentile (+3.32 standard deviations). The solid lines with point markers denote the central estimates at each specific year post-shock (Lag 0 to Lag 5), surrounded by shaded areas representing the 95% confidence intervals. Note that the y-axes are scaled independently across panels.

Conversely, the right panel highlights a starkly asymmetric response to severe positive inflation (+3.32 SD). While the immediate contemporaneous impact (Lag 0) is positive, sitting just below 3 percentage points, the magnitude of the effect compounds dramatically over time. By the second year after the inflationary shock, the trajectory steepens significantly, accelerating into a highly pronounced, long-term structural shift. By Lag 5, the marginal effect of the initial extreme inflationary shock reaches approximately 6.5 percentage points. Crucially, the 95% confidence intervals for this extreme inflationary scenario remain strictly above the zero baseline across all five years, confirming that severe positive inflation drives a highly significant, persistent, and compounding reallocation of bank portfolios toward investments.

6. Conclusions

Our empirical results yield several policy-relevant insights into how inflation shapes bank balance sheets over time, emphasizing on a notable asymmetry in bank asset allocation dynamics between deflationary and inflationary episodes. Leveraging a Distributed Lag Non-linear Model (DLNM) adapted for a longitudinal panel setting, this study empirically evaluates the dynamic and non-linear impact of inflation on bank asset allocation. Utilizing an unbalanced panel of commercial banks across emerging market economies from 2000 to 2021, the baseline specification models the share of investments over total assets as a function of country-level standardized inflation. Moreover, to capture both the immediate and delayed effects of macroeconomic shocks, the model relies on a bi-dimensional cross-basis matrix in times and across the distributional space of inflation. Finally, our estimation isolates the marginal effect of these inflationary shocks by partialling-out confounding variations through a comprehensive suite bank-level and country level control variables, operating within a two-way fixed effects framework (on bank and year) with standard errors clustered at the country level

Bank asset allocation is relatively insensitive to normal business cycle fluctuations of inflation. That is, for inflation levels close the domestic historical average, specifically between -1 and +1 standard deviations from zero (the historical average), the effect on bank investments is relatively silent. In deflationary environments, characterized by shocks exceeding -1 standard deviation, banks exhibit a moderate reduction in their share of investments, an effect that peaks visually around the 2-to-4-year lag horizon. Conversely, extreme positive inflationary shocks prompt a severe and persistent shift in bank portfolios. As standardized inflation exceeds 2 standard deviations, banks significantly increase the share of investments relative to total assets. Notably, this positive effect compounds over time, becoming strongest at the maximum 5-year lag horizon. This indicates that severe inflation triggers a long-term, structural reallocation of bank assets rather than a transitory adjustment.

This notorious compounding shift toward investments carries significant weight for monetary authorities and central banks. As banks persistently increase their share of investments relative to total assets during high-inflation regimes, this reallocation likely comes at the expense of traditional loan creation. Central banks must recognize that severe inflation can inadvertently crowd out private sector lending, starving the real economy of credit and potentially deepening macroeconomic downturns. Furthermore, this structural shift alters the traditional bank lending channel. If banks lock a larger portion of their assets into investments for up to five years post-shock, changes in the monetary policy rate may become less effective at stimulating the economy during the recovery phase. Consequently, policymakers should incorporate these long-lasting portfolio shifts into their stress testing and systemic risk frameworks, as the financial stability risks associated with an inflationary shock have a long tail that persists well beyond the stabilization of consumer prices. Moreover, this effect is generally overlooked when analyzing the traditional effects of monetary policy rates on the business cycle.

For banking executives and portfolio managers operating in volatile emerging markets, these results underscore the need for proactive and dynamic balance sheet management. High-inflation environments fundamentally alter the risk-return profile of lending versus investing, making the observed shift toward investments a likely defensive mechanism against the erosion of loan values and higher default risks in the real economy. Managers must ensure their asset-liability management frameworks are agile enough to safely execute this structural pivot without compromising liquidity. Additionally, a persistent shift into investments during an inflationary period, which usually coincides with aggressive rate hikes-exposes the institution to significant duration risk. Managers must carefully curate the maturity profile of these new investments, as locking into long-term, fixed-rate securities at the peak of an inflationary cycle could lead to severe capital losses if macroeconomic conditions swiftly reverse or if rates remain elevated longer than anticipated.

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Appendix

Table A1 presents the baseline estimates of the two-way fixed effects ordinary least squares (OLS) regression, utilizing the cross-basis matrix for standardized inflation. The model is estimated over 17,882 bank-year observations, controlling for unobserved heterogeneity across 1,770 individual banks and global time shocks spanning 17 years (see Table A1 note). The regression successfully partials out the effects of standard macroeconomic and microeconomic controls. As expected in a DLNM framework, the individual cross-basis parameters (e.g., cb_v1.l1 to cb_v4.l3) largely lack individual statistical significance due to the collinearity inherent in the spline and polynomial transformations. Only a few basis terms, alongside the control variable for the liquidity ratio ($p<0.001$), display isolated significance. Therefore, to interpret the economic magnitude and significance of inflationary shocks, we must reconstruct the exposure-lag-response surface as done in Table 2 in the main document.

Table A1. Fixed-Effects Estimates of the Distributed Lag Non-linear Model

Observations:	**17,882**				
Fixed-effects:	**id:**	**1,770,**	**year:**	**17**	
Standard-errors:	**Clustered**	**(iso3)**			
	Estimate	**Std. Error**	**value**	**Pr(>|t|)**	
cb_v1.l1	-0.710107	1.297045	-0.547481	5.86E-01	
cb_v1.l2	8.629873	3.564801	2.420857	1.84E-02	*
cb_v1.l3	-6.031049	2.904674	-2.076326	4.20E-02	*
cb_v2.l1	-0.559526	1.832127	-0.305397	7.61E-01	
cb_v2.l2	5.501266	6.193403	0.888246	3.78E-01	
cb_v2.l3	-6.312457	5.860252	-1.077165	2.86E-01	
cb_v3.l1	1.247856	2.742595	0.454991	6.51E-01	
cb_v3.l2	14.370258	7.946937	1.808276	7.54E-02	.
cb_v3.l3	-9.864799	6.722235	-1.467488	1.47E-01	
cb_v4.l1	2.557015	1.415738	1.806135	7.58E-02	.
cb_v4.l2	1.751783	6.401883	0.273636	7.85E-01	
cb_v4.l3	2.956219	5.722776	0.516571	6.07E-01	
gdp_gr	0.012702	0.085837	0.147972	8.83E-01	
unemploy	-0.01871	0.154152	-0.121372	9.04E-01	
curr_rat	0.003788	0.003658	1.035569	3.04E-01	
roa	0.081392	0.063633	1.279096	2.06E-01	
log_ta	-0.290618	0.533015	-0.545234	5.88E-01	
solv_rat	0.055369	0.03682	1.503761	1.38E-01	
liq_rat	-0.247239	0.047109	-5.248207	1.98E-06	***

Note: This table reports the raw OLS estimates for the distributed lag non-linear model (DLNM). The dependent variable is the share of bank investments over total assets. The estimation includes two-way fixed effects (bank and year) and clusters standard errors at the country level. The variables cb_v1.l1 through cb_v4.l3 represent the individual components of the bi-dimensional cross-basis matrix for standardized inflation. Although the underlying panel spans 22 years from 2000 to 2021, the effective estimation period encompasses 17 years (2005–2021); the initial five years of observations are mechanically consumed to construct the 5-year maximum lag structure required for the dynamic cross-basis matrix.

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