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Does Uncertainty Weaken Monetary Policy Transmission? Evidence from Interest Rate Pass-Through in Emerging Market and Developing Economies

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Abstract

Monetary policy in emerging market and developing economies (EMDEs) operates largely through bank lending rates, yet these economies are frequently exposed to bouts of elevated uncertainty. This paper examines whether uncertainty weakens the transmission of policy rate changes to market interest rates. Using monthly policy, lending, deposit and treasury bill rates from the IMF Monetary and Financial Statistics and the World Uncertainty Index for 51 EMDEs over 2005–2025, it employs state-dependent panel local projections with economy and month fixed effects. The results show that monetary policy pass-through to lending rates is significantly weaker under high uncertainty. A 100 basis point policy rate increase raises lending rates by 49 basis points after six months under high uncertainty, compared with 81 basis points under low uncertainty. The corresponding one-year cumulative pass-through ratios are 0.43 and 0.65, respectively. Consequently, a cumulative policy rate increase of approximately 150 basis points under high uncertainty is required to achieve the lending-rate response associated with a 100 basis point increase under low uncertainty. Deposit rate responses remain broadly similar across uncertainty states, suggesting that uncertainty primarily constrains the pricing of loans. The effect is concentrated in economies with shallow financial systems and remains robust to alternative specifications and sample exclusions. These findings suggest that central banks in EMDEs may need larger or more persistent policy adjustments, alongside clearer communication, to achieve desired credit conditions when uncertainty is elevated.

JEL classification: E43; E44; E52; E58; D81

1. Introduction

Central banks change policy rates in order to change the cost of credit, and in emerging market and developing economies (EMDEs), where capital markets are thin and most external finance is intermediated by banks, the lending rate is the price that matters most (Mishra et al., 2012). How much of a policy rate change reaches lending rates, and how quickly, therefore determines how much leverage monetary policy has over spending and inflation. A long literature finds that this pass-through is incomplete and slow in EMDEs and attributes the shortfall to limited banking competition, weak institutions and shallow financial markets (Brandão-Marques et al., 2020; Gondwe et al., 2023; Mishra et al., 2014). These are features that change slowly. Yet central banks in these economies also operate in an environment in which uncertainty is frequent and volatile, driven by commodity price swings, elections and political transitions, exchange rate crises and global shocks (Ahir et al., 2022; Carrière-Swallow & Céspedes, 2013; Julio & Yook, 2012).

Theory gives several reasons why uncertainty could loosen the link between policy rates and lending rates even when the structure of the banking system is unchanged. Banks that price loans with long maturities must judge whether a policy rate change will last, and when the outlook is uncertain a given change carries less information about the future path of funding costs. Uncertainty also raises the value of waiting before repricing (Dixit, 1989), and when the riskiness of borrowers rises, banks may prefer to ration credit rather than raise its price (Stiglitz & Weiss, 1981). On the side of borrowers, uncertainty makes firms postpone irreversible investment and reduces the sensitivity of spending to interest rates (Bernanke, 1983; Bloom, 2009).

Evidence for advanced economies is consistent with these mechanisms. Monetary policy has weaker effects on investment and output when uncertainty is high in the United States (Aastveit et al., 2017; Castelnuovo & Pellegrino, 2018; Pellegrino, 2021), long-term bond yields respond less to policy shocks when monetary policy uncertainty is elevated (Tillmann, 2020), and Italian banks become less responsive to changes in short-term rates when aggregate uncertainty rises (Alessandri & Bottero, 2020). For emerging markets, Sen et al. (2026) show that monetary policy uncertainty dampens transmission to financial markets in India, Nigerian equity prices began to respond to monetary policy surprises only after the 2023 reforms of the foreign exchange market and the policy framework (Akpan & Ogbonnaya, 2026). In a panel of 33 advanced and emerging market economies, Deb et al. (2023) find that output responds more to monetary policy shocks when uncertainty is low.

What remains unknown is whether uncertainty weakens the first link in the transmission mechanism of EMDEs, and the most important one in their bank-based financial systems, namely the pass-through of policy rates to bank lending rates. Three gaps stand out. First, the literature on uncertainty-dependent monetary policy has focused on advanced economies and on output, inflation and asset prices, and has not examined bank loan pricing across a broad group of developing economies, where both uncertainty and bank dependence are greatest. Second, the literature on interest rate pass-through in EMDEs treats pass-through as a stable characteristic of each economy, determined by its financial structure, and does not ask whether it varies over time within the same economy as conditions change. Third, the few studies that identify monetary transmission precisely in emerging markets rely on high-frequency or forecast-based data available for a small number of larger economies (Checo et al., 2024), so little is known about the many low-income and smaller economies in which banks are the main channel of transmission. Closing these gaps matters for policy, because a central bank that calibrates its decisions on average pass-through will overestimate its influence on credit conditions precisely when uncertainty is high and the need to influence them may be greatest.

This paper addresses these gaps. It combines monthly policy rates and bank lending, deposit and treasury bill rates from the International Monetary Fund (IMF) Monetary and Financial Statistics with the World Uncertainty Index of Ahir et al. (2022) for 51 EMDEs that conduct an independent monetary policy, over 2005–2025. It estimates state-dependent panel local projections (Gonçalves et al., 2024; Jordà, 2005), in which the response of each market rate to a policy rate change depends on whether domestic uncertainty was high in the previous quarter, with economy and month fixed effects, and complements them with cumulative pass-through ratios that relate the change in market rates to the change in the policy rate over the same horizon.

The results show that the pass-through of policy rates to lending rates is markedly weaker when uncertainty is high. After a year, about 43% of the cumulative policy rate change has reached lending rates in high-uncertainty states, against 65% in low-uncertainty states, even though the policy rate follows a similar path in the first year and is more persistent thereafter. Deposit rates respond similarly in both states, and the weakening is concentrated in economies with shallow financial systems. The result is robust to a wide range of alternative specifications, including controls for global uncertainty, banking and currency crises, and inflation targeting.

The rest of the paper is organised as follows. Section 2 reviews the theoretical and empirical literature. Section 3 sets out the methodology, and Section 4 describes the data and stylised facts. Section 5 presents and discusses the results, and Section 6 reports the robustness checks. Section 7 draws out the policy implications, and Section 8 concludes.

2. Literature review

2.1 Theoretical literature

The starting point for the analysis of interest rate pass-through is the theory of the banking firm (Freixas & Rochet, 2008; Klein, 1971), in which banks set loan rates as a markup over their marginal cost of funds, which the central bank influences through the policy rate. Consider N identical banks that compete in quantities for loans, face a linear market demand for credit $L = a - br_L$, and fund themselves at the policy rate p plus a constant intermediation cost c. Following Freixas and Rochet (2008), the equilibrium loan rate in this setting can be written as

$$r_L = \frac{a}{b\,(N+1)} + \frac{N}{N+1}(p + c)$$

1

where r_L is the loan rate, a and b are the intercept and slope of the demand for credit, and N is the number of banks. Eq. (1) shows that the pass-through of the policy rate to the loan rate, $\partial\, r_L / \partial\, p = N/\,(N+1)$, is incomplete and rises with the number of competing banks, approaching one as competition becomes perfect. This result underlies the emphasis of the empirical literature on competition and financial structure as determinants of pass-through (Cottarelli & Kourelis, 1994; van Leuvensteijn et al., 2013). In this framework, however, pass-through is a structural constant. It does not depend on the state of the economy, and it treats every policy rate change as permanent.

Uncertainty enters once the timing and persistence of policy rate changes are taken into account. A bank that extends a loan at a fixed or infrequently reset rate over M periods prices it on the expected average cost of funds over the life of the loan. The loan rate set in period t can then be written as

$$r_{L,t} = m + \frac{1}{M}\sum\nolimits_{j=0}^{M-1} E_t\, p_{t+j}$$

2

where m is the markup and $E_t\, p_{t+j}$ is the policy rate the bank expects in period $t + j$. Eq. (2) states that the loan rate depends on the whole expected path of the policy rate over the life of the loan, not only on its current level. Suppose that a policy rate change $\Delta\, p_t$ consists of a persistent component $\eta_{\,t}$, which lasts, and a transitory component $\tau_{\,t}$, which is reversed in the following period, that the bank cannot observe the two separately, and that before the change it expected the policy rate to remain unchanged. Solving the resulting signal extraction problem (Lucas, 1972; Muth, 1960), the bank attributes a share $\kappa = \sigma_{\,\eta}^{\,2} / \left(\sigma_{\,\eta}^{\,2} + \sigma_{\,\tau}^{\,2}\right)$ of the observed change to the persistent component, where $\sigma_{\,\eta}^{\,2}$ and $\sigma_{\,\tau}^{\,2}$ are the variances of the two components. Substituting the revised expectations into Eq. (2), the response of the loan rate to the policy rate change can be written as

$$\Delta\, r_{L,t} = \left[\frac{1}{M} + \frac{M-1}{M}\,\kappa\right]\Delta\, p_t$$

3

where the term in brackets is the pass-through coefficient. Eq. (3) suggests that the pass-through to a loan rate falls with the maturity of the loan and with the share of policy rate changes that banks regard as transitory. If periods of high uncertainty are periods in which transitory movements in the policy outlook are larger relative to persistent ones, κ falls when uncertainty rises, and so does the pass-through to long-term loan rates. The pass-through to instruments with short maturities, for which M is close to one, is largely unaffected. This signal extraction argument links the interest rate channel to the literature on monetary policy uncertainty, which shows that uncertainty about the path of policy rates conditions the response of longer-term yields to policy actions (Bauer et al., 2022; Tillmann, 2020).

A second mechanism arises from the costs of adjusting prices. When repricing a loan book entails fixed costs, whether administrative or reputational, banks adjust loan rates only when the gap between the desired rate $r_{L,t}^{*}$ and the current rate is large enough. The change in the loan rate can then be described as

$$\Delta\, r_{L,t} = \left(r_{L,t}^{*} - r_{L,t-1}\right) 1\left\{\left|r_{L,t}^{*} - r_{L,t-1}\right| > \omega\ (\sigma_{\,t})\right\}$$

4

where $1\{\cdot\}$ is an indicator function equal to one when the condition in braces holds, and $\omega\ (\sigma_{\,t})$ is a band of inaction that depends on uncertainty $\sigma_{\,t}$. Eq. (4) states that the loan rate is adjusted in full when the desired change exceeds the band and not at all otherwise. The theory of investment under uncertainty implies that such a band widens as uncertainty rises, because the option value of waiting increases (Bloom, 2009; Dixit, 1989). Higher uncertainty therefore delays the adjustment of loan rates to policy rate changes, and the partial adjustment models of the pass-through literature, in which the speed of adjustment is estimated as a constant (de Bondt, 2005), would capture this as a slower adjustment in uncertain periods. In models of price

setting, however, higher volatility also makes large desired adjustments more frequent, so that its net effect on the frequency of adjustment is an empirical question (Vavra, 2014).

A third mechanism operates through credit risk. Following Stiglitz and Weiss (1981), the expected gross return to the bank on a loan, abstracting from collateral and recovery, can be written as

$$\rho\ (r_L) = (1 + r_L)\,[1 - \pi\ (r_L, \sigma\ )]$$

5

where $\pi\ (r_L, \sigma\ )$ is the probability of default, which depends on the loan rate and on the riskiness of borrowers' returns, σ . Because higher loan rates attract riskier borrowers and induce riskier projects, $\partial \pi / \partial r_L > 0$, and Eq. (5) shows that the expected return does not rise monotonically with the loan rate. The bank's expected return is maximised at a rate $\hat{r}_L$ beyond which it prefers to ration credit rather than raise its price. If greater uncertainty, represented by a mean-preserving spread in borrowers' returns that raises σ , strengthens these adverse selection and moral hazard effects, $\hat{r}_L$ falls, and a larger share of any increase in funding costs is absorbed through tighter non-price terms and lower loan approval rather than higher loan rates. Recent theoretical work on risk-averse banks facing uncertain inflation reaches a related conclusion, that such uncertainty raises loan rates and amplifies credit rationing (Vansteenberghe, 2025). Uncertainty also affects the demand for credit. Because firms delay irreversible investment when uncertainty is high (Bernanke, 1983; Bloom et al., 2007), and precautionary behaviour reduces aggregate demand (Basu & Bundick, 2017), the quantity of credit demanded becomes less sensitive to its price, which weakens the transmission of policy from loan rates to spending.

The signal extraction, adjustment cost and credit risk mechanisms share a common prediction, that the pass-through of policy rates to lending rates is weaker when uncertainty is high. They also have implications that help to distinguish the weakening of loan pricing from a general weakening of monetary control. The signal extraction and credit risk mechanisms apply with particular force to loans, which have longer maturities and carry credit risk, and much less to deposits and money market instruments, which have short maturities and little or no credit risk. And all three mechanisms are likely to be stronger where borrowers have few alternatives to bank credit, so that loan rates are set by banks' own assessment of risk and policy persistence rather than disciplined by capital market benchmarks. The mechanisms are stylised. They are not estimated directly in what follows, since banks' expectations, loan maturities and non-price terms are not observed for the sample, but they organise the interpretation of the evidence.

2.2 Empirical literature

The empirical literature on the macroeconomic effects of uncertainty has grown rapidly since Bloom (2009) showed that spikes in uncertainty are followed by sharp falls and rebounds in output, employment and investment. Subsequent work has refined the measurement of uncertainty, using the predictability of macroeconomic series (Jurado et al., 2015), newspaper coverage of economic policy (Baker et al., 2016) and, for a global sample, the frequency of the word uncertainty in the country reports of the Economist Intelligence Unit, which underlies the World Uncertainty Index (Ahir et al., 2022). Uncertainty shocks have larger effects on investment and consumption in emerging economies than in advanced ones, in part because of tighter credit constraints (Carrière-Swallow & Céspedes, 2013), and their effects on activity are stronger in recessions (Caggiano et al., 2022). Bloom (2014) reviews this literature.

A growing body of work examines whether monetary policy is less effective when uncertainty is high. For the United States, Aastveit et al. (2017) find that monetary policy shocks have considerably weaker effects on investment when uncertainty is high, and Castelnuovo and Pellegrino (2018) and Pellegrino (2021) use nonlinear vector autoregressions and a new Keynesian model to show that the real effects of monetary policy are smaller in uncertain times. Pellegrino et al. (2023) show that systematic monetary policy limited the output loss following the large uncertainty shock of the Great Recession, and Tenreyro and Thwaites (2016) document that the effects of monetary policy depend on the state of the economy more generally. At the level of financial markets, Tillmann (2020) shows that a policy tightening raises long-term bond yields by significantly less when monetary policy uncertainty is high, because term premia fall, and Bauer et al. (2022) show that the level of uncertainty about future policy rates conditions the reaction of asset prices to policy surprises. Evidence beyond advanced economies is more recent. Deb et al. (2023) find, for a panel of 33 advanced and emerging market economies, that monetary policy shocks have stronger effects on output when uncertainty is low, and Sen et al. (2026) show that monetary policy uncertainty dampens transmission to bond, equity and foreign exchange markets in India. Transmission to asset prices can also change markedly within an economy when the policy environment changes, as Akpan and Ogbonnaya (2026) show for the response of Nigerian equity prices to monetary policy surprises before and after the 2023 reforms.

A related strand examines how uncertainty affects bank lending. Baum et al. (2013) find that uncertainty conditions the response of US bank lending to monetary policy, Valencia (2017) shows that banks hold more capital and lend less when aggregate uncertainty rises, and Buch et al. (2015) find that the effect of uncertainty on lending differs with bank characteristics. Bordo et al. (2016) show that economic policy uncertainty slows bank credit growth in the United States, and Berger et al. (2022) find that banks hoard liquidity when policy uncertainty rises. The most directly relevant evidence is that of Alessandri and Bottero (2020), who use loan application data for Italy and find that higher uncertainty lowers the probability that banks accept new loan applications, lengthens the time to disbursement, and reduces banks' responsiveness to changes in short-term interest rates, which weakens the bank lending channel. These studies concern the quantity of credit and its approval in advanced economies. They do not examine whether uncertainty changes the pass-through of policy rates to the price of credit, nor do they cover developing economies.

The literature on interest rate pass-through, in turn, has documented the extent and determinants of the transmission of policy rates to bank rates in great detail. In advanced economies, pass-through to lending rates is incomplete in the short run and close to complete in the long run (de Bondt, 2005), stronger where banking markets are more competitive (Cottarelli & Kourelis, 1994; van Leuvensteijn et al., 2013), and variable over time. The link between policy and lending rates loosened during the global financial crisis, largely because bank funding costs diverged from policy rates (Gambacorta et al., 2015; Hristov et al., 2014; Illes et al., 2019), and in the post-pandemic tightening cycle it was weaker and slower than in earlier cycles for most rates other than those on

corporate loans (Beyer et al., 2024). A meta-analysis of the literature by Gregor et al. (2021) finds that estimated pass-through is lower for consumer and long-term loans and higher in economies with deeper stock markets, so that the macro-financial environment matters.

In EMDEs, pass-through is weaker and more heterogeneous. Mishra et al. (2012) argue that shallow financial markets, limited competition among banks and weak institutions impair monetary transmission in low-income economies, and Mishra et al. (2014) find that pass-through to lending rates is on average low and varies widely across low-income countries. Brandão-Marques et al. (2020) find that transmission is weaker in EMDEs than in advanced economies but stronger where monetary policy frameworks are more credible, and Checo et al. (2024) find, using forecast-based shocks for 18 emerging markets, that transmission to financial conditions and activity is broadly comparable to that in advanced economies. Loan-level evidence for Uganda shows that monetary policy affects both the approval and the pricing of loans (Abuka et al., 2019), and bank-level evidence for South Africa shows that pass-through differs across products and between rate increases and cuts (Greenwood-Nimmo et al., 2024). For Nigeria, Yoriyo et al. (2025) find, with a Bayesian vector autoregression, that monetary policy rate shocks affect short-term market interest rates but have weak effects on consumption and aggregate demand, and that inflation sometimes rises after a tightening. For Sub-Saharan Africa, Gondwe et al. (2023) find that long-run pass-through is incomplete and weaker where capital requirements are stricter, and Oyadeyi (2026) finds that financial development and inclusion improve the efficiency of the interest rate channel across African economies.

Overall, the literature reviewed still leaves an important empirical gap. Studies of uncertainty and monetary policy establish that uncertainty weakens transmission to activity and asset prices, mainly in advanced economies, while studies of pass-through in EMDEs explain cross-country differences by slow-moving structural features and treat pass-through within each economy as constant. To the best of our knowledge, there is limited empirical evidence on whether the pass-through of policy rates to bank lending rates varies with uncertainty across a broad sample of EMDEs, whether any weakening is specific to loan pricing, or whether it depends on financial structure, which are the questions this paper addresses.

3. Methodology

3.1 Measuring uncertainty states

The uncertainty state of economy i in month t is defined from the World Uncertainty Index of Ahir et al. (2022). Because the index is constructed from quarterly country reports and is noisy at the country level, the paper uses the three-quarter weighted moving average recommended by its authors. An economy is in a high-uncertainty state, $U_{i,t} = 1$, if its index in the previous quarter lies in the top third of its own distribution over the sample period, and in a low-uncertainty state, $U_{i,t} = 0$, otherwise. Defining the threshold relative to each economy's own history means that the state captures periods of unusually high uncertainty for that economy, rather than permanent differences in the level of the index across economies. The index for each quarter is assigned to the three months of that quarter, and the state in month t is based on the index three months earlier, so that it always refers to the preceding calendar quarter. Because the weighted moving average combines that quarter with the two before it, no information from the quarter in which the policy rate changes enters the state, which is therefore determined before the policy rate change whose transmission is measured.

3.2 Model specification

The response of market interest rates to policy rate changes in each state is estimated with state-dependent panel local projections. Following Jordà (2005) and Ramey and Zubairy (2018), the cumulative change in a market interest rate h months after a policy rate change, for each horizon $h = 0, 1, \ldots, 24$, can be written as

$$r_{i,t+h} - r_{i,t-1} = \alpha_i^h + \delta_t^h + \beta_U^h U_{i,t} \Delta p_{i,t} + \beta_N^h (1 - U_{i,t}) \Delta p_{i,t} + \gamma^h U_{i,t} + \sum_{s \in \{U,N\}} 1_s(i,t) \sum_{l=1}^{12} \theta_{s,l}^{h\prime} x_{i,t-l} + \epsilon_{i,t+h}$$

6

where $r_{i,t}$ is the lending, deposit or treasury bill rate of economy i in month t, $\Delta p_{i,t}$ is the change in the policy rate, $U_{i,t}$ is the uncertainty state, $1_s(i,t)$ is an indicator equal to one when economy i is in the high-uncertainty state ($s = U$) or the low-uncertainty state ($s = N$) in month t, $\epsilon_{i,t+h}$ is the error term, and $x_{i,t-l}$ contains lags of the changes in the market rate, the policy rate, the log consumer price index and the log exchange rate. All lags are interacted with the state, so that the dynamics of each variable can differ between the two states. Because the dependent variable is a cumulative change, the economy fixed effects α_i^h absorb time-invariant differences across economies in the average change of rates, which is equivalent to allowing for economy-specific linear trends in their levels, and the month fixed effects δ_t^h absorb shocks that affect all economies alike in a given month, including changes in US interest rates, global risk appetite and commodity prices.

The coefficients of interest are β_U^h and β_N^h. Eq. (6) shows that they measure the cumulative change in the market rate after h months per unit change in the policy rate in the high- and low-uncertainty states, respectively, and they are scaled to a 100 basis point policy rate increase. Weaker transmission under uncertainty implies $\beta_U^h < \beta_N^h$ for lending rates. These coefficients measure the conditional pass-through of observed policy rate changes to market rates, not the causal effects of exogenous monetary policy shocks, a distinction discussed in Section 3.4. Gonçalves et al. (2024) show that state-dependent local projections need not recover the population response to a shock when the shock itself can move the economy between states, and Cloyne et al. (2023) discuss how such responses should be interpreted. Here, the state is fixed by the index in the preceding quarter and cannot respond to the policy rate change on impact, although a policy rate change could affect uncertainty in later months. The estimates are therefore interpreted as responses conditional on the state prevailing when the policy rate changes, which is the relevant object for a central bank setting policy in a given state.

3.3 Cumulative pass-through ratios

The responses in Eq. (6) measure the change in market rates following an initial change in the policy rate, but the policy rate itself may follow different paths after the initial change in the two states. If policy rate changes were reversed more quickly when uncertainty was high, a smaller response of market rates would reflect a smaller cumulative policy impulse rather than weaker transmission. To account for this, we also estimate cumulative pass-through ratios. Following the approach of Ramey and Zubairy (2018) to cumulative multipliers, the cumulative change in the market rate is related to the cumulative change in the policy rate over the same horizon as

$$r_{i,t+h} - r_{i,t-1} = \alpha_i^h + \delta_t^h + \phi_U^h U_{i,t}\left(p_{i,t+h} - p_{i,t-1}\right) + \phi_N^h\left(1 - U_{i,t}\right)\left(p_{i,t+h} - p_{i,t-1}\right) + \gamma^h U_{i,t} + \sum_{s\in\{U,N\}} 1_s(i,t) \sum_{l=1}^{12} \theta_{s,l}^{h\prime} x_{i,t-l} + \epsilon_{i,t+h}$$

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where $p_{i,t+h} - p_{i,t-1}$ is the cumulative change in the policy rate over the horizon and the other terms are as defined in Eq. (6). The cumulative policy rate change, interacted with each state, is instrumented with the change in the policy rate in the initial month interacted with the state. With one instrument for each state, the estimated ratio equals the response of the market rate to the initial policy rate change divided by the response of the policy rate itself, both estimated with the specification of Eq. (6) on a common sample (Ramey & Zubairy, 2018). The instrumental variable estimator is therefore used here as a normalisation of the responses in Eq. (6) by the path of the policy rate, and the ratios inherit the interpretation of those responses as conditional pass-through rather than resting on a separate exclusion restriction. Eq. (7) shows that the coefficients ϕ_U^h and ϕ_N^h measure the share of the cumulative policy rate change that has been passed through to the market rate after h months, so that a ratio of one indicates complete pass-through. In terms of the framework of Section 2.1, the ratios are the empirical counterpart of the pass-through coefficient in Eq. (3), averaged across the loans outstanding in each economy.

3.4 Identification and inference

The paper estimates how much of a given policy rate change reaches market rates, conditional on the uncertainty state. This is the object of the interest rate pass-through literature (de Bondt, 2005; Mishra et al., 2014), and it does not require that policy rate changes be unanticipated or exogenous to economic conditions, because both the policy rate and market rates respond to the same information. The main threat to the interpretation is that market rates and the policy rate respond jointly to shocks that differ between the two states. Three features of the design address this concern. The month fixed effects absorb all common shocks, the state-specific lags of inflation and the exchange rate absorb domestic developments that drive both rates, and the state is measured in the previous quarter, so that it is not itself a response to the policy rate change. The robustness checks in Section 6 further control for global uncertainty, exclude the COVID-19 pandemic and high-inflation episodes, and vary the definition of the state.

The paper does not attempt to estimate the effects of monetary policy on inflation and the exchange rate by uncertainty state. Doing so requires exogenous monetary policy shocks, which are typically identified from high-frequency market data (Gertler & Karadi, 2015) or professional forecasts (Checo et al., 2024) that are not available for most economies in the sample. Shocks identified as residuals from estimated policy rules (Romer & Romer, 2004) are a feasible alternative, but a tightening identified in this way is often followed by a rise in prices (Ramey, 2016; Sims, 1992), a pattern also found for Nigeria (Akpan, 2026; Yoriyo et al., 2025). This price puzzle may reflect remaining endogeneity or supply-side constraints, and it makes the estimated effects on prices difficult to interpret. The analysis therefore focuses on the interest rate channel, the first and best-measured link in the transmission mechanism. Because policy rates respond to economic conditions, including within the month, the lags and fixed effects reduce but cannot rule out contemporaneous endogeneity, and the estimates throughout are interpreted as conditional pass-through relationships rather than causal effects of exogenous policy shocks.

Standard errors are clustered by economy and by month (Cameron et al., 2011), which allows for serial correlation within economies, including that induced by the overlapping horizons of the local projections, and for correlation across economies within a month. Controlling for lags of the dependent variable also makes inference at longer horizons robust to persistence in the data (Montiel Olea & Plagborg-Møller, 2021). The difference between the coefficients in the two states, $\beta_U^h - \beta_N^h$ or $\phi_U^h - \phi_N^h$, is tested with the same clustered covariance matrix.

4. Data and stylised facts

4.1 Data sources

Monthly lending, deposit and treasury bill rates come from the IMF Monetary and Financial Statistics, which compile the rates reported by national central banks. The lending rate is the representative rate charged by banks on loans to the private sector, and the deposit rate the rate paid on deposits, as defined by each reporting economy. Policy rates come from the central bank policy rate series of the Bank for International Settlements (BIS) where available, and otherwise from the policy rate or, for 14 economies, all of which are in the main sample of 51, the discount rate reported to the IMF, with the monetary policy rate of Nigeria taken from the Central Bank of Nigeria. Consumer prices and exchange rates from the IMF, the World Bank global inflation database (Ha et al., 2023) and the BIS. Nigeria's consumer price index is used only up to December 2024, because the series is not consistently linked across its rebasing in January 2025. Uncertainty is measured by the World Uncertainty Index (Ahir et al., 2022), and global uncertainty by the Chicago Board Options Exchange Volatility Index (VIX). Domestic credit to the private sector and bank concentration, used to classify financial structure, come from the World Bank World Development Indicators and Global Financial Development Database. Interest rates, consumer prices, exchange rates and the VIX are used at the monthly frequency as published, without interpolation, and months with missing observations are dropped from the regressions that require them. The quarterly World Uncertainty Index is assigned to months as described in Section 3.1. Domestic credit to the private sector and bank concentration are annual series, and they are averaged over 2005–2023 for each economy and used only to classify economies by financial structure. Reporting conventions for the lending and deposit rates, such as period averages or end-of-period values, and the definitions of the representative rates differ across economies, and the economy fixed effects absorb the resulting differences in levels.

4.2 Sample

EMDEs are defined as economies not classified as advanced economies in the IMF World Economic Outlook. The starting point is the 62 EMDEs that conduct an independent monetary policy, defined as those that are not members of a monetary union and do not operate a currency board or hard exchange rate peg, and that have at least ten years of monthly data on the policy rate and consumer prices since 2000. Economies that experienced very high inflation or armed conflict during the period (Afghanistan, Argentina, Iran, Lebanon, Sudan, Syria, Ukraine, Venezuela, Yemen and Zimbabwe) are excluded. Of the 62 economies, 58 have the World Uncertainty Index for at least ten years between January 2005 and December 2025, and the policy rate responses are estimated for these economies. The main sample consists of the 51 that also have monthly lending rates for at least ten years. Deposit rates are available for 52 economies and treasury bill rates for 37. The sample is diverse. It includes 16 economies in Sub-Saharan Africa, 12 in Europe and Central Asia, 12 in Latin America and the Caribbean, and 11 in Asia and the Middle East, and ranges from low-income to high-income economies. Appendix Table A1 lists the economies, and Appendix Table A2 summarises the construction of the sample.

4.3 Stylised facts

Figure 1 shows the evolution of uncertainty and interest rates in the sample. The median World Uncertainty Index more than doubled between the late 2000s and the mid-2010s and rose sharply again in 2025, and the dispersion across economies widened over the same period (panel a). Because the high-uncertainty state is defined relative to each economy's own history, the share of economies in that state is about a third on average, but it varies considerably over time, from below 15% in 2007 to around 60% in 2016–2017 and again in 2025 (panel b). Episodes of high uncertainty are therefore frequent and often shared across many economies at once, which is why the month fixed effects in Eq. (6) are important. Interest rates have trended down over the two decades, with a deep trough during the pandemic and a sharp rise in the tightening cycle of 2022–2023 (panel c). The median gap between lending and policy rates widened to more than 7 percentage points after the global financial crisis and has since narrowed to about 3.5 percentage points (panel d), so the margin between lending and policy rates varies considerably over time.

Table 1 compares the two uncertainty states. High-uncertainty months account for 32% of the sample, and the average World Uncertainty Index in these months is almost three times its level in low-uncertainty months. The two states are otherwise similar. Average policy, lending and deposit rates and the spread of lending rates over policy rates differ little; median inflation is the same, and central banks change their policy rates in about a quarter of months in both states, by similar amounts on average. The similarity of policy behaviour across states means that any difference in the response of market rates is unlikely to reflect differences in the frequency or size of policy rate changes.

Table 1
Summary statistics by uncertainty state, 2005–2025

Economies	**All**	**High uncertainty**	**Low uncertainty**
	51	**51**	**51**
Economy-months	10974	3526	7448
World Uncertainty Index (mean)	0.071	0.123	0.046
Policy rate (%)	8.78	8.46	8.93
Lending rate (%)	14.70	14.16	14.95
Deposit rate (%)	6.61	6.15	6.82
Lending rate minus policy rate (pp)	5.91	5.70	6.02
Months with a policy rate change (%)	24.6	25.0	24.5
Mean absolute policy rate change (bp)	20.0	18.0	21.0
12-month CPI inflation (median, %)	5.2	5.2	5.2

Notes: Monthly data for the economies with lending rates and the World Uncertainty Index, January 2005 to December 2025. A month is classified as high uncertainty if the economy's World Uncertainty Index (three-quarter weighted moving average) in the previous quarter is in the top third of the economy's own distribution over the sample period. Interest rates are period averages. Source: Authors' computation based on IMF Monetary and Financial Statistics, the World Uncertainty Index (Ahir et al., 2022), and IMF, World Bank and BIS price and exchange rate data.

Table 2 reports two sets of correlations for the economies of the main sample, with p-values based on standard errors clustered by economy and by month. Panel A shows that, within economies, the World Uncertainty Index and the high-uncertainty state are almost uncorrelated with the VIX, inflation, exchange rate depreciation, the level and size of policy rate changes, and the lending spread. All the coefficients are below 0.1 in absolute value, and the few that are statistically significant, at the 10% level in most cases, are economically negligible. Domestic uncertainty, as measured by the index, is therefore distinct from global financial stress and from the macroeconomic conditions that might otherwise explain differences in pass-through, which supports its use as the conditioning state. Panel B reports the correlation between the six-month change in each market rate and the six-month change in the policy rate, within economies, separately for months in which uncertainty was high and low. All the correlations and slopes are positive and significant at the 1% level. The co-movement of lending rates with the policy rate is weaker in high-uncertainty months, with a correlation of 0.39 against 0.59 and a slope of 0.33 against 0.44, whereas for deposit rates the slopes are close, at 0.30 against 0.34. In these raw data, however, the difference in the lending rate slopes is not statistically significant. The raw correlations do not control for the dynamics of rates, for the path of the policy rate after the initial change or for common shocks, all of which the local projections address, so they point to the direction of the effect without establishing it.

Table 2
Correlations between uncertainty, macroeconomic conditions and interest rates

A. Within-economy correlation with domestic uncertainty					
	World Uncertainty Index	**High-uncertainty state**			
VIX	−0.05*	−0.04*			
	[0.07]	[0.06]			
12-month CPI inflation	−0.03	0.00			
	[0.34]	[0.95]			
12-month exchange rate depreciation	0.02	0.02			
	[0.46]	[0.49]			
Policy rate	−0.08*	−0.06*			
	[0.09]	[0.08]			
Absolute policy rate change	−0.02	−0.03**			
	[0.15]	[0.02]			
Lending rate minus policy rate	−0.07	−0.05			
	[0.12]	[0.14]			
B. Co-movement of six-month changes in market rates with the six-month change in the policy rate					
	Correlation, high uncertainty	**Correlation, low uncertainty**	**Slope, high uncertainty**	**Slope, low uncertainty**	**Difference in slope**
Lending rate (51 economies)	0.39***	0.59***	0.33***	0.44***	−0.11
	[0.00]	[0.00]	[0.00]	[0.00]	[0.18]
Deposit rate (49 economies)	0.44***	0.55***	0.30***	0.34***	−0.03
	[0.00]	[0.00]	[0.00]	[0.00]	[0.55]
Treasury bill rate (35 economies)	0.50***	0.66***	0.79***	0.86***	−0.07
	[0.00]	[0.00]	[0.00]	[0.00]	[0.43]

Notes: Monthly data for the economies of the main sample, January 2005 to December 2025. Panel A reports correlation coefficients after removing economy means, for the 51 economies of the main sample. Panel B uses the economies of the main sample with data on each market rate, as indicated. Panel B reports, separately for months in which uncertainty in the previous quarter was high or low, the correlation between the change in each market rate and the change in the policy rate from the month before to five months after the base month, the slope of the regression of the former on the latter, and the difference between the slopes in the two states, all after removing economy means. The p-values, in square brackets, are based on standard errors clustered by economy and by month, which allow for the overlap of the six-month changes. The VIX is the Chicago Board Options Exchange Volatility Index. *, ** and *** denote significance at the 10%, 5% and 1% levels. Source: Authors' computation based on IMF Monetary and Financial Statistics, the World Uncertainty Index (Ahir et al., 2022), and IMF, World Bank, BIS and Chicago Board Options Exchange data.

5. Results and discussion

5.1 Responses of market rates to policy rate changes

Figure 2 and Table 3 report the responses of the policy rate and of market interest rates to a 100 basis point increase in the policy rate, estimated with Eq. (6). The policy rate itself follows similar paths in the two states during the first year. It rises further after the initial increase, as central banks typically tighten in several steps, and reaches 160 basis points after six months when uncertainty is high and 146 basis points when it is low. Apart from a small difference of 11 basis points after one month, significant only at the 10% level, the paths do not differ significantly in the first year. Beyond a year, policy rate increases are more persistent when uncertainty is high, as the policy rate remains 130 basis points higher after two years, against 68 basis points when uncertainty is low. Central banks therefore do not respond to uncertainty by moving less, consistent with the evidence that systematic monetary policy plays an important stabilising role in uncertain times (Pellegrino et al., 2023).

Despite this, lending rates respond much less when uncertainty is high. After one month, lending rates rise by 22 basis points in the high-uncertainty state, against 50 basis points in the low-uncertainty state. After six months, the responses are 49 and 81 basis points, and after a year 57 and 96 basis points. The differences, between 28 and 39 basis points, are statistically significant at every horizon up to 15 months. The gap narrows in the second year, to 22 basis points after 18 months and 15 basis points after two years, and is no longer statistically significant. Uncertainty therefore slows the transmission of policy rate changes to lending rates substantially in the first year, although it does not prevent it. This pattern is consistent with the adjustment cost mechanism of Eq. (4), in which a wider band of inaction delays repricing rather than ruling it out, and it mirrors at the level of loan pricing the finding of Alessandri and Bottero (2020) that Italian banks become less responsive to short-term interest rates when uncertainty rises. It is also in line with the weaker effects of monetary policy on activity in uncertain times documented for the United States (Aastveit et al., 2017; Castelnuovo & Pellegrino, 2018) and across countries (Deb et al., 2023), and suggests that part of that weakening may originate in the pricing of credit itself.

The weakening is specific to lending rates. Deposit rates rise by 63 basis points after six months when uncertainty is high and by 68 basis points when it is low, and the differences are small and statistically insignificant at all horizons. Treasury bill rates, available for 37 economies, respond less in the high-uncertainty state in the first months, by 39 basis points after three months, with differences significant at the 10% level between three and five months, but the differences are imprecisely estimated and not significant at other horizons. The contrast between loans and deposits accords with the evidence that pass-through differs systematically across bank products (de Bondt, 2005; Gregor et al., 2021), and it adds that the gap between products widens when uncertainty is high.

Table 3
Responses of interest rates to a 100 basis point policy rate increase by uncertainty state

	Months after the policy rate change						
	h = 0	**h = 1**	**h = 3**	**h = 6**	**h = 12**	**h = 18**	**h = 24**
Policy rate. 58 economies							
High uncertainty	100	112	137	160	162	146	130
		(4)	(13)	(21)	(21)	(17)	(17)
Low uncertainty	100	123	141	146	147	101	68
		(5)	(7)	(9)	(10)	(13)	(21)
Difference	–	−11*	−4	14	15	46*	62*
		(6)	(14)	(22)	(22)	(25)	(32)
Lending rate. 51 economies							
High uncertainty	11	22	41	49	57	59	49
	(3)	(6)	(9)	(11)	(14)	(15)	(14)
Low uncertainty	23	50	69	81	96	81	64
	(4)	(9)	(9)	(9)	(15)	(11)	(10)
Difference	−12**	−28***	−28**	−32**	−39**	−22	−15
	(6)	(10)	(12)	(13)	(19)	(17)	(17)
Deposit rate. 52 economies							
High uncertainty	25	30	41	63	57	51	37
	(11)	(10)	(15)	(25)	(19)	(17)	(13)
Low uncertainty	19	40	55	68	65	41	25
	(5)	(10)	(12)	(10)	(6)	(13)	(16)
Difference	6	−10	−14	−5	−8	10	12
	(9)	(10)	(15)	(22)	(17)	(21)	(19)
Treasury bill rate. 37 economies							
High uncertainty	33	51	62	64	72	66	41
	(13)	(19)	(23)	(23)	(30)	(27)	(22)
Low uncertainty	37	79	101	102	90	74	60
	(7)	(12)	(18)	(20)	(25)	(20)	(20)
Difference	−4	−28	−39*	−38	−18	−8	−20
	(10)	(21)	(23)	(26)	(35)	(33)	(29)

Notes: Estimates of Eq. (6). Each entry is the cumulative change in the interest rate, in basis points, from the month before the policy rate change to h months after it, per 100 basis point change in the policy rate, when uncertainty was high or low in the previous quarter. The regressions include the uncertainty state, 12 lags of the changes in the outcome, the policy rate, consumer prices and the exchange rate, each interacted with the state, and economy and month fixed effects. Standard errors clustered by economy and by month are in parentheses. Stars are reported for the difference only. *, ** and *** denote significance at the 10%, 5% and 1% levels. Source: Authors' estimation.

5.2 Cumulative pass-through ratios

Table 4 reports the cumulative pass-through ratios from Eq. (7), which relate the change in each market rate to the change in the policy rate over the same horizon. The ratios confirm that the weaker response of lending rates does not reflect a smaller cumulative policy impulse. When uncertainty is low, 40% of the cumulative policy rate change has been passed through to lending rates after one month, 56% after six months and 65% after a year. When uncertainty is high, the corresponding ratios are 20%, 38% and 43%. The differences, of about 0.2, are statistically significant at the 5% level at most horizons and persist at 18 months, when the ratios are 0.50 and 0.76. Because the policy rate is more persistent in high-uncertainty states beyond a year, the narrowing of the gap in

the lending rate response in the second year does not translate into a narrowing of the gap in the pass-through ratio. For deposit rates, the ratios are around 0.3 to 0.45 in both states, with no significant difference, and for treasury bill rates the ratios are somewhat lower in the high-uncertainty state in the first months but the differences are not statistically significant.

Table 4
Cumulative pass-through ratios by uncertainty state

	Months after the policy rate change				
	h = 1	**h = 3**	**h = 6**	**h = 12**	**h = 18**
Lending rate					
High uncertainty	0.20	0.35	0.38	0.43	0.50
	(0.05)	(0.06)	(0.07)	(0.07)	(0.10)
Low uncertainty	0.40	0.49	0.56	0.65	0.76
	(0.07)	(0.07)	(0.07)	(0.08)	(0.14)
Difference	−0.19**	−0.14	−0.18**	−0.22**	−0.26**
	(0.08)	(0.09)	(0.09)	(0.09)	(0.12)
Deposit rate					
High uncertainty	0.28	0.32	0.43	0.38	0.38
	(0.09)	(0.09)	(0.13)	(0.08)	(0.09)
Low uncertainty	0.32	0.38	0.45	0.42	0.40
	(0.08)	(0.07)	(0.06)	(0.04)	(0.10)
Difference	−0.04	−0.06	−0.02	−0.05	−0.02
	(0.09)	(0.09)	(0.10)	(0.07)	(0.13)
Treasury bill rate					
High uncertainty	0.50	0.57	0.58	0.63	0.57
	(0.18)	(0.19)	(0.15)	(0.19)	(0.18)
Low uncertainty	0.67	0.72	0.66	0.60	0.58
	(0.09)	(0.10)	(0.09)	(0.13)	(0.11)
Difference	−0.17	−0.15	−0.09	0.03	−0.01
	(0.18)	(0.18)	(0.15)	(0.19)	(0.18)

Notes: Estimates of Eq. (7). Each entry is the ratio of the cumulative change in the market interest rate to the cumulative change in the policy rate over the same horizon, estimated by instrumenting the cumulative policy rate change with the policy rate change in the initial month. A ratio of one indicates complete pass-through. The first-stage F-statistics range from 47 to 2418 at the horizons shown. Controls, fixed effects and standard errors as in Table 3. Stars are reported for the difference only. *, ** and *** denote significance at the 10%, 5% and 1% levels. Source: Authors' estimation.

These magnitudes are consistent with the existing evidence on pass-through in developing economies. The economic significance of the difference can be illustrated with the ratios after a year. Because a lending rate rises by the pass-through ratio times the cumulative policy rate change, achieving the same rise in lending rates when uncertainty is high as a 100 basis point cumulative increase achieves when it is low would, on these estimates, require a cumulative increase of about 150 basis points, since 0.65/0.43 is about 1.5.

The pass-through ratio in low-uncertainty states, of about two-thirds after a year, is incomplete, in line with the evidence that pass-through to lending rates in low-income and emerging economies is slower and less complete than in advanced economies (Brandão-Marques et al., 2020; Mishra et al., 2014) and incomplete in the long run in Sub-Saharan Africa (Gondwe et al., 2023). The results add that, within the same economy, pass-through falls by about a third when uncertainty is high. The state of uncertainty therefore matters for transmission alongside the slow-moving structural characteristics that have been the focus of earlier work.

5.3 Financial structure

Table 5 and Fig. 3 split the sample at the median of domestic credit to the private sector relative to GDP, and at the median of bank concentration. The weakening of pass-through under uncertainty is concentrated in economies with shallow financial systems. In these economies, the cumulative pass-through ratio to lending rates after six months is 0.28 when uncertainty is high and 0.50 when it is low, and after a year 0.36 and 0.58, with differences significant at the 5% level after six months and at the 10% level after a year. In economies with deep financial systems, pass-through is higher in both states, with ratios of 0.82 and 0.98 after a year, and the differences between the states are smaller and not statistically significant.

The higher pass-through in deep financial systems is consistent with the evidence that financial development strengthens monetary transmission, from meta-analysis (Gregor et al., 2021), from cross-country estimates of monetary transmission (Deb et al., 2023) and from African data (Oyadeyi, 2026). The

present results add that financial depth also makes transmission more resilient to uncertainty. In shallow financial systems, firms and households have few alternatives to bank credit, so loan pricing is shaped by banks' own assessment of credit risk and of the persistence of policy, both of which are sensitive to uncertainty. In deeper systems, competition from capital markets and other lenders keeps loan rates closer to market benchmarks.

The split by bank concentration shows smaller differences between the states in both groups, none of them statistically significant at the horizons reported. The concentration of the banking sector therefore does not explain where uncertainty weakens pass-through. This accords with the finding of Beyer et al. (2024) that concentration did not drive the weaker pass-through of the recent tightening cycle in Europe, although it contrasts with the role of competition emphasised in the theory of the banking firm and in earlier euro area evidence (van Leuvensteijn et al., 2013). Concentration ratios are an imperfect measure of competition, and in EMDEs the contestability of the loan market by non-bank lenders and capital markets, which financial depth captures, may matter more than the number of banks.

Financial depth is correlated with other features of an economy, such as the quality of institutions, and could act as a proxy for them. Appendix Table A3 therefore repeats the analysis for economies above and below the median of a governance index built from the World Bank Worldwide Governance Indicators (Kaufmann et al., 2011). The weakening of pass-through under uncertainty is present in both governance groups and, if anything, larger where governance is stronger, with pass-through ratios after a year of 0.50 and 0.91 in the two states, against 0.41 and 0.60 where governance is weaker. Governance therefore does not account for the role of financial depth.

Table 5
Cumulative lending rate pass-through by uncertainty state and financial structure

	Months after the policy rate change		
	h = 1	**h = 6**	**h = 12**
Shallow financial systems. 28 economies			
High uncertainty	0.16	0.28	0.36
	(0.04)	(0.05)	(0.05)
Low uncertainty	0.35	0.50	0.58
	(0.08)	(0.08)	(0.09)
Difference	−0.19**	−0.21**	−0.21**
	(0.10)	(0.09)	(0.11)
Deep financial systems. 23 economies			
High uncertainty	0.45	0.74	0.82
	(0.15)	(0.14)	(0.19)
Low uncertainty	0.59	0.84	0.98
	(0.08)	(0.10)	(0.13)
Difference	−0.14	−0.10	−0.17
	(0.11)	(0.12)	(0.16)
Concentrated banking systems. 27 economies			
High uncertainty	0.23	0.42	0.45
	(0.07)	(0.06)	(0.09)
Low uncertainty	0.32	0.49	0.56
	(0.05)	(0.08)	(0.11)
Difference	−0.09	−0.07	−0.12
	(0.06)	(0.07)	(0.12)
Less concentrated banking systems. 23 economies			
High uncertainty	0.22	0.39	0.47
	(0.10)	(0.14)	(0.14)
Low uncertainty	0.31	0.46	0.57
	(0.11)	(0.09)	(0.11)
Difference	−0.10	−0.07	−0.09
	(0.07)	(0.10)	(0.09)

Notes: Estimates of Eq. (7) for subsamples of economies split at the median of domestic credit to the private sector (% of GDP) and of bank concentration (assets of the three largest banks, % of total), averaged over 2005–2023, from the World Bank World Development Indicators and Global Financial Development Database. Bank concentration is not available for the Democratic Republic of the Congo. Controls, fixed effects and standard errors as in Table 3. Stars are reported for the difference only. *, ** and *** denote significance at the 10%, 5% and 1% levels. Source: Authors' estimation.

5.4 Mechanisms

The similarity of deposit rate responses across states, together with the weaker response of lending rates, narrows the possible explanations. A general weakening of the link between policy and market rates, for instance because policy rate changes are less credible when uncertainty is high, would be expected to affect deposit and money market rates as much as lending rates. Instead, the weakening is concentrated in the pricing of loans. Of the mechanisms set out in Section 2.1, two predict this pattern.

The first is the signal extraction mechanism of Eq. (3). Loans typically have longer maturities than deposits, so their pricing depends on the expected path of funding costs rather than on the current policy rate. When uncertainty is high, banks attribute a larger part of a policy rate change to transitory factors and pass less of it on to long-term loan rates, while short-term deposit rates follow the policy rate closely. Notably, the policy rate in high-uncertainty states turns out to be more persistent, not less, which is consistent with banks discounting the persistence of policy rate changes at the time they are made, before that persistence is revealed. This interpretation parallels the finding of Tillmann (2020) that long-term bond yields respond less to policy shocks when monetary policy uncertainty is high, and of Bauer et al. (2022) that uncertainty about the policy path conditions market reactions to policy actions. The somewhat

weaker early response of treasury bill rates in high-uncertainty states is also consistent with this interpretation, since treasury bills in many EMDEs have maturities of up to a year.

The second is the credit risk mechanism of Eq. (5). When uncertainty raises the riskiness of borrowers, banks may prefer to ration credit through quantities, collateral and approval rather than raise loan rates, which would worsen the quality of the pool of borrowers. The evidence that banks lend less, approve fewer applications and hoard liquidity when uncertainty rises is consistent with this channel (Alessandri & Bottero, 2020; Berger et al., 2022; Valencia, 2017). The concentration of the effect in shallow financial systems, where information asymmetries between banks and borrowers are likely to be larger, also fits this explanation. Distinguishing between the two mechanisms would require data on loan maturities, volumes and terms by economy, which are not available on a comparable monthly basis for the sample. Both imply, however, that a given policy rate change has a weaker effect on the cost of credit when uncertainty is high, and the credit risk mechanism implies that the effect on credit conditions may be partly shifted from prices to quantities. The evidence is therefore consistent with these mechanisms but does not permit a causal distinction between them.

6. Robustness checks

Table 6 reports the difference between the lending rate responses in the two states under alternative specifications, and Appendix Figure A1 shows the full paths of these differences over the 24-month horizon, with their confidence bands, against the baseline. The result does not depend on the threshold that defines high uncertainty. With a median split, the difference is 30 basis points after one and six months, and with the top quartile 26 and 31 basis points, close to the baseline. Measuring uncertainty in the current rather than the previous quarter gives similar results. Controlling for the interaction of the policy rate change with high global uncertainty, measured by the VIX, leaves the estimates almost unchanged, so the result reflects domestic uncertainty rather than episodes of global financial stress, in line with the low correlation between the two measures in Table 2.

Excluding the COVID-19 period, months in which inflation exceeded 20%, or the years after 2019, and estimating without month fixed effects all yield differences of similar size, statistically significant at most horizons in the first year. The sample ending in 2019 is informative because the World Uncertainty Index trends upward and high-uncertainty months are more frequent in the later part of the sample (Fig. 1), so this check confirms that the result is not driven by the pandemic and the tightening cycle that followed it. Excluding the economies of Sub-Saharan Africa, or of Latin America and the Caribbean, gives differences of 23 to 31 basis points in the first year, significant at one month and less precisely estimated at longer horizons in the smaller samples. Across all these specifications, the paths of the differences in Appendix Figure A1 track the baseline closely in the first year.

Periods of high uncertainty may coincide with financial crises that weaken pass-through for other reasons. Excluding the banking crisis years identified by Laeven and Valencia (2018) leaves the estimates almost unchanged. Controlling for the interaction of the policy rate change with an indicator of a currency crisis in the preceding quarter, defined as a depreciation against the US dollar of at least 30% over twelve months that is at least 10 percentage points larger than over the previous twelve months (Laeven & Valencia, 2018), also leaves the differences unchanged, at 28, 32 and 39 basis points after one, six and twelve months, all statistically significant. Controlling for the interaction of the policy rate change with inflation targeting leaves them significant and somewhat larger. The inflation targeting indicator varies over time. It equals one from the year in which an economy adopted inflation targeting, with adoption years taken from Hammond (2012) for adoptions up to 2012 and from the IMF Annual Report on Exchange Arrangements and Exchange Restrictions for later ones (International Monetary Fund, 2023), and none of the economies in the sample abandoned the framework during the period.

The World Uncertainty Index is also available at a monthly frequency for 26 of the economies in the sample, mostly larger emerging markets, from 2008. Defining the state with the monthly index in these economies gives no significant difference between the states. The same is true when the quarterly index is used for the same economies and period, which indicates that the absence of a difference reflects the composition of this subsample rather than the frequency of the index. The economies covered by the monthly index have deeper financial systems on average, with a median ratio of private credit to GDP of 34%, against 25% in the economies for which only the quarterly index is available. The absence of a difference in this subsample is therefore consistent with the results by financial depth in Section 5.3, which show that the weakening of pass-through under uncertainty is concentrated in shallow financial systems, although the smaller sample and the resulting loss of statistical power may also contribute.

Table 6
Difference in the lending rate response between high and low uncertainty, alternative specifications

Specification	Months after the policy rate change				
	h = 1	h = 6	h = 12	h = 24	Economies
Baseline	−28***	−32**	−39**	−15	51
	(10)	(13)	(19)	(17)	
Median split	−30***	−30**	−34*	0	51
	(10)	(12)	(18)	(18)	
Top quartile	−26**	−31**	−39**	−9	51
	(13)	(14)	(17)	(16)	
Uncertainty in the current quarter	−24**	−28**	−33*	−5	51
	(12)	(12)	(18)	(15)	
Controlling for high global uncertainty (VIX)	−28***	−32**	−38**	−17	51
	(10)	(14)	(19)	(16)	
Excluding 2020–2021	−26**	−28*	−37*	−4	51
	(12)	(16)	(21)	(19)	
Excluding months with inflation above 20%	−19***	−25*	−34*	−31*	51
	(7)	(13)	(18)	(18)	
Sample ending in December 2019	−31**	−35**	−40*	1	51
	(14)	(15)	(21)	(18)	
Economy fixed effects only	−28***	−29**	−32	−6	51
	(11)	(13)	(20)	(19)	
Excluding Sub-Saharan Africa	−23***	−25	−31	−28	35
	(6)	(18)	(22)	(22)	
Excluding Latin America and the Caribbean	−30***	−28*	−29	−5	39
	(11)	(17)	(24)	(18)	
Excluding banking crisis years	−27**	−32**	−37*	−12	51
	(11)	(14)	(20)	(19)	
Controlling for currency crises	−28***	−32**	−39**	−15	51
	(10)	(13)	(19)	(17)	
Controlling for inflation targeting	−31***	−41**	−45**	−18	51
	(10)	(16)	(21)	(17)	

Notes: Each entry is the difference between the lending rate responses in high and low uncertainty states, in basis points per 100 basis point policy rate change, estimated with Eq. (6). The median split and top quartile change the threshold that defines high uncertainty. The fifth row adds the interaction of the policy rate change with an indicator of high global uncertainty (the VIX in the top third of its distribution in the previous quarter). Banking crisis years are those identified by Laeven and Valencia (2018), as reported in the World Bank Global Financial Development Database (available to 2017). The last two rows add the interaction of the policy rate change with an indicator of a currency crisis three months earlier, defined as a depreciation against the US dollar of at least 30% over twelve months that is at least 10 percentage points larger than over the previous twelve months (Laeven & Valencia, 2018), or with a time-varying indicator of inflation targeting, equal to one from the year of adoption (Hammond, 2012; International Monetary Fund, 2023). Standard errors clustered by economy and by month are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. Source: Authors' estimation.

7. Policy implications

The results suggest four implications for central banks in EMDEs.

First, central banks may need to account for uncertainty-related variation in pass-through when calibrating their policy stance. With a pass-through ratio of about 0.4 rather than 0.65 in the first year, a policy rate change has roughly two-thirds of its usual effect on lending rates, and calibrating policy decisions on average estimates of pass-through, which are typically dominated by calmer periods, would overstate the effect of policy in uncertain times. This does not imply that larger or more persistent policy moves are always the appropriate response. Whether they are depends on the causes of the weaker transmission, since a weaker response of loan rates may reflect banks' risk assessments or credit rationing rather than a shortfall in the policy stance, and on the implications of more aggressive tightening for financial stability.

Second, to the extent that the weakening arises from banks' assessment of how long policy rate changes will last, clear communication about the policy path can strengthen transmission directly. Forward guidance about the expected direction of policy, a transparent reaction function, and timely publication of the information on which decisions are based can reduce the uncertainty that banks face when pricing longer-term loans (Blinder et al., 2008; Campbell et al., 2012). Communication is also a necessary complement to any larger policy move, since large moves that are not explained may themselves add to uncertainty about the policy path. Where the interest rate channel is weak, central banks may also give more weight to complementary instruments that act directly on bank liquidity and credit conditions, such as reserve requirements, which have proved effective in absorbing banking system liquidity in Nigeria (Yaaba & Akpan, 2026), and macroprudential tools.

Third, central banks would benefit from monitoring the actual pass-through to lending rates closely after each policy decision taken in an uncertain environment, rather than assuming that it follows historical averages. Data on new lending rates by maturity, and on loan approvals and non-price terms, would allow a timely assessment of whether policy is reaching borrowers through prices or through quantities.

Fourth, the concentration of the effect in economies with shallow financial systems suggests that financial deepening makes monetary transmission more resilient to uncertainty. Policies that broaden access to finance, develop domestic bond markets and increase the contestability of credit markets would improve not only the average strength of transmission, as the earlier literature emphasises (Mishra et al., 2012), but also its reliability when uncertainty is high.

8. Conclusion

This paper has examined whether uncertainty weakens the transmission of monetary policy to market interest rates in EMDEs, using monthly data on policy, lending, deposit and treasury bill rates and the World Uncertainty Index for 51 economies from 2005 to 2025. The pass-through of policy rate changes to lending rates is substantially weaker when domestic uncertainty is high. After a year, about 43% of the cumulative policy rate change has reached lending rates in high-uncertainty states, against 65% in low-uncertainty states, even though the policy rate follows a similar path in the first year and is more persistent thereafter. In practical terms, a central bank would need a cumulative policy rate increase of about 150 basis points when uncertainty is high to achieve the rise in lending rates that a 100 basis point increase delivers when uncertainty is low. The weakening is specific to lending rates, concentrated in economies with shallow financial systems, and robust to a wide range of alternative specifications. These patterns are consistent with banks discounting the persistence of policy rate changes, and rationing rather than repricing credit, when the outlook is uncertain, although the paper cannot establish these mechanisms directly.

The analysis has limitations. The World Uncertainty Index is a text-based measure built from a single source of country reports, and is noisy for individual economies, so the high-uncertainty state is measured with error, which is likely to bias the estimated differences towards zero. The lending rates reported by central banks are averages that may mix new and existing loans and differ in definition across economies, although the economy fixed effects absorb level differences. The paper estimates the pass-through of policy rates to market rates rather than the effects of exogenous monetary policy shocks on inflation and activity, because credible shocks are not available for most economies in the sample, and it cannot distinguish conclusively between the signal extraction and credit risk mechanisms without data on loan maturities and volumes. Future research could use loan-level data for individual economies to identify the mechanism, extend the analysis to the transmission of policy to credit volumes and activity, and examine whether forward guidance and other forms of central bank communication can offset the weakening of transmission in uncertain times.

Declarations

Competing interests.

The authors have no competing interests to declare that are relevant to the content of this article.

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Author Contribution

UA conceived and designed the study, compiled the data, carried out the estimation and drafted the manuscript. DA and JEO contributed to the review of the literature, the interpretation of the results and the revision of the manuscript. All authors read and approved the final manuscript.

Data availability.

The data set and the replication code for the paper are available from the corresponding author upon reasonable request.

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Figures

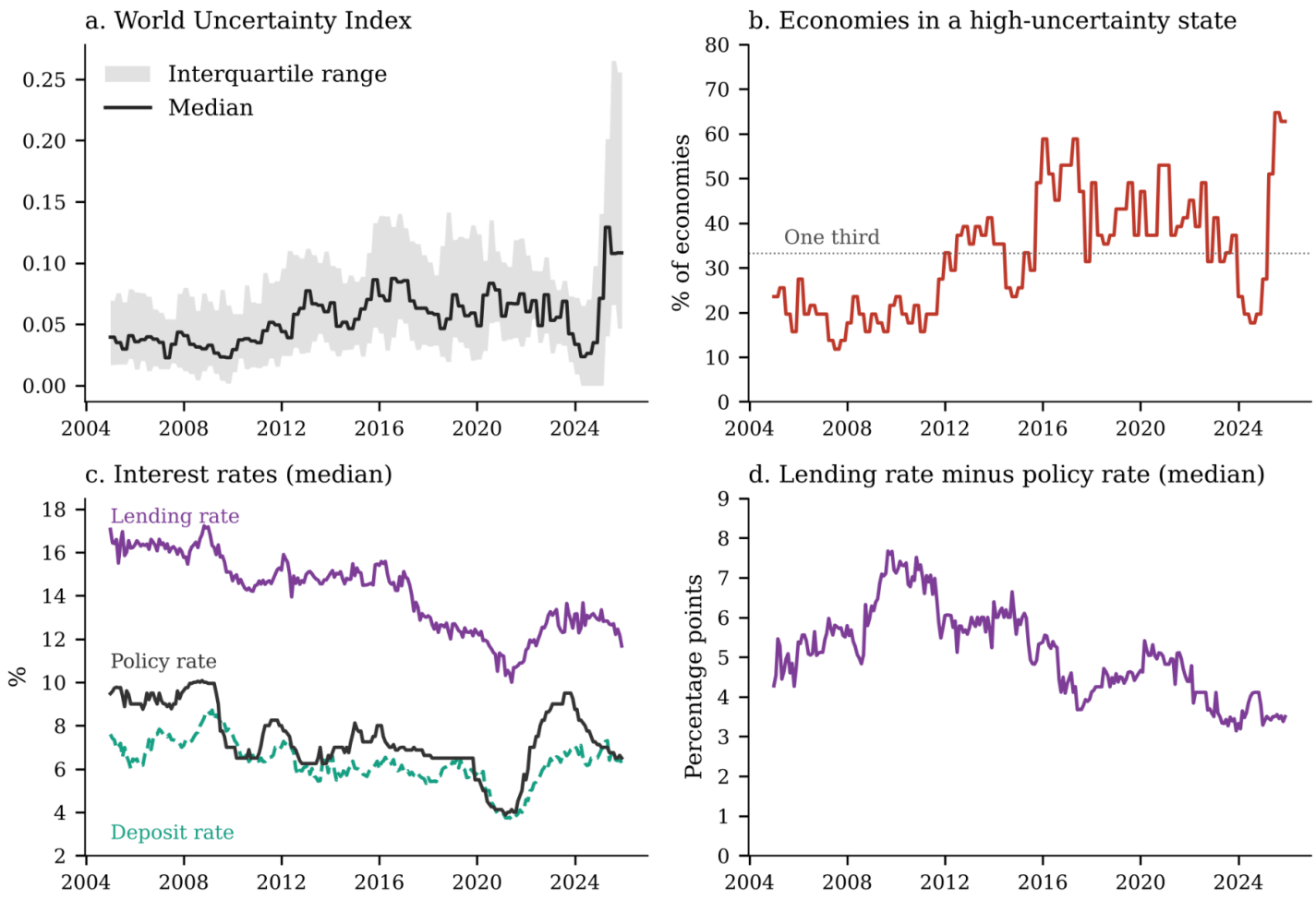


Figure 1

Uncertainty and interest rates in the sample economies, 2005–2025. **Notes:** Panel a shows the cross-economy median and interquartile range of the World Uncertainty Index (three-quarter weighted moving average). Panel b shows the share of economies in a high-uncertainty state, defined as the index in the previous quarter lying in the top third of the economy's own 2005–2025 distribution. Panels c and d show cross-economy medians. 51 economies with monthly lending rates. Source: Authors' computation based on IMF Monetary and Financial Statistics, the World Uncertainty Index (Ahir et al., 2022) and BIS and IMF policy rate data.

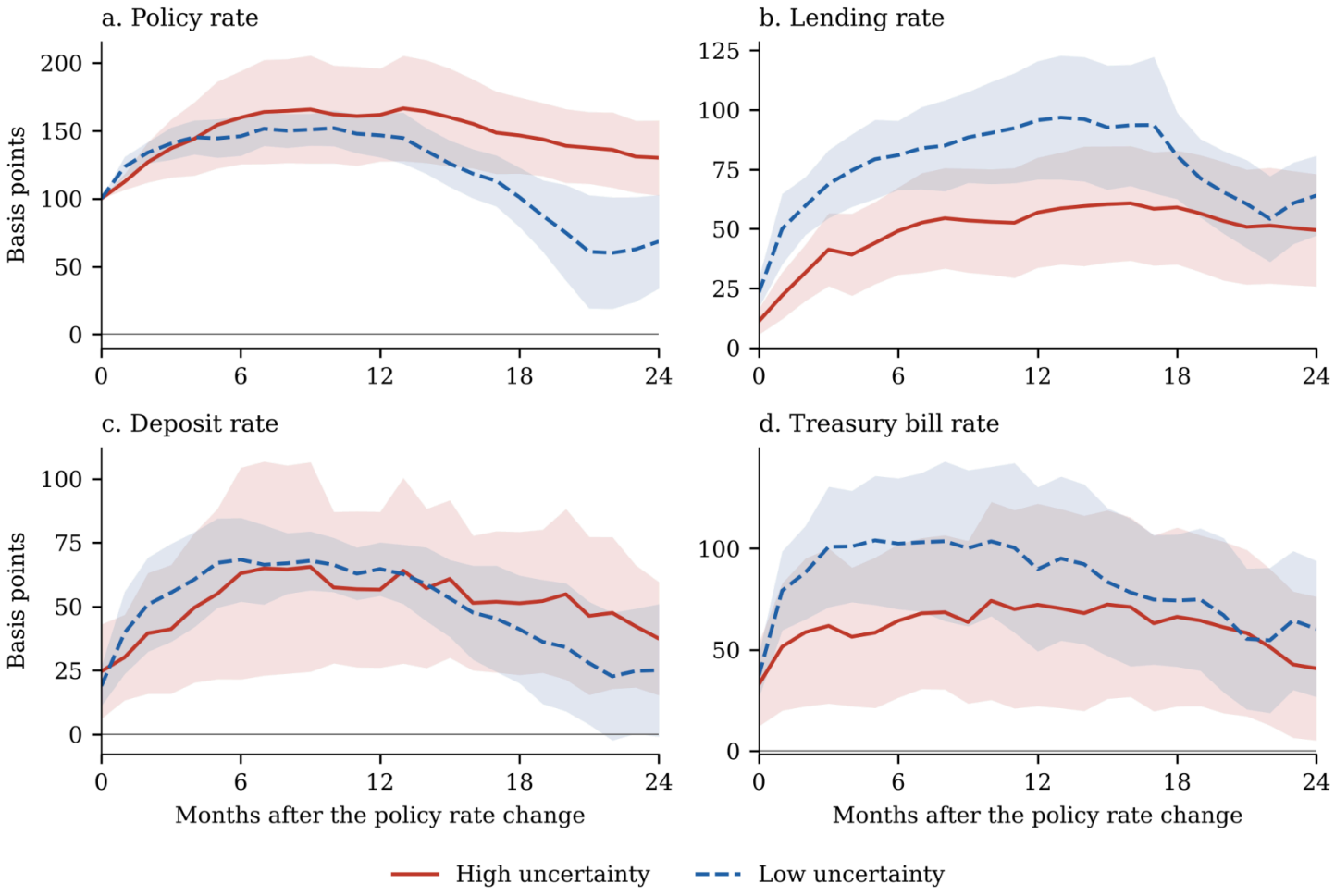


Figure 2

Responses of interest rates to a 100 basis point policy rate increase by uncertainty state. **Notes:**Cumulative responses in basis points, estimated with equation (6), when uncertainty in the previous quarter was high (solid red) or low (dashed blue). Shaded areas are 90% confidence bands based on standard errors clustered by economy and by month. Source: Authors' estimation.

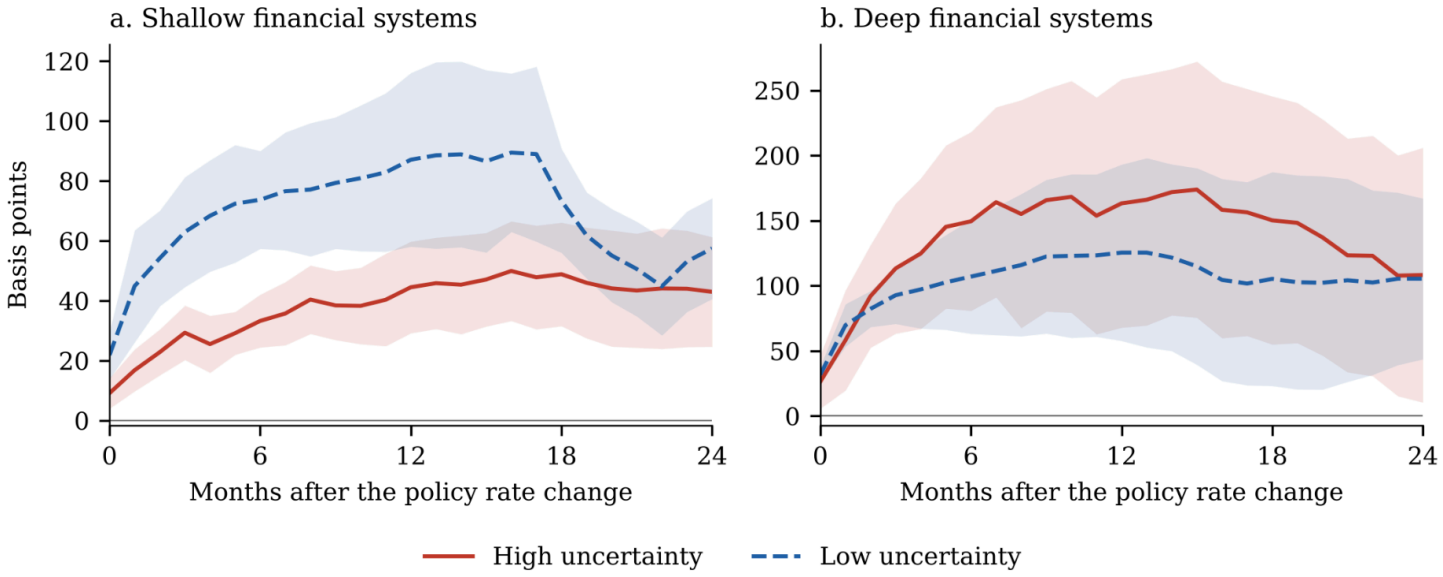


Figure 3

Lending rate responses by uncertainty state and financial depth. **Notes:** Cumulative responses of lending rates in basis points to a 100 basis point policy rate increase, estimated with equation (6) for economies below (panel a) and above (panel b) the median of domestic credit to the private sector relative to GDP. Shaded areas are 90% confidence bands based on standard errors clustered by economy and by month. Source: Authors' estimation.

Supplementary Files

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- Appendix.docx