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The Impact of Cross-Border Capital Flows on Monetary Conditions in the United Arab Emirates[¶]

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Abstract

Cross-border capital flows can significantly influence system-wide liquidity especially in open economies with limited or no nominal exchange rate flexibility. While steady foreign exchange (FX) inflows have boosted excess reserves in the United Arab Emirates (UAE) over the recent years, examining the macro-financial impact of external shocks to net FX flows can inform a more comprehensive, risk-based, and forward-looking assessment of monetary conditions. A simple blockwise structural VAR model indicates regime-dependent monetary transmission since the Dirham Monetary Framework’s inception: cross-border capital flows materially shape credit dynamics mostly when system-wide liquidity drops below its historical norm. Conversely, when liquidity is abundant, the macro-financial impact is limited. However, the findings—albeit based on limited empirical data—underscore the importance of smoothing excessive liquidity fluctuations from external shocks to ensure that monetary transmission remains effective and consistent with the stabilising role of a fixed exchange rate anchor. Effective liquidity management of FX flow-driven changes in system-wide liquidity rather than discretionary policy rate changes (and its interaction with credit and money markets) is the primary and obvious instrument of monetary policy operations to preserve an optimal level of liquidity surplus rather than attempting to directly steer aggregate capital flows.

Keywords: capital flows, monetary policy, spillover, FCI, liquidity management, VAR

JEL Codes: E52, E58, F32

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1 Introduction

Rising geopolitical fault-lines and widening economic fragmentation significantly impact cross-border flows and can have profound implications for monetary conditions, especially for small open economies with limited policy flexibility. However, in the United Arab Emirates (UAE), greater economic diversification, substantial inward investment, and steady hydrocarbon revenues have generated robust foreign exchange (FX) inflows and strengthened system-wide liquidity in the banking sector.¹ In addition, a strong integration with international markets and supply chains have bolstered the UAE's position as a safe haven in the MENA region.

Assessing how cross-border capital flows can influence the strength and predictability of monetary transmission is highly relevant for a highly open economy such as the UAE, whose monetary policy operates through a fixed Dirham-US dollar peg and open capital account, prioritising exchange rate stability and liquidity management.² Domestic interest rates move broadly in line with US dollar rates. When the US Federal Reserve adjusts its monetary policy stance, the Central Bank of the UAE (CBUAE) must recalibrate its own policy settings to align market rates with a policy rate that prevents interest rate arbitrage or destabilises capital flows. In the absence of nominal exchange rate flexibility, monetary transmission operates through the lending channel (supported by wealth and confidence effects), which depends on how cross-border capital flows influence system-wide liquidity and bank balance sheets in response to expectations driving credit demand. As a result, monetary policy autonomy is largely confined to managing system-wide liquidity in the banking sector through open market operations rather than the independent policy rate setting.

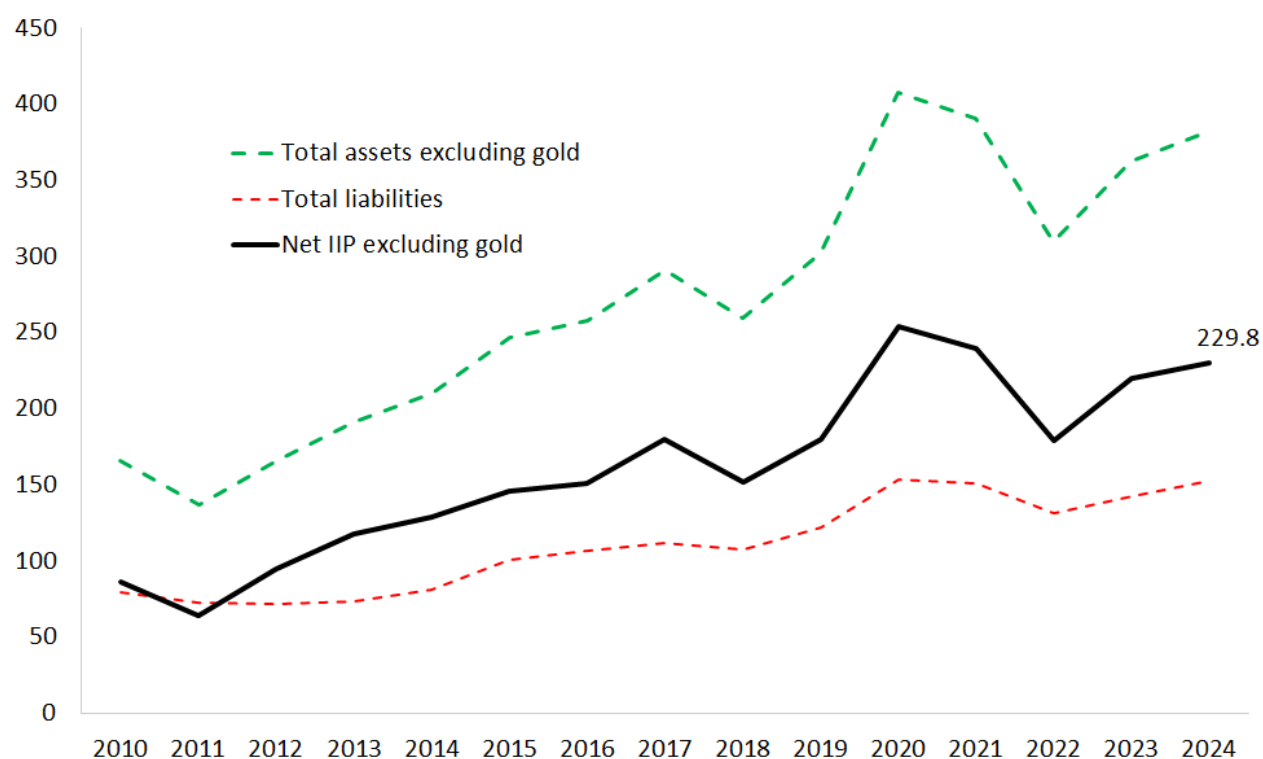
Understanding how external factors could influence system-wide liquidity and its impact on monetary transmission in a fixed exchange rate regime starts with the UAE's external position. The UAE's net creditor position, with the net international investment position (NIIP) significantly exceeding 200 percent of GDP, highlights substantial external buffers (large sovereign wealth funds, ample foreign reserves, and persistent external surpluses). The associated accumulation of FX reserves has raised the monetary base cover ratio to a record level of close to 120 percent in early 2026. The level and the share of external assets relative to GDP have increased substantially over the past decade, consistent with the country's accumulation of foreign assets through sovereign wealth funds and other public and private channels (Milesi-Ferretti [2025]). On average, NIIP relative

¹Excess reserves in the UAE banking sector has averaged about four percent of total banking sector assets since 2020.

²Total exports and imports of goods and services exceeded 220 percent of GDP in 2025.

to GDP has increased by around 12.3 percent percentage points annually between 2011 and 2024, reflecting the combined effect of high FX inflows saving rates, valuation gains, and reinvested investment income. Figure 1 highlights these long-term gains and key turning points. In the early 2010s, the NIIP-to-GDP ratio rose steadily as external assets outpaced liabilities, supported by strong oil revenues and growing investment income even during the oil price slump between 2014 and 2016. Momentum resumed thereafter, culminating in a sharp spike in 2020, driven largely by the temporary contraction in nominal GDP and valuation effects, which pushed NIIP excluding gold close to 254 percent of GDP. As the economy rebounded in 2021, the ratio stabilised due to renewed capital inflows and rising foreign liabilities, reflecting the UAE's success in attracting foreign direct investment into diversified non-oil sectors, supported by pro-business reforms easing foreign ownership limits and strengthening the investment framework. Since then, the NIIP trended higher as external assets expanded on the back of strong export receipts and higher returns on sovereign wealth portfolios.

Figure 1: UAE – Net International Investment Position (relative to GDP, in percent)



Note: Data source: External Wealth of Nations database; GDP from FCSC (current prices). Total assets and the net IIP exclude monetary gold.

Standard open-economy frameworks predict that changes in capital flows operate like “liquidity shocks” that influence bank lending, asset prices, and aggregate demand (Os-

try et al. [2011]; Blanchard et al. [2016]). Managing capital flow volatility (and its interdependence with sovereign risk premia and the real effective exchange rate) requires the central bank to effectively use its liquidity management as well as macro- and microprudential tools to balance the nominal stability benefits of the fixed exchange rate against procyclical risks inherent in commodity dependence (and associated FX inflows) (BIS [2026]). In the context of the UAE, during periods of high hydrocarbon exports, portfolio flows, and strong foreign direct investment, net FX inflows expand the deposit base of banks and increase system-wide liquidity. This abundance of liquidity can weaken the policy rate’s influence over interbank markets, as banks have less need for wholesale funding, and short-term benchmark rates may temporarily decouple from the policy rate. Conversely, during episodes of slower global demand, monetary tightening, or risk aversion, capital outflows can drain bank reserves and interbank liquidity, requiring the central bank to inject funds or recalibrate its market operations to stabilise money market rates.

In this paper, we propose a reduced form model to examine the impact of changes in cross-border flows on macro-financial conditions in the UAE. However, the absence of reliable historical time series data on the balance of payments represents a significant empirical challenge. In this paper, we address this challenge by using FX flows to investigate how changes in cross-border flows that pass through the CBUAE balance sheet impact domestic macro-financial conditions in the UAE.

2 Conceptual Framework: Liquidity Regimes and Monetary Transmission in Pegged Economies

2.1 Structural Liquidity Surplus and Monetary Operations

In economies with pegged exchange rates and persistent positive current or financial account balances, the domestic banking sector typically holds surplus liquidity Khatat and Veyrune [2019].³ This surplus arises when large, structural and sustained FX inflows enter the financial system through trade receivables, net foreign investment, and sovereign asset accumulation. In the UAE, hydrocarbon export receipts and related government-related FX transactions, generate substantial inflows that are converted into local cur-

³Central banks operating under exchange rate pegs must absorb foreign currency inflows caused by positive current or financial accounts. To prevent nominal appreciation, the central bank buys foreign exchange and sells domestic currency. If not fully offset via open market operations, this behaviour permanently leaves the commercial banking sector with structural surplus liquidity.

rency and deposited in the banking sector.⁴ These inflows are mostly exogenous to domestic monetary conditions by reflecting external factors, such as changes in global commodity prices, fiscal policy choices, and the external asset position of sovereign wealth funds, rather than the liquidity impact of banks' lending decisions. Without active management, such inflows would automatically expand the monetary base and bank reserves, potentially fueling procyclical credit growth disconnected from domestic economic fundamentals.

The CBUAE actively manages system-wide liquidity surplus through open market operations (OMOs) to prevent net FX inflows from distorting monetary conditions and ensure effective monetary policy transmission.⁵ It regularly issues Monetary Bills (M-Bills) and Islamic Certificates of Deposit (ICDs), which serve as the main instruments for managing structural liquidity. By incentivising banks to hold these instruments rather than extend credit, these structural OMOs absorb a significant portion of higher FX-driven system-wide liquidity. Otherwise, banks are likely to sweep additional reserves in the CBUAE's overnight facility at the prevailing policy rate (Base Rate), which risks increasing the volatility of overnight interest rates in interbank market.⁶ Keeping system-wide liquidity ample (but not abundant) ensures that market interest rates are closely aligned with the CBUAE's policy rate and allows the CBUAE to maintain effective monetary transmission within the constraints of the fixed exchange rate regime. However, structural OMOs are not a mechanical offset: their intensity varies with policy objectives, market conditions, and the CBUAE's assessment of the appropriate monetary stance. Consequently, the liquidity surplus is not simply a passive by-product of FX inflows. Its level reflects the interaction between the size of exogenous inflows, the intensity of central bank sterilisation, and banks' own portfolio preferences given prevailing credit opportunities and risk appetite.

⁴Since net FX flows significantly boost government-related deposits in the banking sector, the CBUAE also monitors the deposit channel as part of its monetary policy surveillance in [Jobst and Memic \[2026\]](#).

⁵Note that the terms "liquidity surplus" and "excess reserves" are closely related and often used interchangeably; however, they differ in scope and perspective. Excess reserves are a bank-level (or system-level) balance sheet concept, defining the reserves held by banks at the central bank above the regulatory minimum. In contrast, the term liquidity surplus takes the perspective of monetary policy operations; it refers to the net surplus of reserve money in the banking sector above the amount banks require for payments and settlements each day, which the central bank may need to absorb to keep its policy rate on target. For this paper, we use the terms interchangeably for simplicity, but technically, the characterisation of "liquidity surplus regimes" is based on "excess reserves" in the banking sector.

⁶Most excess reserves (above the minimum cash reserve requirement) operationally manifest as banks' holdings in the Overnight Deposit Facility (ODF) and its Islamic equivalent, the Overnight Murabaha Facility (OMF) at the CBUAE. These reserves represent the unsterilised residual of the structural liquidity surplus: funds that banks choose to park with the central bank rather than deploy into credit markets.

2.2 Regime-Dependent Transmission of FX Flow Shocks

The level of liquidity surplus can alter how FX flow shocks transmit to domestic financial conditions and the real economy. Higher liquidity surplus indicates that banks operate with higher liquidity buffers on average, which could insulate credit supply from external shocks.⁷ In contrast, lower liquidity surplus indicates that banks operate closer to their liquidity constraint, amplifying the marginal impact of shocks to FX flows on their potential lending capacity. Besides banks' liquidity conditions, many other factors influence credit conditions; however, for expositional clarity and conceptual simplicity, we focus on the distinction between two different regimes corresponding to higher and lower system-wide liquidity.

Higher Liquidity Surplus Regime. When system-wide liquidity is abundant, the credit supply channel is effectively non-binding. FX outflows mechanically drain bank reserves due to FX sales by the CBUAE, but do not force an immediate contraction in lending. Banks can draw down their ODF balances to maintain credit extension, effectively self-insuring against temporary FX-driven liquidity pressures. Similarly, a positive FX inflow shock does not automatically translate into credit expansion since banks would accumulate additional reserves. Under these conditions, marginal bank lending responds primarily to demand-side factors rather than liquidity availability.⁸ Without sufficient liquidity absorption by the central bank, abundant and non-constraining system-wide liquidity makes banks indifferent between holding additional reserves and extending loans at the margin. Consequently, FX flow shocks have muted effects on bank lending, real activity, and inflation. The transmission mechanism operates through expectations and wealth channels—rising asset prices may boost consumer spending and business investment, but the direct credit supply response is weak.

Lower Liquidity Surplus Regime. When system-wide liquidity is scarce, liquidity conditions might become binding for some banks. An adverse FX outflow shock could drain surplus liquidity to settle FX transactions, forcing some banks to curtail new credit or recall short-term lending. Lending slows not because borrowers demand less credit, but because some banks might prioritise preserving their liquidity position.⁹ In this en-

⁷Given the local currency is pegged to the US Dollar, domestic lending and credit growth are also relatively insensitive to rate changes due to ample local liquidity [Dell'Acqua et al. \[2025\]](#).

⁸Credit growth becomes sensitive to business confidence (captured in real activity measures), asset price dynamics (such as house prices influencing collateral values and wealth effects), and borrowers' ability to service debt.

⁹A contraction in credit supply constrains firms' working capital and investment financing, dampening real activity (reflected in lower real activity). Reduced credit availability can also depress asset prices, as fewer mortgage and corporate loans reduce demand for real estate and other leveraged assets. Over time, credit-driven demand fluctuations feed into inflation dynamics, though with a lag.

vironment, the use of standing credit facilities and open market operations by the central bank (for instance, via term lending and repurchase operations) can prevent a liquidity-induced credit crunches.¹⁰ Conversely, a positive FX inflow shock in a lower liquidity regime directly relaxes the binding constraint, enabling banks to expand credit supply rapidly.

2.3 Empirical Hypotheses

Our empirical analysis focuses on liquidity surplus as the regime-defining variable for two complementary reasons. First, higher system-wide liquidity indicates that banks have generally higher liquidity buffers, which could—among other factors—support potential credit extension. Second, it is this residual liquidity that influences whether the lending channel of monetary policy transmission operates under tight or loose conditions when shocks to FX flows occur. Thus, a lower liquidity surplus regime should feature stronger and faster transmission from FX shocks to domestic macro-financial conditions, elevating the importance of active and preemptive liquidity management to stabilise the economy. The regime-dependent transmission mechanism described above generates testable predictions about how FX flow shocks propagate through the UAE economy under different liquidity conditions. These predictions motivate the use of a regime-switching vector autoregression (RS-VAR) that allows the system’s dynamic response to vary with the the liquidity surplus. We formalise our theoretical expectations as follows.

Hypothesis 1: Muted monetary transmission in the higher liquidity surplus regime.

When system-wide liquidity is abundant, we expect FX flow shocks to have weak and statistically insignificant effects on bank lending, real activity, and inflation. Specifically, a positive FX inflow shock should not trigger immediate credit expansion. Similarly, an FX outflow shock should not force credit contraction, as banks can buffer the liquidity drain by drawing down their excess reserves. Under these conditions, the impulse responses of bank lending to FX shocks should be insignificant, and any changes in real activity (proxied by the purchasing managers’ index, or PMI) or headline inflation (measured as the consumer price inflation, or CPI) should reflect demand-side adjustments (through wealth and confidence channels) rather than binding credit supply constraints. Asset prices (such as house prices) may respond more visibly to the extent that FX flows signal changes in external risk sentiment or affect household wealth perceptions, but these

¹⁰For instance, as a preemptive measure in light of rising uncertainty about the duration of the regional conflict triggered by the confrontation between the United States and Iran, on 17 March 2026, the CBUAE launched a comprehensive *Financial Institution Resilience Package* (FIRP) to support the banking sector, which provided enhanced access to their reserve balances and term lending facilities [CBUAE \[2026a\]](#).

effects operate independently of the credit channel.

Hypothesis 2: Amplified monetary transmission in the lower liquidity surplus regime. When system-wide liquidity is scarce, we expect FX flow shocks to generate strong and persistent effects on the domestic financial system and real economy. Large FX outflows should directly reduce bank lending capacity (all else equal). This negative credit supply shock should then propagate to real activity, with PMI declining as firms face tighter financing conditions. Asset prices should also fall, reflecting both reduced credit availability and the procyclical feedback between lending and collateral values. Inflation responses may be lagged but should ultimately reflect the demand compression induced by tighter credit conditions. Conversely, a positive FX inflow shock should expand credit supply, stimulating real activity, and potentially generating inflationary pressures due to aggregate demand effects if the economy operates near capacity, i.e., the output gap is closed. The key expectation is that the magnitude, speed, and statistical significance of these responses should be substantially larger in the lower liquidity surplus regime than in the higher liquidity surplus regime.

These hypotheses provide a clear empirical test of whether liquidity regime heterogeneity matters for monetary transmission in the UAE. If both regimes exhibit similar impulse response patterns, it would suggest that system-wide liquidity does not fundamentally alter the credit supply channel, and liquidity management plays a secondary role relative to other determinants of credit dynamics. In contrast, statistically and economically significant differences between regimes would validate the theoretical framework outlined above and underscore the importance of active and regime-sensitive liquidity management in stabilising the economy under a fixed exchange rate.

3 Data

We estimate a reduced form model for assessing the impact of cross-border capital flows on monetary and financial conditions based on monthly data from November 2020 to December 2025. The starting date coincides with the CBUAE's implementation of its monetary policy framework, the Dirham Monetary Framework (DMF), following its approval in February 2020 and implementation in mid-2020. The DMF introduced several liquidity management tools, including Monetary Bills (M-Bills), Islamic Certificates of Deposit (ICDs), the Overnight Deposit Facility (ODF), the Overnight Murabaha Deposit Facility (OMF), and a harmonised minimum cash reserve requirement [[International Monetary Fund, 2022](#)].

We distinguish between external and domestic factors for our model specification.

Table 1 lists the ten endogenous variables together with their definitions and primary sources. The external block contains three major drivers of capital flows to oil-exporting economies with US dollar pegs: the Brent crude oil price (OIL), as a proxy for the hydrocarbon-revenue channel; the Federal funds rate (FED), as a proxy for the global monetary cycle to which the UAE is bound by the dollar peg; and the CBOE volatility index (VIX), as a proxy for global capital market risk appetite. The domestic block contains seven domestic variables capturing the channels through which FX-flow shocks transmit to local financial conditions and the real economy.

Table 1: Variable Definitions, Transformations and Sources

Variable	Description	Transformation	Source
<i>External block</i>			
OIL	Brent crude oil price, USD per barrel	Log-level	Bloomberg
FED	Federal Funds Rate, target range midpoint	Level, percent	Bloomberg
VIX	CBOE volatility index, monthly average	Level, index	Bloomberg
<i>Domestic block</i>			
NetFX	Net cross-border FX flow via CBUAE	Percent of nominal GDP	CBUAE; FCSC
FCI	Financial conditions index for the UAE	Level, standardised index	Authors' construction
Business	Bank credit to non-financial corporates	Year-on-Year, percent	CBUAE
HP	Residential house price index	Year-on-Year, percent	ADREC, DLD
PMI	S&P Global UAE Purchasing Managers' Index	Level, index	S&P Global
REER	UAE real effective exchange rate	Level, index	BIS
CPI	Headline consumer price index	Year-on-Year, percent,	FCSC
<i>Threshold variable</i>			
Ratio	Banking-system surplus liquidity to total deposits	Percent, lagged one month	CBUAE

Note: The estimation sample is monthly observations from November 2020 to December 2025, yielding $T = 61$ usable observations after the first lag. The recursive ordering within the domestic block is NetFX, FCI, Business, HP, PMI, REER, CPI, with sticky-price inflation last as in [Christiano et al. \[1999\]](#). The threshold variable Ratio classifies regimes according to equation (6) and does not enter the VAR as an endogenous variable. The UAE house price measure (HP) is calculated by determining the price per square metre for each individual transaction in Dubai and Abu Dhabi and then taking the median of these transaction-level values.

The seven domestic variables are selected to capture complementary channels through which FX-flow shocks may affect domestic macro-financial conditions. The recursive ordering is NetFX, FCI, Business, HP, PMI, REER, and CPI. NetFX is the structural shock of interest and is therefore ordered first within the domestic block. Monthly variations in cross-border FX flows largely reflect sovereign hydrocarbon export receipts, whose domestic deployment may affect system-wide liquidity in the banking sector, financing conditions, credit, asset prices, economic activity, and prices.

The CBUAE financial conditions index (FCI) is ordered immediately after NetFX. FCI

serves as a high-frequency composite indicator of the ease or tightness of domestic financial conditions across funding markets, credit, and asset prices. Its early placement is not intended to assert that broad financial conditions adjust faster than credit quantities or house prices as a matter of economic timing. Moreover, because some FCI components (residential real estate prices, private credit growth) are transformations of information that also enters Business and HP directly, any claim about differential adjustment speed between FCI and these two variables would be difficult to separate from the mechanical overlap in their construction. Instead, FCI's position within the domestic block is identification-neutral for the results we report. Because NetFX is ordered first and the only structural innovation we interpret is the NetFX shock, the reported impulse responses depend only on the first column of the impact matrix, which is determined entirely by each variable's covariance with NetFX and is invariant to how the remaining six domestic variables are ordered relative to one another. This is also why we do not assign an independent structural interpretation to the FCI innovation itself. Its role in the system is limited to summarising the broader financial environment through which the NetFX shock is transmitted, not to serving as an independently identified structural shock.

Business credit growth (Business) is ordered next and captures the bank-lending quantity channel. It is measured as the year-on-year growth rate of bank lending to non-financial corporates and provides a direct indicator of the extent to which changes in FX flows and broader financial conditions translate, through the banking system, into financing for the productive sector. Placing Business after the FCI reflects the assumption that funding costs and other financial conditions may adjust before the corresponding quantities of bank credit fully respond. Residential house price growth (HP) follows Business and captures the asset-price channel of liquidity transmission. Its inclusion reflects the relative importance of real estate in the UAE economy and the wider role of property markets in the transmission of liquidity conditions across the GCC. Changes in cross-border liquidity, funding conditions, and bank credit may be reflected in property valuations before they become fully visible in real activity and consumer prices.

The Purchasing Managers' Index (PMI) is ordered after the financial and asset-price variables and captures the short-horizon response of non-oil private-sector activity. As a forward looking diffusion index of new orders, output, employment, and supplier deliveries, PMI reflects firms' activity expectations and confidence following an FX-flow shock. The joint inclusion of Business and PMI allows us to distinguish transmission through bank balance sheets and credit quantities, captured by Business, from the subsequent response of firms' orders, production, employment, and sentiment, captured by

PMI. The real effective exchange rate (REER) is ordered near the end of the domestic block. Even under the exchange-rate peg, the real value of the UAE dirham varies with movements in the US dollar against the currencies of the UAE’s non-US trading partners and with changes in relative domestic and foreign prices. Because the nominal bilateral rate against the US dollar is fixed, the REER is not treated as an independently adjusting domestic policy instrument or as the initial financial transmission variable. Instead, it is interpreted as a broader relative-price adjustment variable that reflects the combined effects of external exchange-rate movements and domestic macro-financial developments. Its inclusion captures the implications of these relative-price changes for competitiveness and the transmission of FX-flow shocks. Inflation is ordered last, consistent with the assumption that consumer prices adjust more slowly than financial conditions, credit quantities, asset valuations, business activity, and broader relative prices.

Although the recursive scheme formally identifies all structural innovations, the only shock interpreted and reported in the paper is the NetFX innovation. Because NetFX is ordered first within the domestic block, the reported impulse responses to the NetFX shock are invariant to permutations among the domestic variables ordered after NetFX, conditional on an unchanged variable set, sample, lag structure, and block-exogeneity restrictions. Such permutations affect the identification of the downstream shocks themselves, which are not the focus of the analysis.

The threshold variable, used to classify regimes, is the ratio of excess reserves to total deposits in the banking sector. Scaling by total deposits controls for balance-sheet growth and produces a scale-free state variable that captures the structural liquidity position of the banking system. The classification of higher versus lower surplus episodes is based on a one-month lag of this ratio relative to its sample mean.¹¹

4 Methodology

We estimate a small open-economy vector autoregression (VAR) model on UAE monthly data to assess the structural response of macro-financial conditions (business lending, house prices, non-oil activity, financial conditions, and inflation) to positive net FX shocks, while controlling for the influence of changes in oil prices, US policy rate and investor risk sentiment (based on the implied volatility of US equity markets). Block exogeneity prevents domestic variables from feeding back into external ones either contemporaneously

¹¹We compare the ratio of surplus liquidity to total banking sector deposits in the previous month with its full-sample mean. If last month’s ratio was at or above the full-sample mean, the current month is classified as a higher-surplus month; if last month’s ratio was below the full-sample mean, the current month is classified as a lower-liquidity surplus month.

or with lags. The block-exogeneity assumption is conservative for a small open economy. Eliminating feedback effects from domestic conditions to global oil prices, US monetary policy, or global risk sentiment sharpens our model identification at minimal substantive cost. Building on a constant-coefficient benchmark model in Section 4.1, Section 4.2 implements a regime switching VAR that distinguishes between higher and lower surplus regimes. The limited sample motivates a parsimonious model specification: we use a single lag and prefer threshold switching on an observable regime variable to Markov switching, which has weak finite-sample properties when latent state probabilities must be filtered from short time series.

This model set-up is well-suited for the UAE’s monetary policy framework and the characteristics of monetary policy transmission given the UAE’s significant exposure to US dollar-denominated hydrocarbon revenues and open capital account. The Dirham’s peg to the US dollar implies that the CBUAE lacks an independent policy rate setting, so the transmission of FX flow shocks operates primarily through aggregate demand effects of the lending rather than interest rate or exchange rate channels that characterise floating exchange rate regimes over the near term. Over the longer term, the UAE adjusts to external shocks through labour markets and other structural factors affecting relative prices.

4.1 Constant-coefficient VAR

The benchmark specification is

$$\mathbf{y}_t = \mathbf{c} + \sum_{\ell=1}^p \mathbf{A}_\ell \mathbf{y}_{t-\ell} + \mathbf{u}_t, \quad \mathbf{u}_t \sim \mathcal{N}(\mathbf{0}, \Sigma), \quad (1)$$

following Kilian and Lütkepohl [2017], we estimate the benchmark VAR with $p = 1$, given the limited time-series dimension. The vector $\mathbf{c}$ contains equation-specific intercepts only; no deterministic linear trend is included. The variables enter in the transformations reported in Table 1, with no additional differencing. We do not impose a common order of integration or a cointegration rank and focus on finite-horizon impulse responses. The endogenous vector $\mathbf{y}_t$ is partitioned into an external block $\mathbf{y}_t^e = (\text{OIL}_t, \text{FED}_t, \text{VIX}_t)'$ of dimension $q = 3$ and a domestic block $\mathbf{y}_t^d = (\text{NetFX}_t, \text{FCI}_t, \text{Business}_t, \text{HP}_t, \text{PMI}_t, \text{REER}_t, \text{CPI}_t)'$ of dimension $m = 7$.¹² The total system dimension is $M = q + m = 10$. The small open

¹²The external block contains the dominant drivers of capital flows to oil-exporting emerging markets: a commodity-price terms-of-trade channel, the global monetary cycle, and the global financial cycle. The recursive ordering within the domestic block follows Christiano et al. [1999], with sticky-price headline inflation placed last; NetFX is placed first within the block on the grounds that, in a pegged hydrocarbon

economy restriction of Zha [1999] requires that lagged domestic variables do not enter the equations for OIL, FED, or VIX. Partitioning each $\mathbf{A}_\ell$ conformably with $(\mathbf{y}_t^{e'}, \mathbf{y}_t^{d'})'$, this is imposed by setting the upper-right block to zero:

$$\mathbf{A}_\ell = \begin{bmatrix} \mathbf{A}_\ell^{ee} & \mathbf{0}_{q \times m} \\ \mathbf{A}_\ell^{de} & \mathbf{A}_\ell^{dd} \end{bmatrix}, \quad \ell = 1, \dots, p. \quad (2)$$

Each equation is estimated by OLS using only the regressors permitted by the restriction: external block equations on a constant and external lags only, domestic block equations on a constant and the full lag set, i.e., influenced by both domestic and external factors. Under Gaussian innovations, the equation-by-equation estimator is equivalent to both the restricted seemingly unrelated regressions (SUR) and the conditional maximum-likelihood estimators. The reduced-form covariance matrix $\widehat{\Sigma}$ is the residual cross-product divided by $T - K^{\max}$, where $K^{\max}$ is the maximum number of regressors across equations. Structural innovations are recovered through a block-Cholesky decomposition that respects the external–domestic partition:¹³

$$\mathbf{u}_t = \mathbf{P} \boldsymbol{\varepsilon}_t, \quad \mathbf{P} = \begin{bmatrix} \mathbf{P}^{ee} & \mathbf{0}_{q \times m} \\ \mathbf{P}^{de} & \mathbf{P}^{dd} \end{bmatrix}, \quad \mathbf{P}\mathbf{P}' = \Sigma. \quad (3)$$

The upper-right zero block of $\mathbf{P}$ rules out contemporaneous feedback from domestic to external variables, reinforcing the lag-side block exogeneity. Within each block, the recursive ordering delivers point identification of all M structural shocks.¹⁴

The recursive ordering has a contemporaneous rather than a chronological interpretation. A structural innovation associated with an earlier-ordered variable may affect variables ordered later within the same month, while the reverse impact effects are restricted to zero. NetFX is placed first within the domestic block as an identifying assumption: after conditioning on the external block, innovations in domestic macro-financial variables are not allowed to affect NetFX within the same month. A NetFX shock may therefore affect FCI, Business, HP, PMI, REER, and CPI simultaneously on impact; the ordering does not imply that these variables respond sequentially. From the following month onward,

economy, monthly variation in flows is dominated by sovereign hydrocarbon-revenue deployment that is essentially predetermined within the month.

¹³Note that the Cholesky decomposition transforms correlated reduced-form residuals into orthogonal (uncorrelated) structural innovations. Orthogonality means zero covariance, which is a second-moment condition. It does not automatically demand a Gaussian (normal) distribution.

¹⁴ $\mathbf{P}^{ee}$ is the Cholesky factor of the external sub-covariance; $\mathbf{P}^{de} = \Sigma^{de}(\mathbf{P}^{ee})^{-'}$ is the contemporaneous spillover from external to domestic innovations; and $\mathbf{P}^{dd}$ is the Cholesky factor of the domestic covariance conditional on the external block, $\Sigma^{dd|e} = \Sigma^{dd} - \mathbf{P}^{de}(\mathbf{P}^{de})'$.

interactions within the domestic block operate through the VAR's lag structure, while block exogeneity continues to rule out feedback from domestic variables to the external block at all horizons. Under recursive identification, the impulse responses to a shock in position k are invariant to permutations of the variables ordered after k [Christiano et al. \[1999\]](#).

FCI as composite measure includes contemporaneous shocks from its underlying components. Under the adopted ordering, OIL shocks can affect the FCI on impact through the unrestricted external-to-domestic block $\mathbf{P}^{de}$. Within the domestic block, Business and HP precede FCI and may therefore affect it contemporaneously through the lower-triangular factor $\mathbf{P}^{dd}$, with unrestricted signs and magnitudes. The recursive zero restrictions operate in the reverse direction: a structural innovation attributed to FCI does not contemporaneously affect the global variables or the domestic variables ordered before it. These restrictions apply only within the month; lagged FCI enters the domestic equations and can therefore affect the other domestic variables from the following month onward. We do not assign a primitive economic interpretation to the FCI-specific structural innovation. The only structural shock interpreted and reported in the paper is the innovation to NetFX. FCI is included as a composite summary of broad financial conditions, and its response to a NetFX shock should therefore be interpreted partly as reflecting the joint adjustment of its underlying credit, asset price, and funding cost components.

The structural impulse response of variable i to a one-standard-deviation shock to variable j at horizon h is

$$\text{IRF}_{i,j}(h) = \mathbf{e}_i' \mathbf{\Phi}_h \mathbf{P} \mathbf{e}_j, \quad (4)$$

where the reduced-form moving-average matrices $\mathbf{\Phi}_h$ satisfy

$$\mathbf{\Phi}_0 = \mathbf{I}_M, \quad \mathbf{\Phi}_h = \sum_{\ell=1}^{\min(h,p)} \mathbf{A}_\ell \mathbf{\Phi}_{h-\ell}, \quad h \geq 1. \quad (5)$$

The shock of interest is the structural innovation to NetFX, identified by recursive ordering within the domestic block. We report responses up to horizon $H = 12$ months. Uncertainty bands are reported as ± 1 bootstrap standard deviation around the point estimate, $\widehat{\text{IRF}}(h) \pm \widehat{\sigma}^*(h)$, where $\widehat{\sigma}^*(h)$ is the standard deviation of the impulse response across $B = 10,000$ replications of a residual bootstrap in the spirit of [Runkle \[1987\]](#) and [Kilian \[1998\]](#). Under the Gaussian approximation, this band has pointwise two-sided coverage of 68.3%, with edges at the 15.9th and 84.1th percentiles of the normal distribution, so a band that excludes zero indicates one-sided significance at the 15.9% level.¹⁵

¹⁵In each replication we draw an i.i.d. sample from the centred in-sample residuals (preserving cross-

4.2 Regime-switching VAR

Examining the potentially asymmetric response of macro-financial conditions to changes in net FX shocks depending on the level of surplus liquidity, we implement a regime-switching VAR (RS-VAR) in the spirit of Tong [1990] and Tsay [1998], while preserving the block-exogeneity restriction. Let z_t denote the ratio of surplus liquidity in the banking system to total deposits, our measure of the structural liquidity position of the banking system. The regime indicator is

$$S_t = \mathbb{1}[z_{t-1} \geq \tau], \quad (6)$$

with the threshold τ fixed at the full-sample mean of z_t , so that $S_t = 1$ identifies higher-surplus liquidity months and $S_t = 0$ lower-liquidity surplus months. The unit delay ensures that S_t is predetermined relative to the contemporaneous shock ε_t , which preserves the within-period exogeneity required for the structural identification.

The RS-VAR is

$$\mathbf{y}_t = \mathbf{c}^{(S_t)} + \sum_{\ell=1}^p \mathbf{A}_{\ell}^{(S_t)} \mathbf{y}_{t-\ell} + \mathbf{u}_t, \quad \mathbf{u}_t | S_t \sim \mathcal{N}(\mathbf{0}, \Sigma^{(S_t)}), \quad (7)$$

where $S_t \in \{0, 1\}$ indexes the lower and higher surplus liquidity regimes. Each regime has its own intercepts, autoregressive coefficients, and reduced-form covariance, so both the persistence of the system and the contemporaneous co-movement of innovations are state-dependent. Block exogeneity is preserved within each regime.¹⁶ Structural shocks within each regime are identified by the same block-Cholesky scheme as in (3), applied to the regime-specific covariance $\widehat{\Sigma}^{(s)}$, yielding regime-specific factors $\mathbf{P}^{(s)}$.

The regime-conditional impulse response of variable i to a one-standard-deviation shock to variable j at horizon h is

$$\text{IRF}_{i,j}^{(s)}(h) = \mathbf{e}_i' \mathbf{\Phi}_h^{(s)} \mathbf{P}^{(s)} \mathbf{e}_j, \quad s \in \{0, 1\}, \quad (8)$$

equation contemporaneous correlation by resampling the full M -vector jointly), simulate a counterfactual sample recursively from the actual initial conditions and the estimated parameters, and re-estimate the system subject to the same block-exogeneity restriction.

¹⁶Estimation proceeds in two stages. Because external variables are by assumption invariant to UAE-specific regimes, we estimate the external block by OLS on the *full* sample. The domestic block is then estimated equation-by-equation by OLS on the regime-specific subsample $\{t : S_t = s\}$ for $s \in \{0, 1\}$, using the constant and the full set of regressors permitted by block exogeneity. Because S_t is observable and predetermined, the two-stage estimator coincides with the joint conditional maximum-likelihood estimator under Gaussian innovations and the block-exogeneity restriction. The contemporaneous covariance between external and domestic innovations is allowed to differ across regimes through the regime-specific domestic residuals, even though the external residuals themselves are full-sample.

where $\Phi_h^{(s)}$ are the regime-specific moving-average matrices, computed from the regime-specific autoregressive coefficients by the same recursion as in the linear case. Confidence bands for the regime-conditional IRFs are obtained from a fixed-regime-path residual bootstrap with $B = 10,000$ replications,¹⁷ using the same ± 1 bootstrap standard-deviation band (68% pointwise coverage under the Gaussian approximation) as in the linear case.¹⁸

5 Empirical Results

Figure 2 reports the structural impulse responses of business credit, PMI, and headline inflation to a positive shock to net FX flows in the constant-coefficient specification. Overall, the benchmark VAR suggests that FX flow shocks have modest average macro-financial effects: they temporarily lift PMI, generate only a small and short-lived credit response, and do not produce persistent inflationary pressure. Three patterns stand out. First, business credit (Panel (a)) reacts modestly: the response is essentially flat on impact, rises gradually to its peak around the third month, and then declines, crossing zero around the sixth month and remaining negative thereafter. This indicates a small and diminishing impact of higher externally-driven system-wide liquidity on lending conditions over the estimation period. Second, PMI (Panel (b)) reacts positively and sharply on impact, falls back close to zero within two months, recovers to a secondary peak around month five, and then decays thereafter. The non-monotonic PMI response reflects two channels operating at different speeds. The initial increase likely reflects the forward-looking nature of PMI: a positive net FX-flow shock immediately improves perceptions of liquidity, funding availability, and near-term demand conditions. The temporary moderation after the first month suggests that the shock is initially absorbed through financial balance sheets and relative-price adjustment rather than immediately translating into sustained real activity. The second hump, which occurs after the peak in business credit, is consistent with a delayed credit-to-activity channel: easier liquidity and credit conditions gradually feed into firms' production, orders, and employment expectations. Thus, the double-hump pattern is consistent with an immediate sentiment response followed by a slower

¹⁷With $T = 61$ usable observations split between regimes of size $T_0 \approx T_1 \approx T/2$, asymptotic inference is unreliable; the residual bootstrap provides a finite-sample-valid alternative and is the basis for all reported confidence bands. The block-exogeneity restriction (2) also saves 21 parameters per regime relative to an unrestricted VAR, materially improving small-sample efficiency.

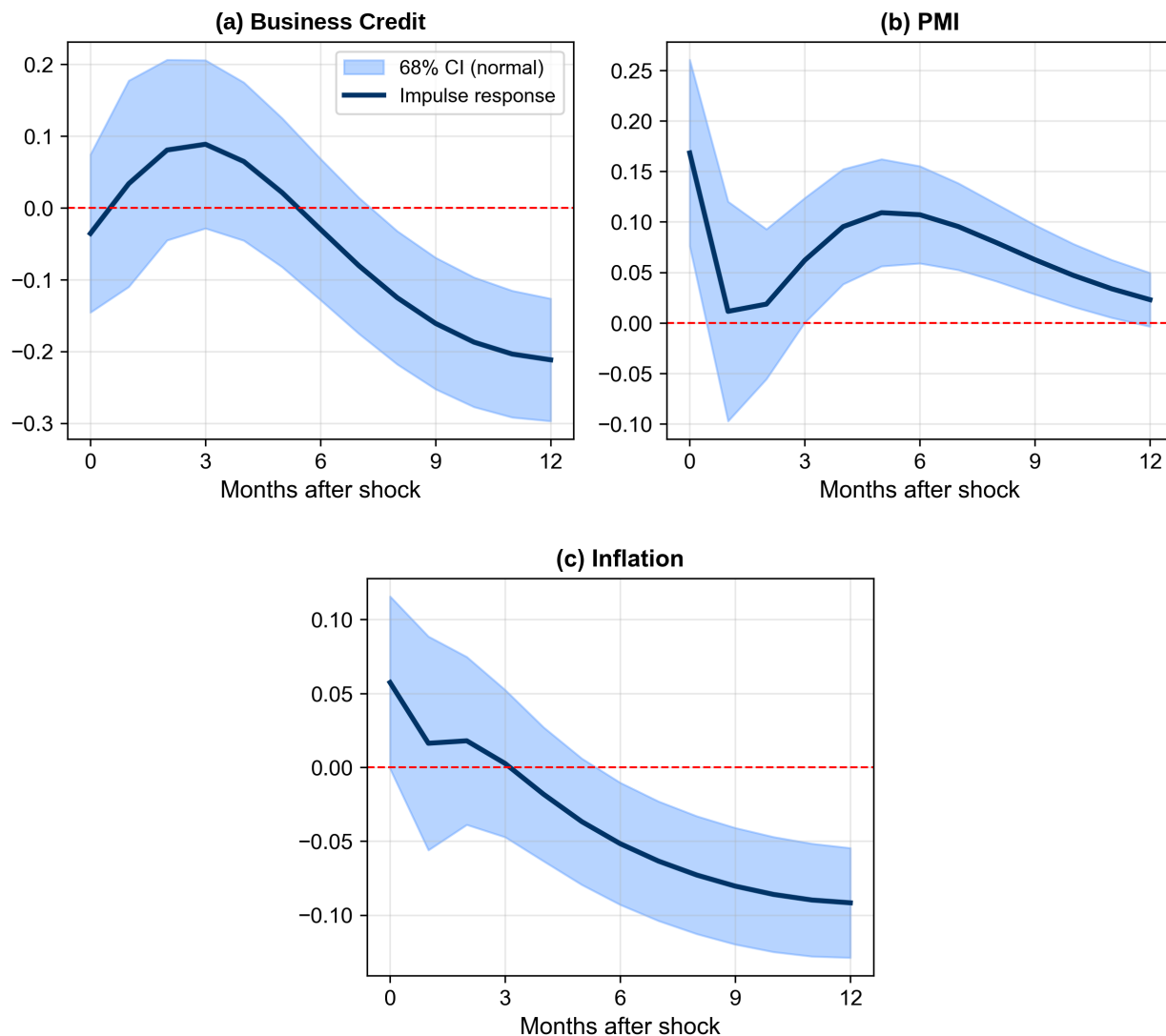
¹⁸The procedure preserves the empirical regime sequence $\{S_t\}$ and resamples residuals separately within each regime, drawing the full M -vector jointly to preserve contemporaneous cross-equation correlation. Bootstrap samples are generated recursively from the actual initial conditions using the regime-specific point estimates along the fixed regime path; regimes are then re-classified on the simulated data using the same threshold rule (6) applied to the original z_t . Replications failing the minimum-observations condition $T_s^* \geq \max(K + 5, 15)$, where K is the number of regressors per equation, are discarded.

real-economy response. Third, inflation (Panel (c)) edges up on impact and then declines steadily, crossing zero around the third month and continuing to drift below baseline through the rest of the horizon. The absence of a persistent positive inflation response (outside from marginal impact from house prices) is consistent with the stabilising role of the peg and the CBUAE’s liquidity management. FX inflows expand bank reserves mechanically, but the CBUAE can absorb additional liquidity through its open market operations to ensure that the level of excess reserves keeps market rates aligned with the prevailing policy rate, including the issuance of M-Bills and ICDs as well as minimum cash reserve requirements under the new Dirham Monetary Framework [[International Monetary Fund, 2022](#)].

Figure 3 reports the regime-conditional impulse responses from the model specified in (7). The effects in the lower- and higher-surplus regimes are shown in the left column (Panels (a)–(c), shaded blue) and the right column (Panels (d)–(f), shaded green), respectively. Overall, macro-financial conditions respond strongly in a lower-liquidity surplus regime. Business credit responds twice as strongly to a net FX inflow shock (compared to situations when liquidity surplus is higher), peaking around the second month before gradually fading and turning negative at longer horizons (Panel (a)). In the higher-surplus regime, by contrast, the credit response is initially negative and remains close to zero over the early horizons (Panel (d)). Although the point estimate turns positive later in the horizon, the confidence band widens substantially after eight months, indicating considerable uncertainty around the longer-run response. So when liquidity surplus is historically high, additional FX inflows do not seem to lead to an easing of lending conditions. This pattern is consistent with domestic financial conditions being relatively insulated from external liquidity shocks in periods of abundant system-wide liquidity. In such an environment, marginal loan growth is likely to be driven more by credit demand than by bank-funding constraints. This interpretation is in line with the threshold-VAR evidence in [Aikman et al. \[2020\]](#) and the state-dependent local-projections results of [Wang \[2019\]](#), which show that international financial-cycle shocks transmit more strongly when domestic credit conditions are tighter.

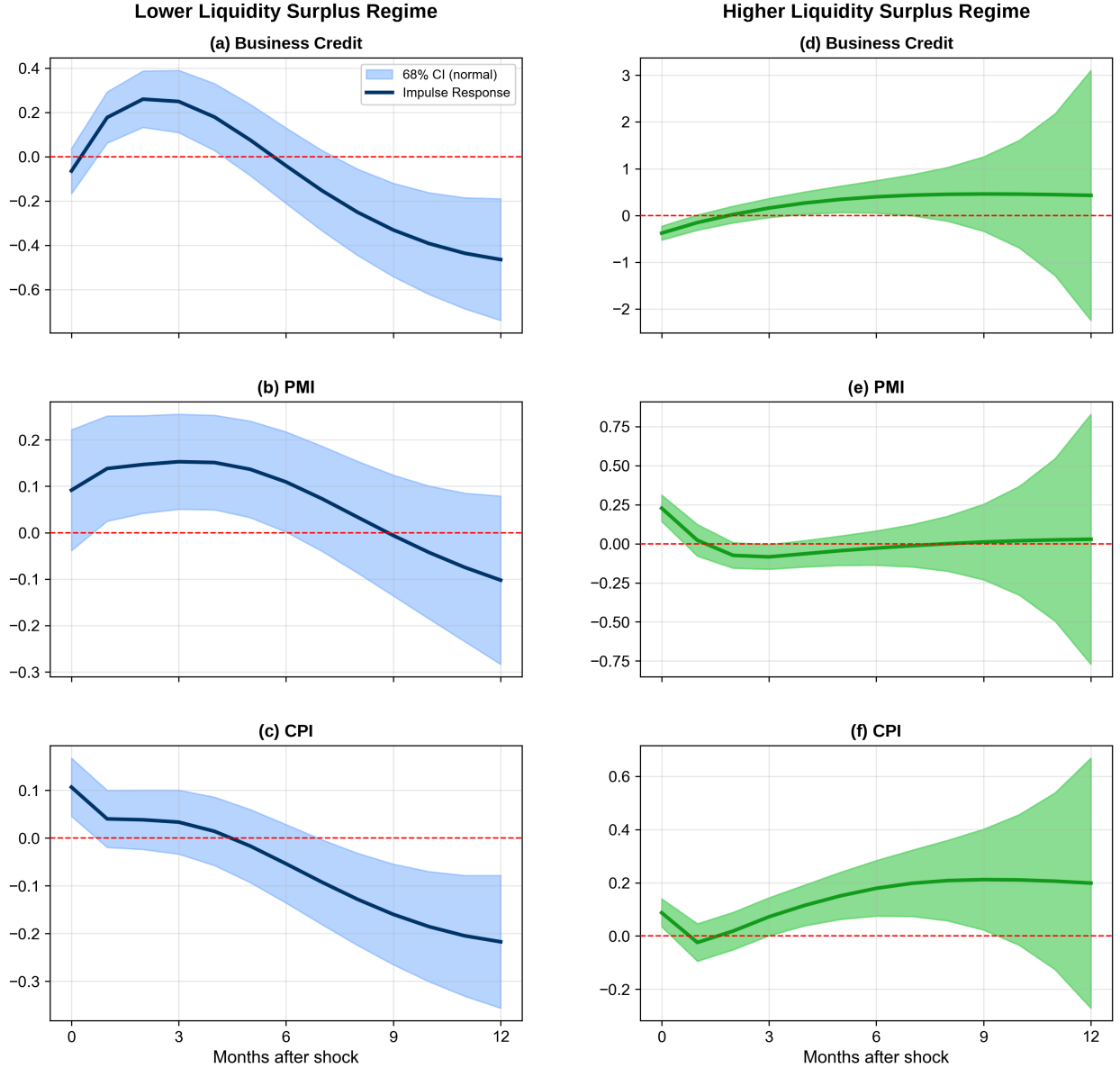
The results are also consistent with general evidence about the bank lending channel in the literature. In [Bruno and Shin \[2015a\]](#), cross-border banking flows affect domestic credit through changes in bank leverage and risk-taking: tighter US monetary policy reduces leverage of international banks, while easier conditions can support balance-sheet expansion. In our setting, however, the expansionary side of this mechanism is muted in the presence of structurally higher system-wide liquidity. As a result, the next FX flow shock has only a limited effect on business credit in the higher-surplus regime [Bruno](#)

Figure 2: Constant-coefficient VAR: Impulse Responses to a Positive Net FX Flow Shock



Note: The figure plots the impulse responses of business credit (Business), the Purchasing Managers' Index (PMI), and headline CPI inflation to a one-standard-deviation positive shock to net FX flows from the constant-coefficient VAR in equation (1). Identification follows the block-Cholesky scheme in equation (3), with the external block (OIL, FED, VIX) ordered first and net FX flows ordered first within the domestic block. Shaded bands show ± 1 bootstrap standard-deviation intervals around the point estimate, constructed from a residual bootstrap with $B = 10,000$ replications (68% pointwise coverage under the Gaussian approximation). A band that excludes zero indicates one-sided significance at the 15.9% level. The dashed horizontal line marks zero.

Figure 3: Regime-switching VAR: Regime-conditional Impulse Responses to a Positive Net FX Flow Shock



Note: The figure plots regime-conditional structural impulse responses of business credit (Business), the Purchasing Managers' Index (PMI), and headline CPI inflation to a one-standard-deviation positive shock to net FX flows from the threshold VAR in equation (7). The left column (panels (a)–(c), blue shading) corresponds to the lower surplus regime, defined as $S_t = 0$ when the lagged ratio of the surplus liquidity to total deposits, z_{t-1} , falls below its sample mean; the right column (panels (d)–(f), green shading) corresponds to the higher-surplus regime, $S_t = 1$. Each regime is estimated with its own intercepts, autoregressive matrix, and reduced-form covariance, with block exogeneity preserved as in the linear case. Identification follows the block-Cholesky scheme in equation (3) applied to the regime-specific covariance, with the external block (OIL, FED, VIX) ordered first and net FX flows ordered first within the domestic block. The horizon is twelve months. Solid lines plot the point estimates. Shaded bands show ± 1 bootstrap standard-deviation intervals around the point estimate, constructed from a residual bootstrap with $B = 10,000$ replications (68% pointwise coverage under the Gaussian approximation). A band that excludes zero indicates one-sided significance at the 15.9% level. The dashed horizontal line marks zero.

and Shin [2015b], Miyajima [2020]. This finding is consistent with evidence for GCC economies that the bank-lending channel is present but weakened by ample structural liquidity, and central bank liquidity absorption [Cevik and Teksoz, 2013, Espinoza and Prasad, 2012, Khandelwal et al., 2016].

When liquidity buffers in the banking sector are relatively lower, PMI displays a similar pattern by peaking around the three-month mark, and remains positive for the first half of the horizon. The response then fades, crosses zero around months 8–9, and becomes mildly negative after one year. The early PMI response suggests that net FX flows (and their impact on fiscal spending) support confidence, generate new orders, and lift production expectations. This is consistent with the view that capital flow shocks are more powerful when they relax binding funding constraints and enable banks and firms to expand activity temporarily. In the higher-surplus regime, PMI rises on impact, but then turns negative over months 2–8 before returning close to zero. The response remains small over the rest of the horizon, and the confidence band widens substantially at longer horizons. Unlike the lowersurplus regime, the higher-surplus regime therefore does not show a sustained improvement in business activity or confidence following the net FX flow shock. Additional inflows appear less relevant for real-side conditions when banks already have sufficient liquidity buffers.

Inflation also responds in a front-loaded way. It rises on impact, but the positive effect fades quickly in the lower- liquidity surplus regime. The response crosses zero around months 4–5 and becomes increasingly negative over the remainder of the horizon. This pattern suggests that the initial demand and liquidity impulse is not strong enough to generate persistent price pressures; however, over the near-term, government-led investment (due to hydrocarbon export receipts) could crowd out private investment and keep inflation elevated.

Instead, the shock appears to be followed by normalisation of liquidity conditions and a reversal of the initial expansion. Inflation, by contrast, responds more persistently in the higher-surplus regime. After a small dip at month 1, inflation rises gradually, reaching its peak around months 8–10 before flattening. The confidence band is above zero over much of the middle part of the horizon, although it widens considerably by month 12. This suggests that, in an environment of already abundant liquidity, the marginal effect of net FX flow is transmitted less through credit and PMI and more through moderate price pressure. However, several UAE-specific features dampen pass-through: administered and regulated prices smooth demand shocks; the dollar peg imports part of the inflation process; and past episodes show limited inflation sensitivity to liquidity surges in the absence of broad-based demand or asset booms.

Overall, the asymmetry between the higher and lower surplus liquidity regimes suggests that net FX inflow shocks only matter for monetary policy transmission when the banking sector’s structural liquidity position drops below its historical norm. When liquidity is abundant, the macro-financial impact is limited to some residual price pressure.

6 Robustness Checks

We completed a series of comprehensive robustness checks. The empirical findings in Section 5 rest on two specification choices that warrant explicit examination. First, VIX is included in the external block as a proxy for level of fear or stress in the U.S equity market, yet for an emerging economy with substantial cross-border capital flows the relevant external risk measure could equally be a credit-spread-based indicator that captures investor sentiment toward emerging markets directly. Second, residential house prices are included in the domestic block to capture the asset-price channel through which liquidity shocks transmit to economic activity, but their inclusion increases the dimension of the system and the share of variance attributable to a single sector. We therefore re-estimate the regime-switching VAR under two alternative specifications that vary one element at a time, holding the rest of the model (block exogeneity, identification, lag length, threshold rule, and bootstrap procedure) fixed.

The first alternative replaces VIX with the J.P. Morgan Emerging Market Bond Index (EMBI) Global Spread. The EMBI spread is a price-based measure of global risk appetite, reflecting shifts in investor sentiment and the balance between “push” and “pull” factors influencing flows into emerging markets [Koepke, 2019]. Periods of widening EMBI spreads denote heightened risk aversion (“risk-off” episodes), typically associated with capital outflows and tighter financial conditions. Conversely, narrowing spreads indicate stronger risk appetite (“search-for-yield”), which tends to support capital inflows and ease domestic financial conditions. With this specification we can see how global risk appetite, and its influence on cross-border capital movements, shapes financing conditions. Substituting EMBI for VIX therefore tests whether the transmission documented in the baseline is driven by a generic global volatility channel or by the more economically targeted EM-credit-risk channel that is arguably the relevant one for a small open economy integrated into global capital markets.

The second alternative drops residential house prices from the domestic block, leaving the remaining six domestic variables and the external block unchanged. This serves a dual purpose. On the methodological side, it addresses a small-sample concern, removing a domestic variable releases degrees of freedom and improves the precision of the

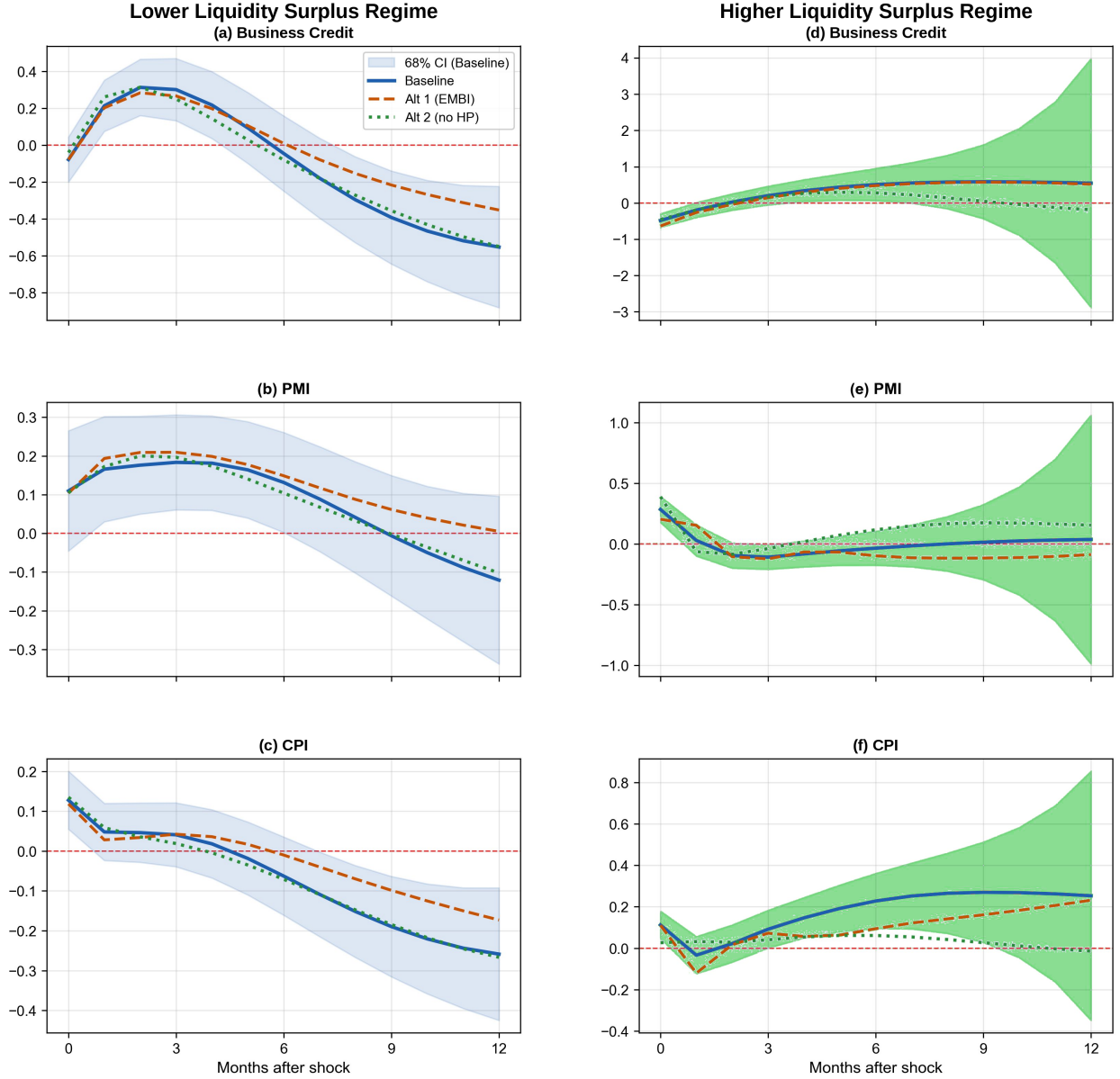
estimated regime-specific coefficients, particularly in the higher-surplus regime. On the substantive side, it tests whether the credit, activity, and inflation responses estimated in the baseline are independent of the housing channel, or whether housing dynamics are quantitatively important for the transmission mechanism we identify.

Figure 4 reports the regime-conditional impulse responses for the baseline and the two alternative specifications, and Table 2 summarises the corresponding numerical estimates at impact, at the peak, at the end of the horizon, and cumulatively across horizons, with ± 1 bootstrap standard-deviation intervals (68% Gaussian-approximation coverage) reported in brackets below each point estimate. Three findings emerge.

The lower surplus regime is strongly robust. The impulse responses for business credit, PMI, and inflation are nearly indistinguishable for the two alternative specifications, with similar peak timing, direction, and long-horizon sign. The alternative specifications track within the confidence band for all three target variables. This shows that the central claim of state-dependent transmission of net FX flow shocks does not depend on either the specific external risk proxy or on the inclusion of housing in the domestic block. The on-impact responses in the higher surplus regime are robust in sign and approximate magnitude. The negative impact response of business credit, the positive impact response of PMI, and the (sustained and) positive impact response of inflation all survive both alternatives. However, there is a persistent positive inflation drift in the higher-surplus regime, peaking between eight to ten months, which seems to be largely driven by the rapid growth in real estate-related investment (with a significant cross-border flow component). Including EMBI in the model specification attenuates this response somewhat while preserving its sign while excluding HP specification eliminates it entirely, leaving the inflation response close to zero throughout the horizon. So the limited transmission operates substantially through housing-related components of CPI rather than through core tradables, which is plausible given the high importance of housing services in the UAE consumption basket. This is consistent with the general literature on housing-rent dynamics in capital-flow recipient economies.

Finally, the results from the simple blockwise structural VAR model should be interpreted with caution due to a short time horizon underpinning our estimation. The Dirham Monetary Framework, which was approved in February 2020, offers only a limited empirical basis for long-term analysis. Therefore, Appendix A re-estimates the constant-coefficient VAR on an extended sample (from January 2016 to February 2026), adding more than four years of additional observations to the original time horizon, including the time before the DMF was implemented as monetary policy framework of the CBUAE

Figure 4: Regime-switching VAR: Regime-conditional Impulse Responses to a Positive Net FX Flow Shock with Alternative Model Specifications



Note: The figure plots regime-conditional structural impulse responses of business credit (Business), the Purchasing Managers' Index (PMI), and headline CPI inflation to a one-standard-deviation positive shock to net FX flows from the regime-switching VAR (7), under the baseline and two alternative specifications. The left column (panels (a)–(c)) corresponds to the lower surplus regime; the right column (panels (d)–(f)) corresponds to the higher-surplus regime. The baseline corresponds to the system in Section 4. *Alternative 1 (EMBI)* replaces VIX with the J.P. Morgan EMBI Global Spread in the external block. *Alternative 2 (no HP)* drops residential house prices from the domestic block. Solid lines plot the baseline point estimates; dashed lines plot Alternative 1; dotted lines plot Alternative 2. Shaded bands show the ± 1 bootstrap standard-deviation interval for the baseline specification, from a fixed-regime-path residual bootstrap with $B = 10,000$ replications (68% pointwise coverage under the Gaussian approximation). The dashed horizontal line marks zero. Y-axis scales differ across panels and across regimes to accommodate the substantially wider confidence bands in the higher-surplus regime.

Table 2: Robustness of Regime-switching IRF Estimates to Alternative Model Specifications

Regime	Variable	Impact	Peak	$h=12$	Cum.
Panel A: Baseline — external block (OIL, FED, VIX)					
Lower Surplus	Business	−0.078 [−0.200, +0.044]	−0.553 [−0.882, −0.224]	−0.553 [−0.882, −0.224]	−1.391 [−3.477, +0.695]
Lower Surplus	PMI	+0.110 [−0.046, +0.265]	+0.184 [+0.061, +0.306]	−0.121 [−0.338, +0.096]	+0.977 [−0.392, +2.345]
Lower Surplus	CPI	+0.128 [+0.055, +0.200]	−0.259 [−0.425, −0.092]	−0.259 [−0.425, −0.092]	−0.974 [−2.051, +0.102]
Higher Surplus	Business	−0.484 [−0.672, −0.295]	+0.586 [−0.434, +1.605]	+0.548 [−2.888, +3.984]	+4.250 [−5.951, +14.451]
Higher Surplus	PMI	+0.285 [+0.177, +0.392]	+0.285 [+0.177, +0.392]	+0.037 [−0.989, +1.064]	+0.033 [−3.080, +3.145]
Higher Surplus	CPI	+0.112 [+0.046, +0.179]	+0.270 [+0.027, +0.512]	+0.253 [−0.349, +0.855]	+2.329 [+0.182, +4.477]
Panel B: Alternative 1 — EMBI replaces VIX in external block					
Lower Surplus	Business	−0.078 [−0.201, +0.045]	−0.352 [−0.670, −0.034]	−0.352 [−0.670, −0.034]	−0.394 [−2.753, +1.964]
Lower Surplus	PMI	+0.104 [−0.047, +0.254]	+0.210 [+0.091, +0.329]	+0.005 [−0.148, +0.158]	+1.574 [+0.419, +2.729]
Lower Surplus	CPI	+0.118 [+0.053, +0.183]	−0.173 [−0.344, −0.003]	−0.173 [−0.344, −0.003]	−0.392 [−1.683, +0.899]
Higher Surplus	Business	−0.636 [−0.821, −0.451]	−0.636 [−0.821, −0.451]	+0.515 [−0.370, +1.400]	+3.678 [−0.396, +7.752]
Higher Surplus	PMI	+0.204 [+0.092, +0.316]	+0.204 [+0.092, +0.316]	−0.087 [−0.563, +0.388]	−0.750 [−2.691, +1.192]
Higher Surplus	CPI	+0.111 [+0.037, +0.184]	+0.232 [−0.159, +0.622]	+0.232 [−0.159, +0.622]	+1.339 [−0.255, +2.933]
Panel C: Alternative 2 — HP dropped from domestic block					
Lower Surplus	Business	−0.040 [−0.166, +0.085]	−0.550 [−0.877, −0.223]	−0.550 [−0.877, −0.223]	−1.409 [−3.576, +0.759]
Lower Surplus	PMI	+0.105 [−0.050, +0.260]	+0.200 [+0.072, +0.328]	−0.103 [−0.315, +0.109]	+0.982 [−0.409, +2.374]
Lower Surplus	CPI	+0.135 [+0.062, +0.208]	−0.267 [−0.427, −0.106]	−0.267 [−0.427, −0.106]	−1.034 [−2.129, +0.062]
Higher Surplus	Business	−0.453 [−0.632, −0.273]	−0.453 [−0.632, −0.273]	−0.187 [−1.800, +1.425]	+0.449 [−4.802, +5.700]
Higher Surplus	PMI	+0.389 [+0.273, +0.506]	+0.389 [+0.273, +0.506]	+0.155 [−0.348, +0.658]	+1.396 [−0.423, +3.214]
Higher Surplus	CPI	+0.027 [−0.060, +0.113]	+0.062 [−0.013, +0.136]	−0.014 [−0.293, +0.264]	+0.421 [−0.727, +1.569]

Note: Regime-switching VAR (7) estimates of impulse responses of business credit (Business), the Purchasing Managers' Index (PMI), and headline CPI inflation to a one-standard-deviation positive shock to net FX flows, separately for the lower- and higher-surplus regimes. Panel A reports the baseline specification with external block (OIL, FED, VIX) and domestic block (NetFX, REER, Business, HP, PMI, FCI, CPI). Panel B replaces VIX with the J.P. Morgan EMBI Global Spread. Panel C drops residential house prices from the domestic block. "Impact" is $\text{IRF}(0)$, "Peak" is the horizon at which $|\text{IRF}(h)|$ is maximised over $h \in \{0, \dots, 12\}$, " $h=12$ " is the response at the end of the horizon, and "Cum." is $\sum_{h=0}^{12} \text{IRF}(h)$. Brackets below each point estimate report the ± 1 bootstrap standard-deviation interval, $\widehat{\text{IRF}} \pm \widehat{\sigma}^*$, from a fixed-regime-path residual bootstrap with $B = 10,000$ replications (68% pointwise coverage under the Gaussian approximation).

in mid-2020.¹⁹ The qualitative conclusions of the main results based on the original time horizon remain unchanged – a transitory real-activity response, no durable credit expansion, and no persistent inflationary effect. However, the impact of the positive shock to net FX flows is smaller, consistent with the extended window pooling two operational frameworks with an intercept-only correction.

7 Discussion

Our results suggest an asymmetric response of monetary conditions to cross-border flows. Due to the UAE’s open capital account and fixed exchange rate regime, shifts in cross-border capital flows directly influence system-wide liquidity, shaping the overall financial conditions. However, the link between capital inflows and lending activity does not stem from changes in supply-side constraints, i.e., banks acquiring more liquidity—they already hold more than sufficient liquidity to meet credit demand. Given the structurally high level of liquidity surplus, positive shocks to net FX inflows seem to manifest only when system-wide liquidity is relatively low.

Since supply side constraints on the pricing and availability of credit are largely non-binding, credit growth is driven predominantly by demand-side factors. The indirect effect of net capital inflows—primarily driven by hydrocarbon export receipts—fuels government and government-related entity (GRE) spending. Such spending strengthens economic confidence and bolsters growth expectations, which, in turn, supports economic activity and crowds in private sector loan demand. Public sector spending therefore plays a crucial role in shaping the UAE’s economic cycle and credit dynamics. This relationship has been consistently observed in CBUAE credit sentiment surveys over the years (CBUAE [2026b]).²⁰

¹⁹The model accounts for this structural break by adding an intercept dummy.

²⁰The limited depth of the local capital market exacerbates the weak response of credit supply to changes in policy rates. The UAE’s domestic bond market remains relatively small, with modest corporate and government issuance compared to bank-based intermediation. Unlike many economies where sovereign debt plays a central role in monetary-financial linkages, the UAE’s low public debt limits direct fiscal-monetary interactions. Because the government does not rely heavily on domestic debt issuance, the interest rate and wealth channels associated with sovereign bond markets remain underdeveloped. Limited secondary market liquidity in Dirham-denominated instruments also means that monetary signals cannot propagate broadly across a domestic yield curve. These structure feature concentrate monetary transmission through the bank lending channel rather than through market-based channels. At the same time, the government’s fiscal position instead influences transmission indirectly—via spending patterns (funded by hydrocarbon revenues) and sovereign wealth fund flows that shape system liquidity and market expectations. A deeper and wider domestic capital market would diversify transmission channels, allowing yields and asset prices to reflect policy adjustments more efficiently and reducing reliance on cross-border liquidity as the main determinant of domestic financial conditions.

From a monetary policy perspective, the results underscore the practical relevance of a comprehensive liquidity forecasting framework for anticipating and evaluating the impact of net FX flows on system-wide liquidity and their transmission through domestic financial and credit markets. External factors—such as global risk sentiment and asset price movements—can temporarily affect these flows through confidence effects and, in turn, influence managing system-wide system-wide liquidity. Given the dominant role of net FX flows as autonomous factor influencing the liquidity surplus, accurate forecasts are essential for effectively managing reserve demand and its impact on macro-financial conditions. However, the structural drivers of cross-border flows are themselves evolving. the increased economic diversification of the UAE could make hydrocarbon-related drivers of net FX flows less relevant, suggesting new challenges in liquidity forecasting (and assessment of appropriate liquidity surplus) in response to a more diverse dynamic of autonomous factors. In addition, the increasing use of US dollar-denominated stablecoins and other crypto assets (outside then banking sector) could result in external flows bypassing the CBUAE balance sheets and reshape the deposit and reserve dynamics on which transmission depends; the CBUAE’s regulated Dirham-denominated stablecoin and Digital Dirham initiatives (Jobst et al. [2025]) (Appendix, D) are designed to preserve marginal reserve demand and keep monetary operations intact.²¹

Building on the customary daily liquidity forecasting framework, the CBUAE has developed a monthly forecast that explicitly accounts for external factors (similar to the model specification in this paper) to guide more forward-looking open market operations.²² In particular, this approach includes estimating the tail risk of large swings in net FX flows, which can have significant effects on system-wide liquidity conditions, and, thus, monetary policy transmission (Appendix, B). Relatedly, advanced liquidity forecasting of tail risk to cross-border flows would also help enhance the reserve adequacy assessment given the hard currency peg arrangement of the UAE—and, by extension, the emerging field of central bank balance sheet stress testing.

The results also support the case for incorporating the FCI in liquidity management decisions to uncover “hidden” supply side effects (Appendix, C). The lending channel transmit monetary impulses only partially and heterogeneously, underscoring the vital role in monitoring transmission effectiveness and appropriateness of the monetary policy

²¹In addition, the Digital Dirham, which—assuming a material adoption in terms of holdings and use of payment systems—would become a new autonomous factor, which must be taken into account in the continuous development of the CBUAE’s liquidity forecasting framework (Appendix, B).

²²Typically, monetary policy operations keep the liquidity surplus at (or close to) a target level of reserve demand, so that marginal borrowing and lending decisions in the interbank market result in a close alignment of the policy rate and benchmark interest rates.

stance.²³

8 Conclusion

Monetary and financial stability in the UAE has remained exceptionally strong in recent years thanks to high system-wide banking liquidity, which has reinforced the country's external position and safe-haven appeal. Our results show that, while monetary conditions seem relatively insulated from external shocks, cross-border flows shape monetary transmission asymmetrically: positive net FX shocks support bank lending, and, to a lesser extent, real activity, but chiefly when the liquidity surplus is lower than the historical norm. Because the banking sector operates with structurally high liquidity, credit-supply factors are largely non-binding and incremental liquidity changes have only a marginal direct effect on financing conditions.²⁴ However, our results should be interpreted with caution. The Dirham Monetary Framework came into effect only in mid-2020, which constraints the empirical basis for a robust and reliable long-term analysis of how external factors impact monetary conditions.

Overall, our findings reflect the characteristics of a liquidity-rich, bank-centric economy operating under a fixed exchange rate anchor. With domestic rates tracking US dollar rates, monetary autonomy is largely confined to managing system-wide liquidity. The link between capital inflows and lending is, accordingly, not a supply-side phenomenon but an indirect, demand-side one during times of higher liquidity surplus: inflows from hydrocarbon receipts fuel spending that strengthens confidence and growth expectations and, in turn, crowds in private sector loan demand. Because credit growth is predominantly demand-driven, bank lending responds mostly to liquidity conditions and expectations rather than the interest rate channel.

Therefore, the CBUAE's main policy levers are open market operations to manage system-wide liquidity and effective macroprudential measures, rather than discretionary rate changes or actions aimed at directly steering capital flows. The absence of destabilising flows during the current regional crisis demonstrates the effective functioning of

²³Movements in the FCI capture the balance sheet, expectations, and liquidity channels through which external shocks—such as oil price swings or shifts in global risk appetite—affect fiscally-driven FX inflows and credit dynamics. When bank lending channel dominates over interest rate effects, the FCI reveals whether domestic conditions (via bank funding costs, credit availability, deposit flows, asset prices, and external cycles) amplify or dampen the intended stance. For instance, ample liquidity from robust macro performance, investment sentiment, and oil-linked capital inflows can enable sustained credit extension, making the FCI an essential gauge of effective monetary transmission.

²⁴Ample liquidity can therefore blunt transmission, so global shocks register mainly through liquidity and financial conditions, with only transient effects on credit and inflation.

the UAE's monetary framework even during times of stress in projecting the appropriate monetary stance. Looking ahead, greater focus on FCI (and other composite indicators) can help improve the liquidity forecasting process by capturing the joint influence of credit supply behavior, asset prices, and external financial cycles.

References

- Tobias Adrian and Hyun Song Shin. Procyclical leverage and value-at-risk. *Review of Financial Studies*, 27(2):373–403, 2014.
- Tobias Adrian, Nina Boyarchenko, and Domenico Giannone. Vulnerable growth. *American Economic Review*, 109(4):1263–1289, 2019.
- David Aikman, Andreas Lehnert, Nellie Liang, and Michele Modugno. Credit, financial conditions, and monetary policy transmission. *International Journal of Central Banking*, 16(3):141–179, 2020.
- Andrea Ajello, Michele Cavallo, Giovanni Favara, William B. Peterman, John W. Schindler IV, and Nitish R. Sinha. A new index to measure U.S. financial conditions. *FEDS Notes*, June 2023. <https://www.federalreserve.gov/econres/notes/feds-notes/a-new-index-to-measure-us-financial-conditions-20230630.html> (Accessed: 2026-12-01).
- Abdullah R. Alotaibi and Anil V. Mishra. Global and regional volatility spillovers to GCC stock markets. *Economic Modelling*, 45:38–49, 2015.
- Rabah Arezki, Filippo Di Mauro, Kamiar Mohaddes, and Isabel van Steenkiste. Sovereign wealth funds in the new era of oil. VoxEU column, CEPR, 2016.
- Jonas E. Arias, Juan F. Rubio-Ramirez, and Daniel F. Waggoner. Inference based on structural vector autoregressions identified with sign and zero restrictions: Theory and applications. *Economic Modelling*, 86:685–720, 2018.
- Stefan Avdjiev, Valentina Bruno, Catherine Koch, and Hyun Song Shin. The dollar exchange rate as a global risk factor: Evidence from investment. *IMF Economic Review*, 67(1):151–173, 2019.
- Syed A. Basher and Elsayed Mousa Elsamadisy. Country heterogeneity and long-run determinants of inflation in the GCC countries. *OPEC Energy Review*, 36(2):170–203, 2012.
- Rudolfs Bems, Francesca Caselli, Francesco Grigoli, Bertrand Gruss, and Weicheng Lian.

- Is inflation domestic or global? evidence from emerging markets. IMF Working Paper WP/18/241, International Monetary Fund, 2018.
- BIS. The crypto ecosystem: Key elements and risks. *Bank for International Settlements - Report submitted to the G20 Finance Ministers and Central Bank Governors*, July 2023. <https://www.bis.org/publ/othp72.htm> (Accessed: 2026-12-01).
- BIS. The next-generation monetary and financial system. *Bank for International Settlements - Annual Economic Report, Chapter III*, June 2025. <https://www.bis.org/publ/arpdf/ar2025e.pdf> (Accessed: 2026-12-01).
- BIS. Capital flows, exchange rates and financial conditions in EMEs in an evolving international monetary system. *Bank for International Settlements Papers No. 171*, May 2026. <https://www.bis.org/publ/bppdf/bispap171.htm> (Accessed: 2026-06-03).
- Olivier Blanchard, Jonathan D. Ostry, Atish R. Ghosh, and Marcos Chamon. Capital flows: Expansionary or contractionary? *American Economic Review*, 106:565–569, 2016.
- Olivier Blanchard, Jonathan D. Ostry, Atish R. Ghosh, and Marcos Chamon. Are capital inflows expansionary or contractionary? theory, policy implications, and some evidence. *IMF Economic Review*, 65(3):563–585, 2017.
- Valentina Bruno and Hyun Song Shin. Capital flows and the risk-taking channel of monetary policy. *Journal of Monetary Economics*, 71:119–132, 2015a.
- Valentina Bruno and Hyun Song Shin. Cross-border banking and global liquidity. *Review of Economic Studies*, 82(2):535–564, 2015b.
- Guillermo A. Calvo. Capital flows and capital-market crises: The simple economics of sudden stops. *Journal of Applied Economics*, 1(1):35–54, 1998.
- CBUAE. Monetary policy and domestic markets: The Dirham monetary framework, 2021. Abu Dhabi. <https://www.centralbank.ae/en/our-operations/monetary-policy-and-domestic-markets/>.
- CBUAE. Payment token services regulation. *Central Bank of the United Arab Emirates - Rulebook C 2/2024*, August 2024. <https://rulebook.centralbank.ae/en/rulebook/>

[payment-token-services-regulation](#) (Accessed: 2026-12-01).

CBUAE. Digital Dirham - a primer on the UAE's central bank digital currency. *Central Bank of the United Arab Emirates - Policy Paper No. 01/2025*, July 2025a. https://www.centralbank.ae/media/lczb2314/cbdc-short-report_july.pdf (Accessed: 2026-12-01).

CBUAE. Balance of payments developments for the United Arab Emirates (UAE): Preliminary data for 2023-2024. *Central Bank of the United Arab Emirates*, October 2025b. https://www.centralbank.ae/media/aqknxvll/balance-of-payments-developments_2023_2024-oct_2025_en.pdf (Accessed: 2026-12-01).

CBUAE. CBUAE board reviews strength and resilience of the UAE's financial system and banking sector and approves a proactive financial institution resilience package backed by CBUAE's assets of AED 1 trillion. *Central Bank of the United Arab Emirates - Press Release*, March 2026a. <https://www.centralbank.ae/media/tqppj12e/cbuae-board-reviews-strength-and-resilience-of-the-uae-s-financial-system-and-banking.pdf> (Accessed: 2026-03-18).

CBUAE. Credit sentiment survey q4 2025. *Central Bank of the United Arab Emirates*, February 2026b. <https://www.centralbank.ae/en/news-and-publications/publications/quarterly-reports/credit-sentiment-survey-q4-2025/> (Accessed: 2026-04-18).

Eugenio M. Cerutti, Stijn Claessens, and Andrew K. Rose. How important is the global financial cycle? evidence from capital flows. *IMF Economic Review*, 67(1):24–60, 2019.

Serhan Cevik and Katerina Teksoz. Lost in transmission? the effectiveness of monetary policy transmission channels in the GCC countries. *Middle East Development Journal*, 5(3):1350018–1, 2013.

Lawrence J. Christiano, Martin Eichenbaum, and Charles L. Evans. Monetary policy shocks: What have we learned and to what end? In John B. Taylor and Michael Wood-

- ford, editors, *Handbook of Macroeconomics*, volume 1A, chapter 2, pages 65–148. Elsevier, Amsterdam, 1999. doi: 10.1016/S1574-0048(99)01005-8.
- David O. Cushman and Tao Zha. Identifying monetary policy in a small open economy under flexible exchange rates. *Journal of Monetary Economics*, 39(3), 1997.
- Sebastiano Dell’Acqua, Rana Fayez, Koralai Kirabaeva, and Michele Marcaletti. The UAE economy: Economic and financial resilience – financial resilience to global shocks. *International Monetary Fund - United Arab Emirates: Selected Issues, Country Report No. 2025/328*, pages 5–9, December 2025. <https://doi.org/10.5089/9798229031486.002> (Accessed: 2025-12-10).
- Raphael Espinoza and Ananthakrishnan Prasad. Monetary policy transmission in the GCC countries. IMF Working Paper WP/12/132, International Monetary Fund, 2012.
- Raphael A. Espinoza and Abdelhak S. Senhadji. How strong are fiscal multipliers in the GCC? an empirical investigation. IMF Working Paper WP/11/61, International Monetary Fund, 2011.
- Fozan Fareed, Abolfazl Rezghi, and Charlotte Sandoz. Inflation dynamics in the GCC: What is the role of external factors? IMF Working Paper WP/23/263, International Monetary Fund, 2023.
- Kristin J. Forbes and Francis E. Warnock. Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2):235–251, 2012.
- Armand Fouejieu, Sergio Rodriguez, and Sohaib Shahid. Fiscal adjustment in the gulf countries: Less costly than previously thought. IMF Working Paper WP/18/133, International Monetary Fund, 2018.
- Gaston Gelos, Pietro Patelli, and Ilhyock Shim. The US dollar and capital flows to EMEs. *Bank for International Settlements Quarterly Review*, September 2024. https://www.bis.org/publ/qtrpdf/r_qt2409d.htm (Accessed: 2025-12-10).
- Atish R. Ghosh, Jonathan D. Ostry, and Mahvash S. Qureshi. When do capital inflow surges end in tears? *American Economic Review Papers and Proceedings*, 106(5):581–585,

2016.

Domenico Giannone, Michele Lenza, and Giorgio E. Primiceri. Prior selection for vector autoregressions. *Review of Economics and Statistics*, 97:436–451, 2015.

Sam Gidoomal and Zeeshan Mansoor. CBUAE resilience package: A familiar playbook for an unfamiliar situation. *Dubai: Alvarez & Marsal Holdings, LLC*, March 2026. <https://www.alvarezandmarsal.com/thought-leadership/cbuae-resilience-package-a-familiar-playbook-for-an-unfamiliar-situation> (Accessed: 2026-03-20).

Maurizio M. Habib and Livio Stracca. Getting beyond carry trade: What makes a safe haven currency? *Journal of International Economics*, 87(1):50–64, 2012.

Maurizio M. Habib, Livio Stracca, and Fabrizio Venditti. The fundamentals of safe assets. *Journal of International Money and Finance*, 102:102119, 2020.

Bruce E. Hansen. Inference when a nuisance parameter is not identified under the null hypothesis. *Econometrica*, 64(2):413–430, 1996. doi: 10.2307/2171789.

Luke Hartigan and Michelle Wright. Financial conditions and downside risk to economic activity in Australia. *Reserve Bank of Australia Research Discussion Paper 2021-03*, March 2021. <https://www.rba.gov.au/publications/rdp/2021/2021-03/full.html> (Accessed: 2025-12-10).

Corrinne Ho and Robert N. McCauley. The pass-through of exchange rate and foreign price changes to inflation in selected emerging market economies. *BIS Papers*, (8):130–150, 2005.

Boris Hofmann, Ilhyock Shim, and Hyun Song Shin. Bond risk premia and the exchange rate. *Journal of Money, Credit and Banking*, 52(S2):497–520, 2020.

Dániel Hollo, Manfred Kremer, and Marco Lo Duca. CISS—a composite indicator of systemic stress in the financial system. *European Central Bank Working Paper No. 1426*, March 2012. <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1426.pdf> (Accessed: 2025-12-10).

Hong Kong Monetary Authority. A modern day currency board system, 2007. <https://www.hkma.gov.hk/eng/other-information/a-modern-day-currency-board-system/>.

International Monetary Fund. The rise of public and private digital money: A strategy to continue delivering on the IMF's mandate. *International Monetary Fund - Policy Paper No. 2021/055*, July 2021. <https://www.imf.org/en/publications/policy-papers/issues/2021/07/28/the-rise-of-public-and-private-digital-money-462919> (Accessed: 2025-12-10).

International Monetary Fund. United Arab Emirates: Technical assistance report—liquidity management and forecasting. IMF Staff Country Reports 22/236, International Monetary Fund, 2022.

International Monetary Fund. External sector report 2024: Imbalances receding. *Washington, D.C.: International Monetary Fund*, July 2024a. <https://www.imf.org/en/publications/esr/issues/2024/07/12/external-sector-report-2024> (Accessed: 2025-12-10).

International Monetary Fund. United Arab Emirates: 2024 article IV consultation—press release; and staff report. IMF Staff Country Reports 24/325, International Monetary Fund, 2024b.

Andreas A. Jobst and Deni Memić. Monetary policy transmission in the UAE: The deposit channel. *Central Bank of the United Arab Emirates - forthcoming*, 2026.

Andreas A. Jobst, Jouni Timonen, Oğuzhan Çepni, Michael Creed, Alexander Karpf, Lokmen Kassim, Beka Lamazoshvili, Willy Lim, Deni Memić, Waleed Eid Abdel Rhman Samarah, and Andrew Turner. Digital Dirham - selected issues and policy considerations. *Central Bank of the United Arab Emirates - Working Paper No. 01/2025*, July 2025. <https://www.centralbank.ae/media/qw1ex32h/cbdc-long-report-july.pdf> (Accessed: 2025-12-10).

Padamja Khandelwal, Ken Miyajima, and Andre O. Santos. The impact of oil prices on the

- banking system in the GCC. IMF Working Paper WP/16/161, International Monetary Fund, 2016.
- Mariam El Hamiani Khatat and Romain Michel Veyrune. Liquidity management under fixed exchange rate with open capital account. *International Monetary Fund - Working Paper No. 19/58*, March 2019. <https://www.elibrary.imf.org/view/journals/001/2019/058/article-A001-en.xml> (Accessed: 2026-06-09).
- Lutz Kilian. Small-sample confidence intervals for impulse response functions. *Review of Economics and Statistics*, 80(2):218–230, 1998. doi: 10.1162/003465398557465.
- Lutz Kilian and Helmut Lütkepohl. *Structural Vector Autoregressive Analysis*. Themes in Modern Econometrics. Cambridge University Press, Cambridge, 2017. ISBN 9781107196575. doi: 10.1017/9781108164818.
- Robin Koepke. What drives capital flows in emerging markets? a survey of the empirical literature. *Journal of Economic Surveys*, 33(2):516–540, 2019.
- Gary Koop, M. Hashem Pesaran, and Simon M. Potter. Impulse response analysis in nonlinear multivariate models. *Journal of Econometrics*, 74(1):119–147, 1996. doi: 10.1016/0304-4076(95)01753-4.
- Jan Hannes Lang, Marek Rusnák, and Moritz Greiwe. Anticipating the bust: A new cyclical systemic risk indicator to assess the likelihood and severity of financial crises. *European Central Bank - Occasional Paper No. 219*, February 2019. <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op219~7483083881.en.pdf> (Accessed: 2026-12-01).
- Jan Hannes Lang, Marek Rusnák, and Moritz Greiwe. Medium-term growth-at-risk in the Euro Area. *European Central Bank - Working Paper No. 2808*, April 2023. <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2808~573fdb4019.en.pdf> (Accessed: 2026-12-01).
- Thai Hong Le and Anh Tram Luong. Dynamic spillovers between oil price, stock market and investor sentiment: Evidence from the United States and Vietnam. *Resources Policy*,

78(102931), 2022.

Helmut Lütkepohl. *New Introduction to Multiple Time Series Analysis*. Springer, Berlin, 2005.

Enrique G. Mendoza. Sudden stops, financial crises, and leverage. *American Economic Review*, 100(5):1941–1966, 2010.

Enrique G. Mendoza and Marco E. Terrones. An anatomy of credit booms: Evidence from macro aggregates and micro data. NBER Working Paper 14049, National Bureau of Economic Research, 2008.

Gian Maria Milesi-Ferretti. The external wealth of nations database. *Washington, D.C.: Brookings Institute - The Hutchins Center on Fiscal and Monetary Policy*, June 2025. <https://www.brookings.edu/articles/the-external-wealth-of-nations-database/> (Accessed: 2026-12-01).

Silvia Miranda-Agrippino and Hélène Rey. U.S. monetary policy and the global financial cycle. *Review of Economic Studies*, 87(6):2754–2776, 2020.

Prachi Mishra and Antonio Spilimbergo. Exchange rate pass-through to domestic prices: Recent evidence and cross-country differences. Imf working paper, International Monetary Fund, 2016.

Ken Miyajima. An empirical investigation of oil-macro-financial linkages in Saudi Arabia. IMF Working Paper WP/16/22, International Monetary Fund, 2016.

Ken Miyajima. What influences bank lending in Saudi Arabia? *Islamic Economic Studies*, 27(2):125–155, 2020.

Claudio Morana. Oil price dynamics, macro-finance interactions and the role of financial speculation. *Journal of Banking and Finance*, 73:206–226, 2013.

Maurice Obstfeld. Trilemmas and trade-offs: Living with financial globalization. In Claudio Raddatz, Diego Saravia, and Jaume Ventura, editors, *Global Liquidity, Spillovers to Emerging Markets and Policy Responses*, pages 13–78. Central Bank of Chile, 2015.

Jonathan D. Ostry, Atish R. Ghosh, Marcos Chamon, and Mahvash S. Qureshi. Oil price

- dynamics, macro-finance interactions and the role of financial speculation. *IMF Economic Review*, 59:562–580, 2011.
- Jesper Pedersen and Søren H. Ravn. The effects of fiscal policy in a small open economy with a fixed exchange rate: The case of Denmark. Danmarks Nationalbank Working Paper 80, Danmarks Nationalbank, 2014.
- Mahmoud Qadan and Hazar Nama. Investor sentiment and the price of oil. *Energy Economics*, 69:42–58, 2018.
- Carmen M. Reinhart and Vincent R. Reinhart. Capital flow bonanzas: An encompassing view of the past and present. In Jeffrey Frankel and Christopher Pissarides, editors, *NBER International Seminar on Macroeconomics 2008*, pages 9–62. University of Chicago Press, 2009.
- Hélène Rey. Dilemma not trilemma: The global financial cycle and monetary policy independence. NBER Working Paper 21162, National Bureau of Economic Research, 2015.
- David E. Runkle. Vector autoregressions and reality. *Journal of Business & Economic Statistics*, 5(4):437–442, 1987. doi: 10.1080/07350015.1987.10509609.
- Afees A. Salisu, Rangan Gupta, and Riza Demirel. Global financial cycle and the predictability of oil market volatility: Evidence from a GARCH-MIDAS model. *Energy Economics*, 108(105934), 2022.
- Christopher A. Sims. Macroeconomics and reality. *Econometrica*, 48(1):1–48, 1980. doi: 10.2307/1912017.
- Howell Tong. *Non-Linear Time Series: A Dynamical System Approach*. Oxford University Press, Oxford, 1990.
- Ruey S. Tsay. Testing and modeling multivariate threshold models. *Journal of the American Statistical Association*, 93(443):1188–1202, 1998. doi: 10.1080/01621459.1998.10473779.
- Shiyi Wang. Capital flow volatility: The effects of financial development and global fi-

nancial conditions. Job market paper, University of California, Davis, 2019.

Tao Zha. Block recursion and structural vector autoregressions. *Journal of Econometrics*, 90(2):291–316, 1999. doi: 10.1016/S0304-4076(98)00045-1.

APPENDIX

A Robustness Analysis with Extended Sample and DMF Structural Break

As an additional robustness exercise, we re-estimate the constant-coefficient block-exogenous VAR over the longer available sample (January 2016 - February 2026). Since the extended sample includes observations preceding the implementation of the Dirham Monetary Framework (DMF), we augment the domestic equations with a deterministic DMF dummy:

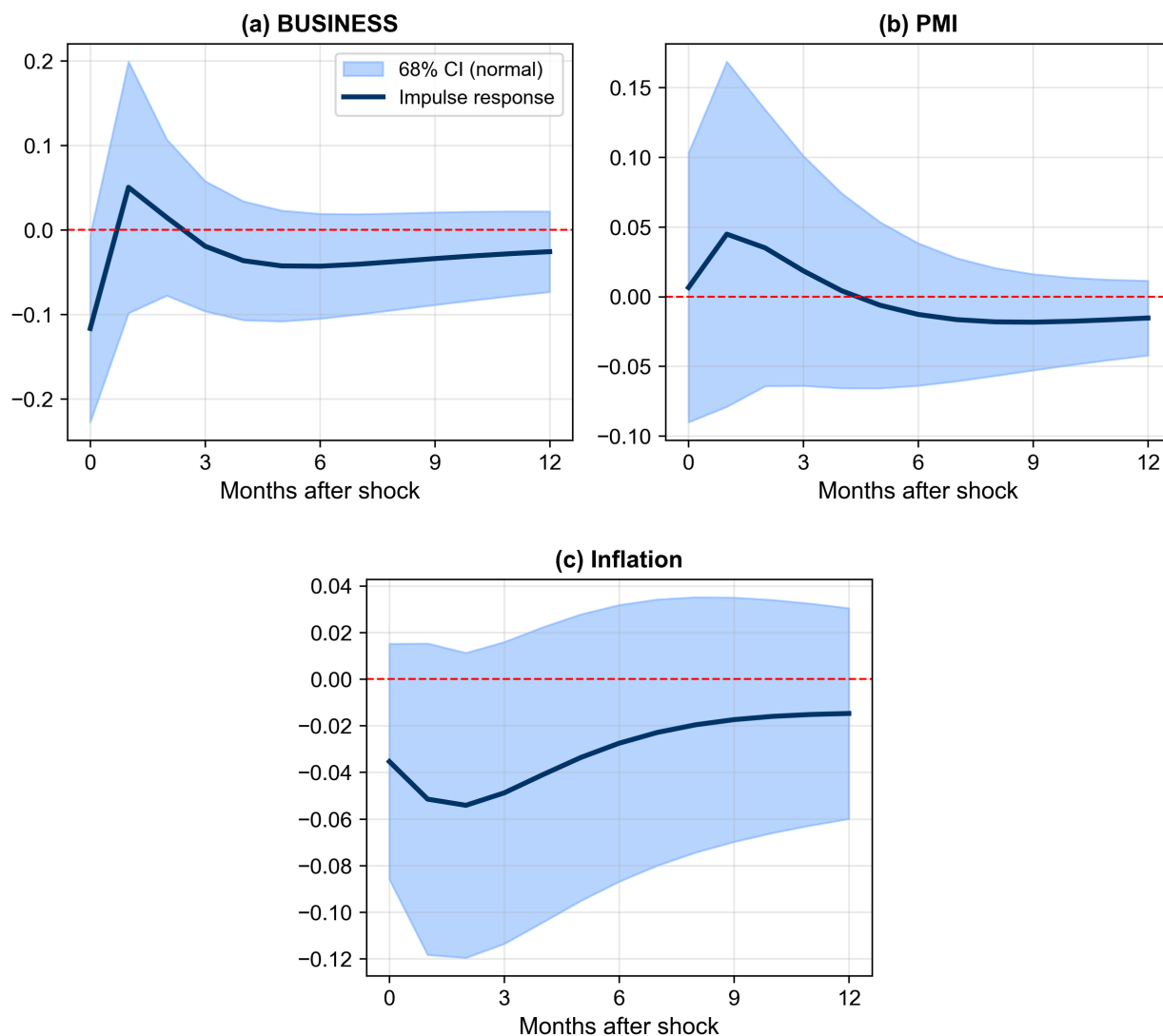
$$\mathbf{y}_t = \mathbf{c} + \mathbf{A}_1 \mathbf{y}_{t-1} + \mathbf{\Gamma} D_t^{\text{DMF}} + \mathbf{u}_t, \quad (9)$$

where D_t^{DMF} equals one from November 2020 onward and zero otherwise. The dummy is treated as a deterministic control and is held fixed when calculating and bootstrapping the impulse responses. The model otherwise retains the block-exogeneity restriction, one-lag specification, recursive identification scheme and variable ordering used in the main analysis. No distinction is made between higher and lower surplus liquidity states.

Figure [A.1](#) reports the responses to a one-standard-deviation positive NetFX shock. The point estimate for business credit declines on impact, rebounds temporarily after one month and becomes moderately negative thereafter. PMI exhibits a small and short-lived positive response, peaking after approximately one month before fading toward zero and becoming mildly negative at longer horizons. Inflation declines initially and gradually returns toward its pre-shock path.

The bootstrap bands include zero for all three variables at every reported horizon. Consequently, the longer-sample model provides no conclusive evidence of a positive response of business credit, PMI or inflation to a NetFX shock. Rather than establishing liquidity-state dependence directly, this result suggests that the impact of changes

Figure A.1: Constant-coefficient VAR with Extended Sample Period and DMF Dummy:
Impulse Responses to a Positive Net FX Shock



Note: The figure reports the impulse responses of business credit (Business), the Purchasing Managers' Index (PMI), and headline CPI inflation to a one-standard-deviation positive structural innovation to NetFX. The constant-coefficient block-exogenous VAR is estimated over the extended sample without distinguishing between liquidity-surplus regimes. A deterministic dummy equal to one from the implementation of the Dirham Monetary Framework onward is included in the domestic equations and held fixed when calculating the impulse responses. Identification follows the block-Cholesky scheme used in the main analysis, with the external block ordered first and NetFX ordered first within the domestic block. Shaded bands extend one bootstrap standard deviation above and below the point estimate at each horizon, corresponding to approximately 68% pointwise coverage under the Gaussian approximation. The dashed horizontal line denotes zero.

of net FX flows on monetary conditions are imprecisely estimated when observations from different liquidity conditions and monetary-operating environments are pooled. We therefore interpret the results cautiously. Therefore, exercise provides a conservative benchmark for, rather than an independent test of, the state-dependent transmission documented in the main analysis.

B CBUAE Liquidity Forecasting Approach for FX Flows

For the purpose of this paper, foreign exchange (FX) flows are defined from a monetary policy perspective as the difference between FX inflows (primarily from UAE government entities repatriating foreign currency from investment proceeds and hydrocarbon export receivables) and FX outflows (mainly from licensed financial institutions (with central bank access) purchasing foreign currency in exchange for Dirham). This measure captures the largest autonomous factor driving changes in the UAE's money supply. The CBUAE forecasts these flows daily to calibrate monetary policy operations so that the system-wide liquidity surplus remains within a target range. This ensures ample but not excessive reserves, supporting effective policy transmission in the floor-rate system by anchoring interbank rates to the CBUAE policy rate. Net FX inflows have trended upward over the past decade, broadly tracking GDP growth and accelerating during the post-COVID recovery. This has generated persistent liquidity surpluses in the banking sector, peaking in 2025.

Recently, the CBUAE has augmented its liquidity forecasting framework with monthly probabilistic forecasts using Bayesian Model Averaging (BMA), which integrates historical data with key domestic and global indicators (e.g., credit spreads, volatility indices, and sovereign risk metrics) and an FX-at-Risk model to quantify tail risks from extreme flows during stress periods. Both models are periodically updated to reflect structural economic shifts and new inputs, primarily financial market indicators. Figure [B.1](#) above

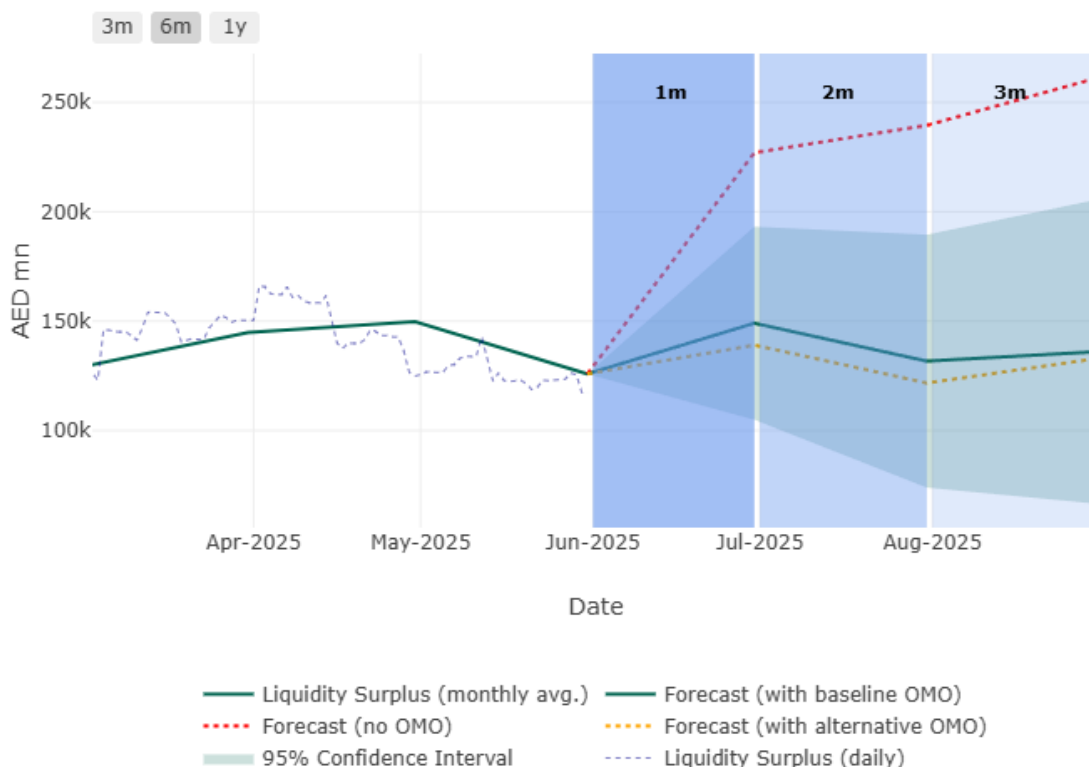


Figure B.1: CBUAE Monthly Liquidity Forecast of Liquidity Surplus

illustrates out-of-sample three-month forecasts under baseline and alternative scenarios, informing both the monetary policy stance and the sizing/timing of open market operations.

C CBUAE Financial Conditions Index (FCI)

In general, FCIs vary notably across countries and institutions, reflecting differences in their objectives, the range of financial variables included, and the methods used to aggregate them. There is no universally accepted definition or methodology. In fixed exchange rate regimes with limited monetary policy autonomy, such as in the UAE, FCIs are particularly valuable for gauging the effectiveness of monetary transmission and guiding calibrated liquidity management.

The CBUAE's monetary stance assessment incorporates a tailored FCI based on a com-

prehensive, data-driven framework to interpret the alignment between imported monetary conditions and domestic financial dynamics. It provides the CBUAE with a comprehensive overview of system-wide liquidity and related implications for credit dynamics and asset prices, which helps identify domestic over- or under-tightening relative to economic fundamentals. Externally, the assessment analyses macro-financial developments in the United States—the anchor currency country—to gauge business cycle alignment with the UAE. Domestically, it evaluates how financial and monetary conditions propagate through the UAE economy and affect interest rate transmission. Key inputs include:

- *Financial conditions*: credit impulse, results from credit sentiment surveys (especially in the real estate sector), and a FCI constructed from asset prices, oil prices, lending rates, and changes in private credit (Appendix C);
- *Monetary conditions*: net foreign exchange inflows/outflows, money multiplier, interbank and market rates relative to an estimated neutral rate range, and movements in the real effective exchange rate; and
- *Macroeconomic indicators*: domestic inflation and growth dynamics to assess whether prevailing financial conditions are sustainable

When the FCI moves in the opposite direction to changes in the policy rate, such as when US monetary tightening coincides with easing domestic financial conditions in the UAE, the divergence offers valuable diagnostic insights. Such instances often arise when strong capital inflows, higher oil prices, or improved trade competitiveness contribute to abundant domestic liquidity. At the same time, stronger growth prospects, risks absorbed by banks' balance sheets, or fiscally driven public investment can further boost credit expansion and asset valuations. This divergence signals that system-wide liquidity has become abundant (rather than ample)—stemming from either external inflows or robust domestic fundamentals—and may be muting monetary transmission. The CBUAE can use this analysis to recalibrate liquidity absorption through structural monetary op-

erations, or, if excess reserves persist above desirable levels, adjusting reserve requirements to reduce surplus liquidity. Conversely, when the FCI tightens while policy rates remain stable (or decline), it can reveal the emergence of domestic funding constraints, risk aversion, or credit quality concerns independent of external rate settings. In such episodes, the CBUAE may deploy targeted liquidity support to preserve orderly market functioning.

More specifically, the FCI is compiled monthly (but can be updated continuously as new data points become available) as a weighted average of a broad set of transformed macro-financial indicators (see Table C.1 below). Each underlying variable is standardised by mapping its values onto the unit interval through percentile transformation. This procedure places all variables on a comparable scale, regardless of their original measurement units or volatility (Hollo et al. [2012]). As a result, the composite index captures both the levels of individual indicators and their time-varying cross-correlations. When multiple financial variables move together more than usual, the FCI rises, signaling common shifts in the underlying drivers of financial conditions. This approach improves the ability of the index to identify periods of elevated financial stress or exuberance. Indicator weights are estimated to maximise the predictive power of the FCI for future bank default rates over a two-year horizon. By adopting this data-driven weighting scheme, the CBUAE's FCI serves as an early-warning tool within the macroprudential policy framework, helping to identify emerging vulnerabilities and inform timely policy responses.

Table C.1: CBUAE Financial Conditions Index (FCI)

	Variable	Unit of Measure	Comment/Motivation
Prices	Residential real estate	Year-on-year price change	Large increases in real estate prices can lead to higher debt servicing cost and lower affordability ¹
	Equity	Year-on-year price change ²	Large increases in equity prices could lead to asset mispricing and over-consumption (due to wealth channel effects)
	Oil (spot)	Current price divided by the two-year moving average	Periods of historically elevated oil prices can result in excessive investment/government spending as well as over-consumption ³
Credit	Private credit	Year-on-year growth	Sustained high credit growth rates can lead to excessive risk-taking and asset mispricing, resulting in boom-bust cycles ¹
	Interbank rate (3-month EIBOR)	Level	Cheap borrowing may result in asset bubbles, misallocation of resources, and diminished risk awareness; also serves as proxy for lending conditions.

Source: authors. Note: EIBOR=Emirates Interbank Offering Rate; 1/ Property prices and credit are widely used in financial cycle indices, which are often interchanged with FCIs [Lang et al. \[2019\]](#), but less commonly used globally in FCIs ([Hartigan and Wright \[2021\]](#); [Ajello et al. \[2023\]](#)); 2/ orthogonalised by year-on-year growth of the oil price given the strong correlation between a growth of the domestic stock market and oil prices; 3/ See Qadan and Nama [Qadan and Nama \[2018\]](#), Le and Luong ([Le and Luong \[2022\]](#)), Salisu and others [Salisu et al. \[2022\]](#) as well as Morana [Morana \[2013\]](#).

D Potential Effects of Stablecoins and Crypto Assets on Monetary Policy Effectiveness

The CBUAE's Payment Token Regulation provides a comprehensive regulatory framework for the use of digital private money in the UAE. However, the unchecked rise of US dollar-denominated stablecoins and crypto assets could pose challenges to the implementation of monetary policy. Widespread private-sector adoption for payments and savings may gradually substitute Dirham usage and erode commercial banks' demand for Dirham reserves. This shift would degrade the informational value of local monetary aggregates, complicating the CBUAE's assessment of money supply, velocity of money, and transmission mechanism effectiveness([BIS \[2025\]](#);[BIS \[2023\]](#);[International Monetary Fund \[2021\]](#)). Monitoring such shifts via FCI would become essential, as stablecoin proliferation could loosen deposit/lending dynamics independently of policy rates, signaling muted transmission not captured by traditional indicators.

The implications for FX interventions and monetary control could intensify over time. While initial issuance and redemption of stablecoins settle within commercial banks without impacting the CBUAE balance sheet, sustained USD stablecoin inflows would eventually require reserve expansion to defend the peg. Unchecked proliferation might also undermine liquidity management by fragmenting domestic funding conditions, heightening FX reserve pressures during times of stress like capital outflows when Dirham demand structurally weakens against (more) accessible digital US dollars. Here too, FCI divergence from policy signals could prompt timely sterilisation, preserving transmission integrity.²⁵

To mitigate these risks, the CBUAE is advancing Dirham-denominated stablecoins and the Digital Dirham under a regulated framework featuring full asset backing, segre-

²⁵The BIS Annual Economic Report 2025 ([BIS \[2025\]](#)) argues that stablecoins fare poorly against three tests money must meet — singleness, elasticity and integrity — and so cannot serve as the mainstay of the monetary system, and warns that without regulation they pose a risk to monetary sovereignty.

gated custody, and real-time par redemption (CBUAE [2024]; CBUAE [2025a]; Jobst et al. [2025]). Such instruments preserve marginal reserve demand and keep the effectiveness of monetary operations intact. Critically, they could enhance efficiency: given the CBUAE’s conservative reserve asset composition requirements, converting sight deposits into backed stablecoin reserves would consume of the liquidity surplus that currently absorbed by the CBUAE through costly open market operations, while increasing the demand for CBUAE monetary bills (and government debt securities). This strategy protects Dirham’s position as the sole legal tender, strengthens the credibility of the exchange rate regime, and reduces the reliance on intensive FX interventions without disrupting transmission channels. In this context, effective coordination of CBUAE with multiple other regulatory bodies—including the *Capital Markets Authority* (CMA), the *Virtual Assets Regulatory Authority* (VARA), the *Dubai Financial Services Authority* (DFSA), and the *Financial Services Regulatory Authority* (FSRA)—is essential to ensure consistent supervision, mitigate regulatory arbitrage, and support the secure development of virtual assets and stablecoins in the UAE.

