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Macroeconomic Uncertainty and Household Saving in India and China

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ABSTRACT

In this paper, the authors examined the role of macroeconomic uncertainty in driving the behaviour of household savings in two key economies in developing Asia: India and China. We focused on three main sources of economic uncertainty: income uncertainty, fiscal uncertainty and financial market uncertainty. We used the agricultural share of GDP as a measure of income uncertainty; we computed the volatility of global spot gold prices as an indicator for the presence of economic uncertainty, as gold is considered a safe-haven asset. We used Government Surplus/Deficit over GDP to address policy uncertainty. Using yearly data from 1992 to 2023, we independently estimated a Bayesian VAR model for each country and compared impulse responses on household savings by nation. According to the criteria employed in this study, the presence of a Ricardian channel is suggested by the findings that household savings respond to primary balance shocks in both countries. The results highlight that how domestic savers could be impacted by the primary balances of governments of the countries under study.

INTRODUCTION

Saving is a key factor in determining long-term growth, financial stability, and the effectiveness of macroeconomic policy in all countries around the world (University of Wisconsin–Madison Division of Extension, 2024). Stressing the importance of savings and investment, Arthur Lewis (1954) wrote 'The central problem in the theory of economic development is to understand the process by which a community which was previously saving and investing 4 or 5 percent of is national income or less, converts itself into an economy where voluntary saving is running at about 12 to 15 per cent of national income or more'. Savings are the part of income that is not spent on current consumption but instead set aside for future use. Total savings are typically classified into household, corporate, and public-sector savings, each contributing differently to economic growth. Household savings, which usually form the largest share, are the portion of disposable income that households choose not to consume. These household savings consist of financial savings (net financial savings being gross financial assets minus financial liabilities) and savings in physical assets. Financial savings may take the form of bank deposits, shares, and bonds, while physical savings are held as real estate, gold, and other tangible assets. 'In most of the developing countries just as in developed countries the surplus sector is the household sector which provides resources directly, or indirectly through financial intermediaries, to the government and the corporate sector'(Bhatt,1974). Some Asian nations consistently demonstrate elevated household saving rates; nonetheless due to rapid income growth, young demographics, precautionary motives, underdeveloped social insurance, and pro-saving policies (Loayza, Schmidt-Hebbel, & Servén, 2000); though the fundamental factors influencing these savings are frequently underexplored, particularly concerning macroeconomic instability. Existing research has underscored the significance of precautionary motives, habit formation, and portfolio considerations in influencing household saving behaviours, with households adapting their intertemporal consumption and saving strategies in response to perceived income and policy risks (Carroll, Overland, and Weil, 2000; Mees, 2012). At the same time, discussions on fiscal sustainability and Ricardian behaviour show that households that think forward may vary how much they save in response to changes in government balances to prepare for future taxes (Blanchard and Perotti, 2002; Bhattacharya & Qiao, 2015). Since the global financial crisis and the pandemic, many governments in emerging markets have had chronically high budget deficits. This has led to fast public debt growth and increased concerns about fiscal sustainability (World Bank, 2022).

Against this backdrop, the paper investigates how different forms of macroeconomic uncertainty income uncertainty, fiscal uncertainty and financial-market uncertainty shape household saving in India and China over the period 1992 2023. Income uncertainty is proxied by the agriculture share of GDP (AG), reflecting the idea that economies with a larger agricultural base face greater exposure to weather shocks, commodity-price fluctuations and other exogenous disturbances that generate unstable incomes over time (Ahmed, 2018). Fiscal uncertainty is captured by the primary balance-to-GDP ratio (PB), which summarises the stance of fiscal policy. Financial-market uncertainty is measured through the volatility of global spot gold prices (VGold), recognizing gold's role as a safe-haven asset in both countries and its prominence in

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household portfolios. Together, these variables provide a rich representation of the channels through which macroeconomic risk can influence saving behaviour.

The research uses a Bayesian Vector Autoregression (BVAR) methodology, computed independently for India and China, employing annual data on household saving-to-GDP (HS), AG, PB, and VGold. The temporal dimension is limited to 32 annual data points, and the system is of moderate scale; thus, a standard unrestricted VAR would suffer from overparameterization and inaccurate estimates when a realistic lag structure is introduced. A recursive (Cholesky) technique that is in line with normal macroeconomic practice (Sims, 1980; Lütkepohl, 2005) is used to find structural shocks. The order is based on relative slowness and exogeneity: AG, which is a slow-moving real indicator of income composition, is first; global gold price volatility, which is seen as an external financial shock, is second; the primary balance, which is subject to institutional and implementation lags, is third; and household saving, which adjusts with inertia to macro-financial conditions, is last (Ahmed, 2018; Kilian, 2009; Carroll, Overland and Weil, 2000; Mees, 2012; Bhattacharya & Qiao, 2015). This structure lets households react to changes in income composition, global uncertainty, and fiscal attitude at the same time, but it stops reverse contemporaneous feedback.

The paper tackles broadly two questions within this framework. First, how do changes in the composition of income, fiscal balances, and the price of gold affect how people in China and India save? When the two economies are modelled using identical variables, sample periods, how comparable are their dynamic responses? The study demonstrates the impact of macroeconomic uncertainty on household saving in two significant emerging Asian markets by focusing on a parsimonious BVAR. The Ricardian channel is the most important channel through which uncertainty impacts saving decisions.

The next section covers a brief review of literature, section 3 discusses empirical analysis, and section 4 discusses the results and section 5 concludes the study.

LITERATURE REVIEW

Theoretical underpinnings

There is a lot of research on household savings and increasing uncertainty that is directly related to strong reasons for saving as a precaution and differences in how households allocate their portfolios. Researchers have examined various forms of uncertainty income risk, unemployment risk, macroeconomic and policy uncertainty, and even political uncertainty to elucidate the reasons households increase savings during turbulent periods (Deaton, 1992; Carroll, 1997; Gourinchas & Parker, 2002; Bloom, 2014; Caggiano *et al.*, 2020; ECB, 2021)

Emerging markets tend to have more macroeconomic uncertainty because their economic and institutional environments make both domestic and external shocks worse. This is because their policy frameworks are weaker and less reliable, they are more exposed to volatile capital flows and commodity prices, their financial markets are shallower, and their institutions and politics are more fragile (Bloom, 2014; Rodríguez *et al.*, 2025). Research indicates that developing and emerging economies experience more volatile GDP growth, currency rates, and asset values than mature ones. Monetary and policy uncertainty in these nations might generate an adverse supply shock, leading to decreased output and higher inflation (Bloom, 2014; Rodríguez *et al.*, 2025). The high level of macroeconomic uncertainty has a significant impact on household savings. In these kinds of situations, households face more risk of losing their jobs and income, inflation and interest rates are less stable, and there is more uncertainty about future taxes, transfers, and regulations. All these make people more cautious and encourage them to save for the future (Frost & Sullivan Institute, 2024; World Bank, 2019). Consequently, households with higher incomes and those in the formal sector frequently augment their savings and reallocate their portfolios towards safer or more liquid assets, including foreign currency or tangible assets during periods of diminished macroeconomic credibility. In contrast, households with lower incomes or in the informal sector may face credit and liquidity constraints that hinder optimal adjustments, occasionally leading to dissaving or distress borrowing. Thus, the overall household saving in emerging markets reflects a blend of heightened precautionary saving by certain groups and restricted behaviour by others (Frost & Sullivan Institute, 2024; World Bank, 2019).

The theoretical basis for the connection between uncertainty and saving behaviour is precautionary saving models. These models show how households maximise their expected lifetime utility under future income, which is uncertain, typically within an intertemporal expected utility framework (e.g., Deaton, 1992; Carroll, 1997). In these models, people decide how much to spend and save today by comparing the utility they get from doing so now with the value they expect to get from doing so in the future, because income is random and that there are limits on how much they may borrow. A fundamental need is that the period utility function exhibits both concavity (risk aversion) and "prudence," characterised by a positive third derivative of utility concerning consumption. When prudence prevails, an escalation in the riskiness of future income while maintaining expected income augments the marginal value of greater wealth, since extra assets serve as a safeguard against unfavourable outcomes. Consequently, elevated income risk results in increased desired wealth building and a stronger buildup of precautionary reserves as a safeguard against unforeseen events (Carroll, 1997). Prudence formally denotes that the marginal utility of consumption is more responsive to downside risk than to upside risk, rendering cautious saving an ideal reaction to heightened uncertainty regarding future resources. This mechanism is particularly effective when consumers encounter inadequate markets, borrowing limitations, or restricted access to formal insurance, as self-insurance via

saving emerges as the principal method for consumption smoothing over time. In buffer-stock models of saving, families aim for a level of wealth that balances impatience, expected income growth, and risk. When there is greater income risk, the goal wealth level goes up, and families cut back on spending in the short term to increase their precautionary buffer (Carroll, 1997). These models can show why people save more money when their jobs are unstable, their wages are unpredictable, or their social insurance systems are inadequate (Deaton, 1992).

Empirical Evidence

Empirical research reveals various mechanisms via which uncertainty influences saving, as seen by both cross-country and panel studies. Income and unemployment risks are paramount: Lavenko's 2020 study investigates the determinants of household saving in Europe, focusing on labour-income uncertainty, utilising system GMM panel estimations on aggregate data from 22 European nations spanning 1996 to 2017. The household saving rate exhibits significant persistence and is primarily influenced by income growth and fluctuations in labour-income uncertainty, which can be divided into actual uncertainty and expectations regarding future uncertainty. A study by Zaman *et al.* (2013) investigates the influence of economic uncertainty on household saving behaviour in certain European economies, focusing on three kinds of uncertainty: unemployment risk, fiscal policy uncertainty, and investment risk associated with financial crises. Unemployment rates served as a surrogate for labour income uncertainty and the potential for income loss, while country-specific stock price volatility represented financial crisis risk; fiscal uncertainty was indicated by the Baker, Bloom, and Davis policy uncertainty index, the debt-to-GDP ratio, and the government surplus/deficit to GDP ratio. A Structural VAR is initially generated independently for each nation using quarterly data from 1999 to 2012. The impulse responses of household saving rates to fiscal and unemployment shocks vary among economies, whereas no significant responses to stock price volatility are observed. The approach subsequently employs Bayesian estimation of reduced form VARs inside a hierarchical (panel) framework, concentrating on average impulse responses to ascertain the collective impact of common shocks on household saving.

Research indicates that uncertainty influences household saving behaviour in the Chinese economy. The study by Yu *et al.* (2015) examines household savings and expenditure adjustments in response to an unforeseen, significant, and swiftly developing political shock that predominantly transpired in May 1989 in Beijing, China. The study utilises monthly home panel data to demonstrate that an increase in political uncertainty resulted in significant albeit temporary increases in savings among urban Chinese households. Households primarily modified their expenditures by reducing semi-durable consumption and deferring significant durable acquisitions. The impact of uncertainty is most pronounced among older, affluent, and more socially privileged households. A significant contribution is the research on income uncertainty and household savings in China conducted by Chamon, Liu, and Prasad (2013). Utilising an extensive dataset from urban household surveys covering a prolonged period of market-oriented reforms, the authors demonstrate that, despite a rapid increase in average household incomes, the variability of transitory income shocks has significantly escalated, signifying a pronounced increase in labor-income risk. The pronounced volatility was unevenly allocated: younger cohorts, who entered the labour market under more market-oriented employment and wage-setting frameworks, faced particularly significant escalations in income risk, whereas older cohorts were chiefly impacted by institutional modifications to pensions and social insurance that diminished the generosity and reliability of conventional state-provided safety nets.

Household savings constitute the primary domestic source of investment financing in India, making them essential for maintaining long-term growth and capital accumulation. Empirical research from multiple authors, including the study "Determinants of Household Savings in India" (2014) by Sahoo and Dash, indicates that macroeconomic factors such as income growth, interest rates, inflation, and the dependence ratio substantially influence gross household savings behaviour. In addition to these real-sector influences, current research highlights the impact of economic and financial uncertainty—reflected in price volatility, growth decelerations, and fluctuations in financial markets—on modifying households' precautionary saving motivations and investment decisions. Anthony and Raravikar (2025) conduct an analytical examination of the macroeconomic and financial determinants of Indian family savings, employing time-series evidence to correlate gross household saving with income growth, interest rates, inflation, and financial sector variables. Their analysis emphasises the pivotal importance of households as the primary source of domestic savings for investment in India and demonstrates that changes in financial conditions influence saving behaviour.

Consequently, research on this topic indicates that household saving responses differ based on wealth, income, and credit accessibility: affluent or unconstrained households tend to increase savings significantly during periods of uncertainty, whereas lower-income households may be compelled to dissave to maintain consumption despite heightened risk. The literature consistently indicates that uncertainty—be it economic, political, or firm-specific—generally increases desired savings due to precautionary reasons; nevertheless, the overall effect is contingent upon distributional factors and the degree of liquidity constraints among households. In this context, this research employs specific metrics of uncertainty previously discussed to analyse household savings responses in China and India.

MATERIALS AND METHODS

In the present study, sources of variables are given in Table 1. Annual data is used from 1992 to 2023 for both countries.

In the case of India, only one variable (HS) in the system

is integrated of order one while the remaining variables are stationary, cointegration analysis is not applicable. Cointegration would require at least two non-stationary variables to form a stationary linear combination (Engle and Granger, 1987). Accordingly, the cointegration rank of the system is zero by construction, and BVAR is appropriate method here given the small sample size of 32 years and 4 variables. For China is it found that two variables are integrated of order 1; HS and PB; on checking for cointegration between the two I(1) variables, there was no evidence of cointegration. In this case, BVAR is well suited for macroeconomic applications where the researcher wishes to model a moderately sized system with rich dynamics, but the time dimension is limited, as is typical with the annual data used in the study (Karlsson, 2012). In similar settings, BVARs yield more precise credible intervals and superior calibrated forecasts than unrestricted VARs, as they incorporate economically rational prior assumptions, notably the notion that macro variables frequently adhere to persistent yet mean-reverting processes. In this study, the absence of cointegration links for both India and China eliminate the necessity for a VECM specification. However, the existence of small samples and diverse endogenous variables makes BVAR an appropriate and methodologically consistent choice for analysing the dynamic effects.

Table1: Variables and their Sources

Variable(s)	**Sources**
Household saving/GDP(HS)	MoSPI (India)**, National Bureau of Statistics, (China).
Agriculture/GDP(AG)	World Bank
Primary Balance/GDP (PB)	IMF
Spot Gold Prices volatility (VGold)*	World Bank and authors' calculations

**calculated by taking standard deviation of annual returns;*
***for India FY data of 2021-2022 is treated as 2021and likewise for other years*

The main benefit of BVAR in small samples is that it combines prior information with the likelihood to regularise the high-dimensional parameter space. This makes estimates more accurate and forecasts better when T is low. The classic Minnesota prior of Doan, Litterman, and Sims (1984) and Litterman (1986) offers a systematic approach to reduce coefficients on lagged variables towards a random-walk or white-noise benchmark, employing stricter priors on longer lags and cross-variable effects, which is especially beneficial in macroeconomic VARs with relatively brief samples. From a frequentist standpoint, this shrinkage diminishes prediction error variance in typical instances of misspecification and overfitting, elucidating the superior forecasting efficacy of BVARs compared to unrestricted VARs in empirical contexts. Recent studies, including Giannone, Lenza, and Primiceri (2015), show that correctly designed priors in BVARs can consistently do better than regular VARs when predicting things that aren't in the sample, especially when the cross-sectional dimension is not small compared to T. These arguments are directly applicable in this context, where the sample encompasses merely 32 years and the system comprises four variables, resulting in a substantial number of coefficients per equation relative to the effective information content in the data. Furthermore, an unrestricted frequentist VAR rapidly becomes parameter-hungry, particularly upon the inclusion of a reasonable lag length, thereby inflating standard errors and causing unstable impulse responses and forecasts. BVAR directly addresses this small sample over parameterisation problem by shrinking the VAR coefficients towards parsimonious prior values, thereby reducing estimation variance and improving finite sample performance (Chan, 2021). Moreover, serial correlation is less fatal in BVAR because shrinkage stabilizes estimation but it still signals dynamic misspecification and should not be ignored (Banbura, Giannone, & Reichlin, 2010)

In this paper, structural shocks are identified using a recursive (Cholesky) decomposition, which imposes economically motivated short-run restrictions on contemporaneous interactions among variables (Sims, 1980; Lütkepohl, 2005). The ordering reflects differences in the speed of adjustment and the exogeneity of shocks within our observation period. In small- to medium-scale applications like this present study, a Cholesky identification with a carefully justified ordering remains standard and practical. as structural shocks and impulse responses are required alongside a simple, recursive identification that is coherent with macroeconomic priors (Wu ad Koop, 2022)

The agriculture share of GDP (AG) is the first thing. This variable shows how output and income are structured. This is mostly because of slow-moving elements that are hard to manage, like climate, cropping patterns, technology, and demographics. Agricultural output may react to global price shocks in real time, either through changes in terms of trade or changes in expectations. However, it is unlikely to react to changes in fiscal balances or household saving decisions in the same time frame. It is conventional macroeconomic VAR practice to treat AG as a slow-moving real variable. A high agriculture-to-GDP ratio is a sign of an economy where income is less stable because production and earnings depend a lot on weather, commodity prices, and other outside shocks that

Table 2: Descriptive Statistics

	China				India			
	AG	**HS**	**PB**	**VGOLD**	**AG**	**HS**	**PB**	**VGOLD**
Mean	11.80	0.20	-1.80	0.04	19.92	0.20	-3.94	0.04
Median	10.00	0.21	-1.16	0.04	17.50	0.20	-4.18	0.04
Maximum	21.30	0.23	0.44	0.08	27.66	0.24	0.26	0.08
Minimum	6.80	0.17	-8.62	0.01	16.00	0.16	-7.26	0.01
Std. Dev.	4.60	0.02	2.22	0.02	4.09	0.02	1.67	0.02
Skewness	0.70	-0.51	-1.44	1.28	0.78	0.06	0.21	1.19
Kurtosis	2.10	2.49	4.47	5.49	2.00	1.89	2.82	5.02
	3.70	1.74	13.89	17.08	4.86	1.76	0.30	13.81
Jarque-Bera	0.20	0.42	0.00	0.00	0.09	0.41	0.86	0.00
Probability	377.70	6.44	-57.61	1.19	677.23	6.81	-134.09	1.27
	5105.80	1.31	256.26	0.05	14041.32	1.38	621.11	0.06
Sum	647.70	0.01	152.54	0.01	551.87	0.02	92.26	0.01
Sum Sq.	11.80	0.20	-1.80	0.04	19.92	0.20	-3.94	0.04
Sum Sq. Dev.	10.00	0.21	-1.16	0.04	17.50	0.20	-4.18	0.04

Source: Authors' calculations.

happen slowly but cause changes over time. Therefore, we consider this variable to be the most exogenous in the system. Ahmed, O. (2018) study the volatility effect of agricultural exports on agriculture share of GDP and find that shocks to agricultural exports and the agriculture share of GDP are linked to greater output volatility, reinforcing the idea that heavy agricultural dependence could cause income instability.

The second place goes to the global gold price volatility (VGold). People think that the prices of gold on international markets have nothing to do with individual economies, especially those that are small and open to trade. At the same time, or even for short periods of time, the state of the economy in a country, its fiscal balance, or how much people save do not affect the price of gold around the world. Putting gold price volatility second means that most of the time, shocks to the price of gold come from outside the country. This approach is typical in country-level VARs that incorporate global commodities prices or external financial variables (Sims, 1980; Kilian, 2009).

The primary balance to GDP ratio (PB) comes in third. Institutional rigidities, legislative procedures, and implementation gaps make it impossible for fiscal policy to change right away when the private sector does something. Changes in global financial conditions or commodity price volatility can affect fiscal results, but household saving decisions made at the same time do not have an immediate effect. This arrangement is consistent with the fiscal literature, which often regards fiscal variables as policy instruments that exhibit delayed adjustments rather than high-frequency endogenous variables (Blanchard and Perotti, 2002).

Household saving as a ratio to GDP (HS) is at the last place. Saving behaviour is affected by reasons for smoothing consumption, precautionary reasons, and decisions on how to divide up a portfolio. These reasons change over time because of habits, realising income, and planning constraints (Carroll, Overland, and Weil, 2000; Mees, 2012).

RESULTS AND DISCUSSIONS

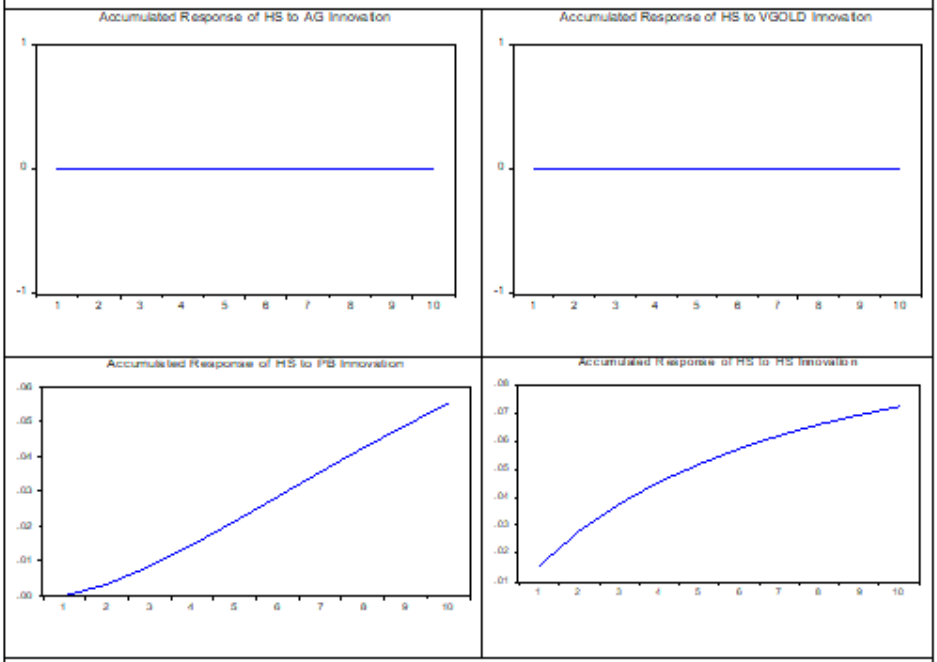
Against the above reasoning, we apply the BVAR model choosing appropriate lag length as per the SIC criterion. The prior type is the Litterman / Minnesota, which means that for each variable, the coefficients are pushed towards a random-walk (or near-random-walk) univariate AR process. This is done with tighter priors on longer lags and cross-equation effects, and unstable draws are removed. The structural shock of HS has the most effect on India. The IRF exhibits a big positive spike at first, followed by a slow decline. This suggests that HS innovations have a substantial posterior persistence. On the other hand, shocks to AG and Vgold cause responses whose posterior means are close to zero at all horizons. This suggests that HS is not affected by these shocks in a dynamic way. The PB shock has a clear, positive effect that shows the presence of the Ricardian Channel. This is because households save more when the primary deficit rises, which they do because they expect taxes to go up in the future. However, the effect is smaller than HS's own shock at short horizons, so HS's own shock is the main cause of HS variability in the BVAR. (Chart 1).

In the case of China, similar results are obtained hence no chart is shown here. Given similar sample sizes, variable definitions and priors, it is not surprising that the BVAR "shrinks" both country systems towards a comparable dynamic structure, producing alike IRFs ((Banbura,

Giannone, & Reichlin, 2010). In both the cases, fiscal uncertainty is important; while other channels are not which could be explained by reasons which include gold being a small part of the household portfolio allocation; alongside declining share of agriculture in GDP also not impacting household saving behaviour. As a measure of robustness, lag length is changed leading to no material change in our results.

The article examines how uncertainty affects household saving in India and China, finding that savings change

Chart 1: Accumulated Response to Cholesky One S.D. (d.f. adjusted) Innovations



Source: Authors' estimation

mainly through changes in primary balances, while responses of gold and agricultural GDP are small and statistically weak. Given the ratio form and persistence of many variables, impulse responses are gradual, suggesting that sustained improvements in the primary balance can foster higher private saving as per this study.

CONCLUSIONS

This study shows that macroeconomic uncertainty affects household saving in India and China mainly through the fiscal channel, with primary balance shocks causing a Ricardian rise in household saving, while shocks from agriculture's GDP share and gold-price volatility have weak effects. The BVAR framework with Minnesota priors proves suitable for short annual samples and yields stable impulse responses, but its use of aggregate ratios and limited time dimension restricts the visibility of high-frequency adjustments and distributional heterogeneity in emerging markets. Future research could use higher-frequency or micro data, richer uncertainty indicators, and extended BVAR structures.

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