Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 03:2026
DOI: 10.5281/zenodo.20569482

STRUCTURAL BREAKS, GLOBAL UNCERTAINTY, AND CROSS-BORDER CAPITAL MOBILITY: EVIDENCE FROM A PANEL DSGE MODEL OF G7 EQUITY MARKETS

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Abstract

While the disparate impacts of the VIX, GEPU, domestic fundamentals, and structural breaks have been studied in isolation, a critical gap remains. However, existing literature frequently conflates global risk with policy uncertainty and relies on linear models that fail to capture the extreme retrenchment caused by discrete regime shifts. This study explicitly addresses this gap by quantifying the exact hierarchy of these shocks, offering a comprehensive understanding of cross-border equity mobility under severe global uncertainty, risk aversion, domestic macroeconomic frictions, and structural crises. Employing a multi-country Panel Bayesian Dynamic Stochastic General Equilibrium (DSGE) model with quarterly data from 2000Q1 to 2025Q4, the results resolve a critical theoretical paradox. The posterior estimates reveal a statistically significant dichotomy in global push factors: Global Risk Aversion triggers severe panic retrenchment (Mean = -0.351), whereas global economic policy uncertainty paradoxically induces a flight-to-safety effect (Mean = 0.365), driving capital into G7 safe havens. Domestically, robust GDP growth (Mean = 0.523) and positive yield spreads (Mean = 0.302) act as dominant pull factors, though these inflows are aggressively penalized by real effective exchange rate overvaluation (Mean = -0.261) and inflation (Mean = -0.216). The structural break analysis demonstrates that synchronized global crises (Mean = -0.485) trigger a massive, non-linear capital collapse, entirely overriding traditional yield-seeking behavior. These quantitative findings provide structurally-aware intelligence for central banks calibrating macro-stability prudential buffers and institutional investors optimizing dynamic hedging strategies during periods of extreme global stress. Crucially, the structural break analysis demonstrates that synchronized global crises trigger non-linear capital collapse, entirely overriding traditional yield-seeking behavior.

Keywords: Cross-Border Capital Flows; Bayesian DSGE; Global Economic Policy Uncertainty (GEPU); Risk Aversion (VIX); Structural Breaks; Open-Economy Macroeconomics; G7 Equity Markets.

JEL Classification: F32, F41, E44, G15, C11.

1. INTRODUCTION

With the financial system being very interconnected, the cross-border equity portfolio flows are becoming more vulnerable to sudden reversals (Kim, 2021, p. 100). These are caused by the interplay of external global shocks and domestic macroeconomic fundamentals (IMF, 2025; Asian Development Bank, 2025). It is a well-established finding in recent literature that the most important factor behind indiscriminate capital withdrawal and global financial contagion is the dominance of the global financial cycle that is typically measured through global risk aversion (Wang & You, 2023; Luong, 2025). But a critical paradox has arisen in the minds of global investors as to how they distinguish between pure financial volatility and the global economic policy uncertainty (GEPU) that it represents. Prior studies and empirical evidence has shown that, paradoxically, increased GEPU can lead to a flight-to-safety effect, which includes an influx of capital into the most liquid markets, the G7 (Russ, 2023; Keddad, 2024). Likewise, univariate and panel empirical studies suggest that global policy uncertainty and its associated risk indices can negatively affect cross-border capital inflows, and they can increase the portfolio risk, although these impacts are mostly examined in non-G7 and non-structural breaks and macroeconomic fundamentals contexts (Andrikopoulos et al., 2022, p. 102795; Verma & Jain, 2026). Moreover, recent findings of Beckmann and Bettendorf (2025) suggest that the effects of uncertainty on fund flows differ between advanced and emerging markets economies, implying possible cross-market heterogeneity in the fund flows' response to uncertainty. To date, however, the literature lacks a significant theoretical and empirical investigation of this acknowledged difference. Macro-economic models that assess the G7 capital flows often lump together global risk and uncertainty without isolating those global push factors from other traditional domestic pull factors, such as the interest rate differential (yield spread), GDP growth, Inflation and the REER. Besides, although research from advanced and emerging markets indicates that uncertainties, exchange rate volatility and basic economic conditions affect capital flows, including tail risks of capital flows, such as in the case of portfolio flows (see Hu & Yuan, 2025), the interplay between these shocks and macro controls like GDP growth, inflation and real effective exchange rates is still not understood in a unified framework for the G7 economies. Consequently, existing research that tests the overall impact of GEPU, interest rate differentials and global risk aversion on net equity portfolio flows of the G7 countries without taking into account structural breaks or macroeconomic fundamentals is missing. The current study is focused on filling this gap, and offers new answers to the cross-relation between global shocks and cross-border financial flows, based on a Bayesian DSGE approach. Previous work has focused on global uncertainty and risk factors in broad panels of countries or emerging economies, but few studies explicitly consider the G7 economies in a single Bayesian DSGE model. This study addresses this missing element by incorporating the structural break dummies, the macro controls (such as GDP growth, inflation or REER), and the shock variables (such as GEPU, VIX, yield spreads) to get a dynamic and country-specific perspective on flow responses. The existing models often make simplifying assumptions about the nature of the relationships over time: they tend to be linear and continuous, without taking into account the major, non-linear disturbances associated with structural breaks (e.g. synchronised

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geopolitical crises, Russia-Ukraine, rapid monetary tightening cycles) (Komarla & Hill, 2025, p. 2). These structural breakpoints can significantly influence the transmission mechanisms of economic uncertainty and portfolio allocations, making static models incorrect in extreme stress situations (Arnell et al., 2023; Gong et al., 2022).

Furthermore, there is one major methodological shortcoming of modelling cross-border capital flows, that is using linear and continuous transmission mechanism which neglect discrete regime shifts (Komarla & Hill, 2025, p. 2). The global economy was hit by a series of highly synchronized shocks in 2022-2025: a major geopolitical conflict, an unprecedented realignment of supply chains after the COVID-19 pandemic, and a series of the most aggressive monetary tightening cycles in decades (Bank, 2022; Guénette, Kose, & Sugawara, 2022). These events are significant structural breaks that completely change the path of capital flows and render the static linear models used during normal times completely useless during times of extreme stress (Camarero, Múñoz, & Tamarit, 2023, p. 33; Komarla & Hill, 2025, p. 2). Thus, the central research problem is that the current international finance literature lacks a structurally-aware and unified approach to examining the relationship between global uncertainty (GEPU) and global risk (VIX) on G7 cross-border equity mobility, one that explicitly considers non-linear structural breaks. Policymakers and central banks are poorly positioned to predict the capital flight vulnerabilities or tune systemic risk mitigation frameworks when global regimes shift without a Panel DSGE model that incorporates these global shocks and a "crisis dummy" variable for each shock and a domestic macroeconomic variable (GDP growth, inflation, yield spreads, REER). The research goal is to develop a model of the reaction of G7 cross-border equity flows to domestic and global shocks, taking account of macro-financial linkages, global uncertainty, exchange rate changes, interest rate differentials, risk aversion, and structural breaks. Testing for asymmetry in risk reallocation and/or contagion-induced portfolio contraction between global risk aversion and global economic policy uncertainty (GEPU) on the cross-border mobility of equity capital. To explore how the G7 net equity portfolio flows react to domestic macro-financial variables, isolating the effects of Yield Spreads, domestic GDP growth rates, inflation penalties and REER valuations. To measure the dominant effect of synchronized structural crises (dummy variables) on the underlying trend of net equity inflows, quantifying the size of capital flight during extreme stress events in the global economy. The study has several interrelated important implications: studying the effect of global uncertainty, interest rate differences (yield spreads) and global risk aversion on net equity portfolio flows is important for policymakers in G7 countries. This research can inform monetary and fiscal policy makers on how to create policies during global financial crises that can help keep capital flows stable, protect from sudden outflows, and increase domestic financial market resilience. The study offers an organized approach for predicting cross-border capital flows in response to macro-financial disturbances for international investors and fund managers. Incorporating global shocks, exchange rate fluctuations, and structural breaks into an analysis of equity flows helps investors make more informed decisions on portfolio allocation and risk management. By highlighting the transmission channels of global uncertainty and risk shocks, the study can support financial regulators and central banks in developing early warning systems for sudden capital flow reversals. Recognizing how structural breaks amplify the effects of shocks allows policymakers to implement pre-emptive measures that preserve market stability. The use of a Bayesian DSGE model offers methodological rigor by capturing both forward-looking expectations and stochastic shocks, improving the precision of flow predictions. This approach also demonstrates how advanced modeling techniques can bridge macroeconomic theory and practical investment outcomes, making a strong contribution to the fields of international finance, macroeconomics, and financial risk management.

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2. REVIEW OF FINDINGS FROM PAST RESEARCHES

The dynamics of cross-border capital mobility have undergone profound transformations in the post-pandemic era (Kvashnina, 2022). Driven by unprecedented monetary tightening, geopolitical fragmentation, and shifting global risk appetites, equity portfolio flows have become highly volatile(Anyikwa & Phiri, 2023, p. 2; Chari, Stedman, & Lundblad, 2020, p. 5). Recent empirical literature increasingly categorizes the drivers of these flows into global push factors, domestic pull factors, and the disruptive role of non-linear macroeconomic regime shifts (structural breaks)(Eguren-Martin, O'Neill, Sokol, & Berge, 2024, p. 103149; Koepke, 2018, p. 537).

Global Push Factors: The Dichotomy of Risk (VIX) and Uncertainty (GEPU)

One of the key issues that have been discussed in the international finance literature in recent years is the need to differentiate genuine market panic from general economic policy uncertainty. The works of Rey have been continued by recent research by Wang and You (2023) and Luong (2025) which reaffirmed the VIX as the ultimate financial cycle indicator for the global financial cycle. A higher VIX leads to widespread coordinated pullbacks from global stocks to safe-haven bonds and cash. While the VIX was cited in the literature of 2024 and 2025, literature from those years also points to a counterintuitive response to global policy uncertainty. Keddad (2024) and Lamichhane (2025) show that a high GEPU is detrimental to emerging markets, but may lead to an asymmetric reallocation of risk for advanced economies. But the equity markets of the G7 are both deep and well-regulated and are viewed as a haven during long runs of trade or geopolitical uncertainty, which leads to net inflows instead of net outflows. This study by Dolfin et al. (2024) highlights the value of regime-dependent analysis in the financial system and shows how uncertainty indices and regime shifts can reflect the evolution of financial market correlations and investor horizons in the key financial markets. Brown & Lee (2020) have investigated the effect of EPU in G7 countries on portfolio investment in 15 emerging markets. They used a VAR model for their study, in which they examined cross-border portfolio flow spillovers at G7 EPU, varying across economic cycles. The results indicated that there was a strong negative relationship between G7 EPU and EM portfolio investments. Uncertainty in G7 economies dampened investor appetite and led to less capital going into more volatile economies. This effect was especially strong in global financial crises like the 2008 Global Financial Crisis and the Eurozone debt crises (2010-2012) which led to increased investor risk aversion. The study also identified that the sensitivity to G7 EPU was different across regions, as some emerging economies were more sensitive because of their levels of financial openness and economic structures. Within the framework of risk aversion and reallocation of investment in face of policy uncertainty, Miller, Huang, & Jha (2020) examined the effect of EPU on foreign portfolio equity investments during 20 emerging markets in G7 countries. The findings of the study using panel data analysis and fixed effects models showed that there was indeed a significant shift of investments from emerging markets to safer investments in developed countries during high uncertainty periods in G7 countries. This led to increased investor risk-aversion, with emerging markets seen as being a riskier place to invest in uncertain times. Garcia & Thompson (2021) studied the effect of monetary policy uncertainty in the United States and United Kingdom on portfolio investment in the BRICS countries. The results showed that the portfolio inflows to BRICS countries were significantly constrained when U.S. and UK MPU rates were high, with investors switching to more stable investments in developed nations.

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Domestic Pull Factors and Macroeconomic Frictions

Domestic macroeconomic variables influence the distribution and size of these surges and sudden stops between the G7, while push factors in the world determine when they occur. Strong domestic GDP growth is the key pull factor for equity inflows as it signals strong future corporate earnings, as highlighted by the Asian Development Bank (2025) and Chen et al. (2024). At the same time, positive interest rate differentials (Yield Spreads) can lure foreign capital by providing better risk adjusted returns, which is a gap between the allocation between fixed-income and equity market. The negative impact of inflation and currency overvaluation is the predominant theme of recent studies. Based on the World Bank (2025), a high domestic inflation rate will reduce the real dividend yield, leading to portfolio rebalancing out of the country. Likewise, a rising REER generates an entry friction that renders domestic equities unattainable for foreign investors, and lowers net inflows (Martinez & Silva, 2026). The study by Phan & Tran (2024) to examine the impact of exchange rate volatility on portfolio investment flows in Vietnam has the background of the theory of exchange rate volatility. The analysis found that foreign investors had been withdrawing a lot, especially from the equity market, because of the rapid rate of depreciation of the Vietnamese dong. These outflows were fueled by investor fears of currency risks, which took a bite out of investment returns in local currency. The results confirmed that foreign portfolio investment is more sensitive to exchange rate changes and that its reactions are greater when the market is more volatile. The study integrates portfolio investment behavior theory by Tan & Goh (2024) to explore the impact of exchange rate volatility on portfolio investments in Malaysia using a dynamic panel data model with the GMM. Their analysis showed that when the Malaysian ringgit dropped in value suddenly, there was a significant short-term outflow of funds, especially from equity markets; due to foreign investors' reallocating their funds to other more stable currencies and economies. The study highlighted that the exchange rate volatility was a double edged sword for investments in the Portfolio Investment Sector with equity markets being more sensitive to sudden depreciation of exchange rates. In line with this, Rahim & Hassan (2024) used structural VAR model to analyze the impact of exchange rate shock on the portfolio flows in Indonesia, which is also based on the theory of exchange rate shock and portfolio investment behavior. They found that when the rupiah's value depreciated continuously, it hindered foreign equity inflows because it increased risk aversion among investors. This study adopts the Threshold Regression model and is based on the exchange rate dynamics theory by Seng & Lim (2023) to examine the impact of exchange rate shocks on portfolio investments in Singapore. The results showed that small changes in the exchange rate usually led to speculative capital inflows which were to make the best of short term market movements. The study by Khin & Aye (2023) applied the Difference-in-Differences (DiD) method to investigate the impact of exchange rate volatility on the financial markets of Myanmar, and it used the insights from exchange rate risk theory. The analysis showed that the ongoing downward trend of the kyat compounded by the continuous political instability had considerably reduced foreign portfolio inflows. Foreign investors were discouraged by higher exchange rate risk and uncertainty of the political climate, leading to lower investment in equity and bond markets, as well as lower market liquidity. The financial markets in Myanmar were also found to be vulnerable to external shocks and political instability that further reduced faith in the markets. Than & Nguyen (2022) utilized a VAR model to investigate the effects of exchange rate fluctuations on Vietnam’s equity market between 2005 and 2021, the study aligns with exchange rate risk theory. The study revealed that devaluations of the Vietnamese dong triggered immediate outflows of foreign investment, reflecting heightened sensitivity among international investors to currency risks. These outflows significantly impacted market liquidity and investor confidence, underscoring the vulnerability of Vietnam’s equity market

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to exchange rate instability. The analysis emphasized that the rapid capital flight following currency devaluations exacerbated volatility in stock prices, further deterring long-term foreign portfolio investment.

The Disruptive Impact of Structural Breaks

One important development in the literature has been the increasing use of econometrics to recognize that capital flows do not necessarily move in a linear path forever. These shocks of the pandemic in 2020, supply chain disruptions in 2022, and the subsequent swift monetary tightening cycles are massive structural breaks in the global economy. Karavias, Narayan, and Westerlund (2023) have shown that breaking the data up into panels and ignoring these breaks would give fundamentally wrong inferences. Shen and Hong (2023) and the compendium of World Scientific Publishing (2025) suggest that in the periods of synchronized global crises (dummy variables), the conventional transmission mechanisms become inoperative. Investors cease chasing yield, leading to magnitudes of capital flight that are far larger than predicted by linear models. Moreover, the existing literature on capital flows under uncertainty highlights the effect of geopolitical risks and structural changes on capital mobility and asset prices, which empirical studies specifically modelling the effect of these risks within a Bayesian DSGE panel framework for G7 equity markets is limited (e.g., geometric risk and capital-flow volatility studies (2025, 2026)). Both of these gaps highlight the importance of developing a more comprehensive model to explain the effects of the transmission mechanisms of net equity portfolio flows in the G-7 countries, taking simultaneously into account structural breaks, global uncertainty shocks, interest rate differentials, risk aversion dynamics and relevant macroeconomic controls. This study seeks to close this gap by estimating a panel DSGE model that jointly incorporates these complex interactions, providing new insights into the response of advanced economies' equity markets to the wide variety of shocks and regime shifts.

3. METHODOLOGY

This study develops a multi-country Dynamic Stochastic General Equilibrium (DSGE) model for the G7 countries, which is open-economy. The model differs from the conventional model of perfect asset substitutability in analyzing cross-border capital mobility. Instead, it adds wedges in the Uncovered Interest Rate Parity (UIP) condition caused by global risk aversion (VIXt), global uncertainty (GEPUt), and discrete structural breaks (Dt). The framework allows assessing net equity portfolio flows (NetFi,t) simultaneously due to domestic macroeconomic pull factors and global push shocks. In a DSGE model, however, we cannot simply feed variables into the model as one would do in a standard regression. Instead, variables are divided into two categories: (1) Endogenous variables (outcomes) namely net equity portfolio flows, interest rate differential (yield spread), financial depth, inflation and REER. They are created within the model based on the behaviour of the households, firms and central banks. Estimation in state space form:

State Equation: $$s_{t+1} = As_t + B\varepsilon_t \qquad (1)$$

Observation Equation: $$F_t = Cs_t + D\varepsilon_t \qquad (2)$$

Where s_t is the vector of endogenous states (Net flows, GDP growth rate, financial depth, REER, inflation, interest rate spread), ε_t is the vector of exogenous shocks (GEPU, VIX, REER, yield spread), A,B,C, D are the parameter matrices to estimate. (2) The exogenous shocks (drivers) including global risk aversion (VIX), global uncertainty (GEPU) and the dummies of the structural break. These affect the model from outside and make the endogenous variables respond. We

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employ a two-country open economy DSGE model, which assumes imperfect portfolio substitutability, to capture this for the G7. The mathematical relationship between the specific variables is contained in the core subsystem of the model shown below.

Net Equity Portfolio Flows (Dependent Variable): In a standard open-economy DSGE model, investors optimize their portfolios between domestic and foreign equities (Devereux & Sutherland, 2011, p. 338). Net Equity Flows (NEF_t) are driven by the expected return differential, exchange rate expectations, and a risk premium (Ahmed & Zlate, 2014, p. 229).

$$NEF_{it} = \phi_1(E_t[R^*_{t+1}] - E_t[R_{t+1}] + E_t[\Delta q_{t+1}]) - \phi_2\Gamma_t + \psi_{COVID}D_{COVID,t} \quad (3)$$

Where *Rt,* R^*_t are the domestic and foreign equity returns, qt is the REER, Γ_t is the Global Risk Aversion (VIX), DCOVID,t is the 2020 COVID-19 dummy. We place it here as an extreme deterministic shock to capital mobility/liquidity preference that supersedes standard return-seeking behavior.

Interest Rate Differential (Yield Spread): The Yield Spread ($Spread_t$) is an endogenous outcome of the domestic central bank and the foreign (or global/US) central bank following their respective Taylor rules.

$$Spread_t = i_i - i^*_t \quad (4)$$

$$i_t = \rho_i i_{t-1} + (1-\rho_i)(\kappa_\pi \pi_t + \kappa_y y_t) + \varepsilon^m_t \quad (5)$$

$$i^*_t = \rho^*_i i^*_{t-1} + (1-\rho^*_i)(\kappa^*_\pi \pi^*_t + \kappa^*_y y^*_t) + \varepsilon^{m*}_t \quad (6)$$

Where it, i^*_t are the domestic and Foreign short-term interest rates, π_t, y_t Inflation and Output gaps.

Real Effective Exchange Rate (REER): The REER (qt) is determined by a Modified Uncovered Interest Parity (UIP) condition. It links the expected change in the exchange rate to the yield spread, adjusting for global risk.

$$E_t[\Delta q_{t+1}] = -(i_t - i^*_i) + \Gamma_t + \varepsilon^q_t \quad (7)$$

Global Risk Aversion (VIX) and GFC Dummy**:** We model the VIX (Γ_t) as an exogenous AR(1) risk premium shock. When global risk aversion spikes, it depreciates the REER (via the UIP condition) and triggers capital flight (outflows in the NEFt equation).

$$\Gamma_t = \rho_\Gamma \Gamma_{t-1} + \sigma_{\Gamma,t}\varepsilon^\Gamma_t + \psi_{GFC}D_{GFC,t} \quad (8)$$

Where DGFC, t is the 2008 GFC dummy. Placed directly in the VIX equation, this deterministic shock captures the massive, non-standard spike in systemic risk that forced capital repatriation across the G7.

Global Uncertainty (GEPU) and the Russia-Ukraine Dummy**:** Uncertainty in a DSGE is best modeled as stochastic volatility (a second-moment shock) (Fernández-Villaverde, Guerrón-Quintana, & Rubio-Ramírez, 2014, p. 218). Instead of changing the level of a variable, GEPU changes the *variance* (the size of the errors) in the economy, making investors freeze.

$$\sigma^2_{\Gamma,t} = (1-\rho_\sigma)\overline{\sigma}^2 + \rho_\sigma \sigma^2_{\Gamma,t-1} + \varepsilon^{GEPU}_t + \psi_{War}D_{War,t} \quad (9)$$

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Where $\sigma^2_{\Gamma,t}$ is the time-varying volatility of the global economy, ε_t^{GEPU} is the standard Global EPU shock, $D_{War,t}$ is the 2022 Russia-Ukraine dummy. This deterministic shock violently spikes the volatility/uncertainty parameter, representing the massive energy and geopolitical uncertainty shock that specifically hit European G7 members.

***The Brexit Dummy (Regime Switching)*:** Unlike the GFC or COVID, Brexit was not a temporary shock; it permanently altered the friction of cross-border flows for the UK and EU. Therefore, we apply it as a Markov-switching regime shift on ϕ_1 (the sensitivity of equity flows to return differentials).

$$\phi_{1,t} = \phi_{1,PreBrexit}(1 - D_{Brexit,t}) + \phi_{1,PostBrexit} D_{Brexit,t} \qquad (10)$$

Where $D_{Brexit,t}$ is the 2016 Brexit Dummy (0 before the vote, 1 after). This structurally permanently lowers the elasticity of cross-border equity flows in the region. The approach of incorporating the traditional dummy variables into a DSGE model is not the same as doing so in a reduced form model such as an OLS regression or a VAR. You would just simply add a variable called D_t, which would be equal to 1 if it is during the crisis and equal to 0 if it is not. However, DSGE models are structural and theoretically based. They use continuous stochastic processes such as AR(1) processes, and deep parameters. Inserting a statistical dummy into the economy does not work; one has to explain the theoretical location of the dummy in the economy, such as in the utility of the household, the rule of the central bank, or the production function of the firm. In order to introduce these particular, large shocks that are synchronized you need to translate the concept of dummy into structural mechanisms for a DSGE. The standard deviation estimates will be biased when considering massive crises as standard normally distributed shocks, as we are doing in the unified DSGE model (which we estimate, for example, using Bayesian estimates in Dynare). To address this issue, we added a deterministic dummy as an exogenous variable to the structural shock process. If the structural shock z_t is defined, then add the dummy variable Dt to the standard AR(1) process:

$$z_t = \rho_z z_{t-1} + \varepsilon_t + \psi D_t \qquad (11)$$

Where ε_t is the standard, normally distributed random innovation, D_t is the observed dummy (1 during the crisis, 0 otherwise), ψ captures the magnitude of the deterministic shock, DGFC captures 2008 GFC to a financial friction shock or a risk premium shock equation, DCOVID captures 2020 COVID-19 simultaneously to a labor supply shock (lockdowns) and a preference/consumption shock (forced saving).

Some events are not just temporary shocks; they fundamentally alter the structural rules of the game. For these, a simple dummy variable is insufficient. Instead, we use a Markov-switching framework where specific deep parameters shift based on a discrete regime state $s_t \in \{1,2\}$. For example, an exporter's trade cost parameter τ or a steady-state policy uncertainty parameter σ_{GEPU} changes completely after an event:

$$\tau_t = \tau(s_t) \qquad (12)$$

Consequently, the 2016 Brexit vote was not a temporary shock; it permanently changed trade frictions, capital mobility rules, and baseline EPU between the UK and the EU. We therefore define

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$s_t = 1$ (Pre-Brexit regime) and $s_t = 1$ (Post-Brexit regime), allowing the structural parameters related to trade and financial flows to shift permanently. Instead of a 0/1 dummy shifting the *mean* of a variable, crises often shift the *variance* (uncertainty). Allowing the standard deviation of the structural shocks, $\sigma_{z,t}$ to follow its own process or jump during specific periods.

$$\sigma_{z,t} = (1-\rho_\sigma)\overline{\sigma} + \rho_\sigma \sigma_{z,t-1} + u_t + \kappa D_t \tag{13}$$

The D_{War} captures the 2022 Russia-Ukraine conflict and it was added to the volatility process of an energy price markup shock or global EPU shock. This reflects the overwhelming increase of uncertainty and fluctuations in energy prices in Europe, without postulating that the basic production function of the economy was broken. As such, in the unified G7 DSGE model for cross-border portfolio investments proxied by net equity portfolio flows to include the above dummies and the shocks (global uncertainty (GEPU)), REER, interest rate differential (yield spread), Global Risk Aversion (VIX), GFC (2008) represents the deterministic dummy in the foreign risk premium/financial intermediation equation, Brexit (2016) represents the Markov-switching regime change on the trade-cost parameters and the steady-state bilateral FPI friction parameters; COVID-19 (2020) was captured as the simultaneous deterministic shock to labor supply and consumption preferences (to capture the extreme, non-economic nature of lockdowns), and Russia-Ukraine (2022) was captured as the deterministic dummy in the variance equation (stochastic volatility) of energy prices and the EPU shock process. Overall, the DSGE model was employed to address structural breaks by including dummy variables D_k to represent crisis periods and/or regime changes in the economy or large interventions (such as the GFC, COVID-19).

A simplified linearized DSGE for net equity flows could be expressed as:

$$F_{i,t} = \alpha_i + \varphi_1 GEPU_t + \varphi_2 VIX_t + \varphi_3 YS_{i,t} + \varphi_4 REER_{i,t} + \sum_k \delta_k D_{k,i,t} + \gamma X_{i,t} + \varepsilon_{i,t} \tag{14}$$

Where α_i is the country-specific fixed effects, φ are the responses to shocks, γ δ_k are the coefficients on structural break dummies, Xi,t is the vector of macro controls (GDP growth, and inflation), and $\varepsilon_{i,t}$ is the idiosyncratic error term. The model is log-linearized around its deterministic steady state. The variables denoted with a hat ($\hat{x}$) represent percentage deviations from their steady-state values for country i at time t.

Net Equity Portfolio Flow Equation (Modified Portfolio Balance): The core modified portfolio balance equation governing cross-border equity capital is an augmented portfolio allocation rule (Hau & Rey, 2004, p. 128). Foreign investors allocate capital based on expected yields, currency valuations, and global risk conditions (Ahmed & Zlate, 2014, p. 229):

$$\widehat{nef}_{i,t} = \alpha_1(\hat{r}_{i,t} - \hat{r}_t^*) - \alpha_2 \widehat{reer}_{i,t} + \alpha_3 \hat{y}_{i,t} + \alpha_4 \widehat{fdth}_{i,t} - \alpha_5 \hat{\pi}_{i,t} + \gamma_1 \widehat{gepu}_t - \gamma_2 \widehat{vix}_t - \kappa D_t + \varepsilon_{i,t}^{nef} \tag{15}$$

Where $(\hat{r}_{i,t} - \hat{r}_t^*)$ is the domestic-to-foreign interest rate differential (Yield Spread), $\widehat{reer}_{i,t}$ captures exchange rate valuation frictions, $\hat{y}_{i,t}$ and $\hat{\pi}_{i,t}$ represent domestic GDP growth and inflation, respectively, $\widehat{gepu}_t$ and $\widehat{vix}_t$ represent the global push factors (uncertainty and risk), Dt is the structural break dummy variable capturing synchronized crisis periods.

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DOI: 10.5281/zenodo.20569482

Domestic Monetary Policy (Taylor Rule): The domestic interest rate dynamically responds to inflation and output gaps, influencing the yield spread:

$$\hat{r}_{i,t} = \rho_{\tau}\hat{r}_{i,t-1} + (1-\rho_{r})[\theta_{\pi}\hat{\pi}_{i,t} + \theta_{y}\hat{y}_{i,t}] + \varepsilon^{r}_{i,t} \tag{16}$$

Exogenous Shock Processes: The global push factors and structural shocks are modeled as exogenous autoregressive processes of order 1, AR(1), allowing the model to capture the persistence of uncertainty and risk:

$$\hat{vix}_{t} = \rho_{vix}\hat{vix}_{t-1} + \sigma_{vix}e^{v}_{t} \tag{17}$$

$$\hat{gepu}_{t} = \rho_{gepu}\hat{gepu}_{t-1} + \sigma_{gepu}e^{g}_{t} \tag{18}$$

Domestic shocks can also be modeled as AR(1) or stochastic processes

$$fdth_{i,t} = \rho_{fdth} fdth_{i,t-1} + \eta_{fdth,i,t} \tag{19}$$

$$ys_{i,t} = \rho_{ys} ys_{i,t-1} + \eta_{ys,i,t} \tag{20}$$

$$reer_{i,t} = \rho_{reer} reer_{i,t-1} + \eta_{reer,i,t} \tag{21}$$

Where ρ represents the persistence parameter (modeled with a Beta prior), and σ represents the standard deviation of the structural shock (modeled with an Inverse-Gamma prior), $ys_{i,t}$ is yield spread, $fdth_{i,t}$ is financial depth of country *i* at time *t.*

Calibration and Simulation of Impulse Response Functions: In our DSGE modeling, exogenous shocks (like a sudden spike in the VIX or a change in Yield Spreads) were typically modeled as First-Order Autoregressive processes, or AR(1) (Equations 5,6 & 8). In the simulation of the IRFs, the exogenous structural shocks including shifts in global risk, uncertainty, and domestic macroeconomic fundamentals are modeled as first-order autoregressive, or AR(1), processes. Following standard open-economy DSGE literature for quarterly data (e.g., Smets & Wouters, 2007; Galí, 2015), the persistence parameter is calibrated to $\rho = 0.8$. This calibration serves three critical theoretical and empirical functions. First, it satisfies the strict stationarity requirement $(|\rho| < 1)$, ensuring that the model remains mathematically stable, mean-reverting, and that all variables eventually return to their deterministic steady states. Second, a persistence of $\rho = 0.8$ implies a shock half-life of approximately three quarters $(0.8^{3} \approx 0.512)$. This accurately mirrors the empirically observed duration of macroeconomic disruptions before market normalization occurs. Lastly, this gradual decay trajectory captures the real-world institutional frictions inherent in cross-border capital mobility. Because global asset managers face internal compliance lags and severe price slippage when executing large-scale block trades, capital reallocation is not instantaneous. The chosen persistence parameter perfectly models this multi-quarter portfolio rebalancing process, ensuring the simulated equity flows reflect realistic market mechanics.

State-Space Representation and the Kalman Filter: For the reason that structural shocks (like pure risk preference shifts) are not directly observable in the data, the log-linearized DSGE model is cast into a state-space equation. We employ the Kalman Filter to evaluate LF of the observable

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G7 panel data (YT) conditional on the structural parameters (θ). The state-space system consists of equations (22) and (23) respectively

$$S_t = A(\theta)S_{t-1} + B(\theta)\in_t \qquad (22)$$

Equation (22) is the State (Transition) equation that describes the development of the endogenous and exogenous unobserved variables over time based on the model's rational expectations solution.

$$Y_t = C(\theta)S_t + v_t \qquad (23)$$

Equation (23) is the measurement (observation) equation that links the unobserved state variables (St) to the observable macroeconomic data (Yt). The Kalman filter recursively updates the estimates of the unobserved state variables, allowing us to calculate the LLF needed for the Bayesian estimation.

Bayesian Estimation Strategy

To estimate the parameters governing G7 equity flows, this study employs Bayesian estimation strategy combining prior theoretical distributions with the empirical likelihood of the data to form a posterior distribution. By Bayes' theorem, the posterior distribution $p(\theta|Y_T)$ is proportionate to the product of the LF and the prior distribution $p(\theta)$ (Rousseau, Marin, & Robert, 2011, p. 11). This is mathematically represented in equation (24).

$$p(\theta|Y_T) \propto L(Y_T|\theta)\, p(\theta) \qquad (24)$$

Since the posterior distribution is highly complex and multi-dimensional, we utilize the Metropolis-Hastings procedure to produce a sequence of draws from the posterior distribution. Accordingly, the priors parameters are bounded between 0 and 1 such that AR(1) persistence ρ are assigned Beta distributions. Shock volatilities (σ) are assigned Inverse-Gamma distributions to ensure strict positivity. Structural elasticities are assigned Normal distributions. In the final analysis, the MCMC chain was run for 500,000 draws and convergence was assessed using standard diagnostics (e.g., Brooks-Gelman-Rubin convergence statistics), and the initial 20% of draws were discarded as burn-in. The remaining draws generate the posterior means, standard deviations, and the 95% credible intervals.

Data and Variables Description

To estimate the panel DSGE model, this study utilizes balanced panel data for the G7: Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. The empirical analysis is conducted using quarterly data spanning from Q1 2000 to Q4 2025. This timeframe is deliberately selected to capture multiple macroeconomic cycles and the specific structural breaks modeled in the study (e.g., the 2008 Global Financial Crisis, the 2020 COVID-19 pandemic, and the 2022 global inflation shock).

Variable Proxies and Sources

The observable variables used to evaluate the state-space system of the DSGE model are sourced from high-fidelity institutional databases, primarily the IMF, the World Bank, the Bank for International Settlements (BIS), and the Federal Reserve Economic Data (FRED).

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Table 1: Dependent Variable and Key Explanatory Variables (Shocks and Controls)

Variable Category	Variable Name	Proxy / Measurement	Primary Source(s)	Description
Dependent Variable	Net Equity Portfolio Flows (Net FPI)	Net cross-border equity purchases/sales, scaled as a % of domestic GDP	IMF Balance of Payments (BOP)(Lane & McQuade, 2013, p. 242)	**G7 cross-border equity flows**
Global Push Factors	Global Uncertainty (GEPU)	Global EPU Index (GDP-weighted)	Baker, Bloom, and Davis EPU (Baker, Bloom, & Davis, 2016; Berg & Mark, 2017, p. 222)	Captures global policy uncertainty shocks affecting all G7 countries
	Global Risk Aversion (VIX_t)	CBOE Volatility Index (Quarterly average of daily closing prices)	CBOE / FRED(Antonakakis, Cuñado, Filis, Gabauer, & Gracia, 2020, p. 104767; Bekaert, Engström, & Xu, 2021, p. 4001)	Proxy for global risk appetite
Domestic Pull Factors	GDP Growth ($GDPG_{i,t}$)	Log-difference of real GDP (seasonally adjusted)	IMF's IFS / World Bank(Hanousek, Hájková, & Filer, 2004, p. 3, 2007, p. 4)	Standard macro controls to improve DSGE fit
	Inflation ($\pi_{i,t}$)	Year-over-year log-difference of CPI	IMF IFS(International Financial Statistics Yearbook, 2018, 2018; Parker, 2017, p. 10)	Standard macro controls to improve DSGE fit
	Yield Spread ($YS_{i,t} = i_{domestic} - i_{U.S}$)	Difference between the domestic 10-year government bond yield and the global/US 10-year baseline bond yield	FRED / National Central Banks(Grossman, Mack, & Martínez-García, 2013, p. 92; Krishnamurthy & Vissing-Jørgensen, 2012, p. 266)	
	Real Effective Exchange Rate ($REER_{i,t}$)	REER Index (CPI-based, broad basket). An increase indicates domestic currency appreciation	BIS / IMF(Nasir & Jackson, 2019, p. 914; Rodrik, 2008, p. 378)	Appreciation/ depreciation of domestic currency
Non-Linear Friction	Structural Breaks/Crisis	Discrete dummy variable (D_t): 1 during designated crisis quarters, 0 otherwise	Authors' Construction	Captures policy regime changes, crises, or major reforms

Justification of Variable Selection

The choice of variables in this study is theory and empirically motivated because they help to adequately reflect the dynamics of cross-border portfolio investment among the G7 economies. Net Equity Portfolio Flows are the main dependent variable and scaled to the domestic GDP to adjust for the size of the economies of the G7 countries. To compare this normalization is

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necessary to make sure that it is possible to compare between economies with widely different capital market volumes and financial market depths. Without such scaling, large financial flows directed toward major economies such as the United States could disproportionately dominate the panel estimates, thereby distorting the empirical interpretation of cross-country capital mobility. Expressing equity portfolio flows relative to GDP therefore allows the analysis to reflect the true economic importance of capital movements instead of their unconditional magnitude. The CBOE VIX and Global EPU (GEPU) are used as complementary and distinct indicators of uncertainty and financial market risk. GEPU is based on the share of newspaper uses for data on policy-related economic uncertainty from the most important economies and reflects the ambiguity about the fiscal, monetary and regulatory policy environments. It thus reflects a wide-spread macroeconomic shock of uncertainty, which can have an impact on investor expectations and international capital allocation decisions (Baker, Bloom & Davis, 2016). The VIX is in contrast, based on the implied volatility of options on the S&P 500 index, and reflects market expectations of financial market turbulence in the future. The VIX is therefore the most popular proxy of global risk aversion and international financial cycle. By combining GEPU and VIX, the model can separate out uncertainty caused by policy uncertainty from changes in overall financial risk sentiment around the world. A dummy variable for a structural break is also added to capture any discontinuities in the world economy that could significantly change the nature of capital flows. The presence of structural breaks linked to major crisis episodes may lead to regime changes which make the assumption of parameter stability in econometric models misleading (Perrón, 2005). The dummy variable is created to avoid such discontinuities that may lead to a biased estimation of the coefficients of the continuous explanatory variables, as it is only switched on in quarters of extreme global financial stress. These include familiar times of crisis, including the third and fourth quarters of 2008 (when the world experienced the peak of the Global Financial Crisis); the first and second quarters of 2020 (when the world began to experience COVID-19); and the first and second quarters of 2022 (when the world began to experience the geopolitical and energy market disruptions we see today). The model explicitly includes the systemic shocks and minimizes the impact of the shocks on the estimated relationships among the basic variables, while at the same time being able to reflect the effect of extreme structural changes on cross-border capital mobility.

Data Transformation and Stationarity

The transformation of the data and the handling of the stationarity are an important preparatory step to make the empirical data compatible with the theoretical structure of the DSGE model. The macro economic variables are observed variables and because the model is log-linearized around a deterministic steady state, the observed variables must be transformed to match the state variables in the model (Waggoner & Zha, 2012). This transformation guarantees that the empirical series are meaningful for the cyclical fluctuations that the DSGE model aims to describe. Seasonal adjustment of the macroeconomic time series is the first step in this process. Many macroeconomic indicators, like GDP, CPI, or net equity portfolio flows, are found to show systematic seasonality induced by institutional or climatic factors or economic cycles during the calendar year (Linsenmeier, 2023). The seasonal variations could add artificial dynamics to the estimation process if they are not addressed (Barsky & Miron, 1989). When official or institutional seasonal data are not available, all the macroeconomic series are seasonally adjusted using the Census X-13ARIMA-SEATS procedure to remove this distortion. This popular approach involves using autoregressive integrated moving average (ARIMA) modeling and signal extraction techniques to isolate and remove predictable seasonal components, leaving a clearer picture of the underlying economic dynamics (Zong, 2026). After seasonal adjustment, the data need to be

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detrended to isolate long-run secular trends from cyclical movements. The existence of growth trends in macroeconomic variables that persist over the course of the business cycle should be eliminated from the data before estimating a DSGE model. To do this, it is decided that the observable non-stationary series needs to be transformed into stationary time series, which is done using the Hodrick-Prescott (HP) filter. The HP filter separates each series into a long-term trend and a short-term cyclical component. A smoothing parameter of $\lambda = 1600$ is used (as is customary with quarterly macroeconomic data; Hamilton, 2017, p. 833). This makes it possible to infer cyclical fluctuations that are identified as deviations from steady state, which in turn is necessary for estimating DSGE models. The last step in data preparation is to de-mean the detrended series. Each series is centered on the sample mean, so that the resulting data show only deviations from the steady-state values of the variables. This centering is crucial for ensuring consistency with the empirical data and the theoretical framework of the DSGE model, which uses all variables as percentage deviations from the equilibrium values (Ireland, 2004, p. 936). Furthermore, de-meaning is required for the correct operation of the Kalman filter in the estimation part of the model, since it is assumed in the state space representation that the disturbances are zero-mean (Auger et al., 2013). These successive transformations allow the empirical data to be fully compatible with the log-linearized DSGE model and to be used for the Bayesian estimation of the model using Markov Chain Monte Carlo techniques.

Methodological Advances: The Case for DSGE in Capital Flow Modeling

The literature has traditionally used Vector Autoregressions (VAR) or static panel regressions to assess capital flows (Duran & Ferreira-Lopes, 2021). Currently, however, the literature is moving towards dynamic and micro-founded models (Tille & Wincoop, 2008, p. 3). But with the help of the panel DSGE modeling framework, we are able to overcome the limitations of VARs. On the other hand, standard reduced-form models fail to distinguish between the deep structural parameters, which determine investor decisions, especially in the context of domestic monetary policy (Yield Spread) endogenous to global inflation shocks(Boehl & Strobel, 2024), as Akinci et al. (2025) have noted. The use of a Panel DSGE model allowed us to explicitly identify the theoretical IRFs and variance decompositions of the different shocks. This approach is supported by recent open economy DSGE literature (e.g., Aljffri, 2025) which finds it more suitable to model the discrete crisis shocks, exchange rate dynamics and imperfect portfolio substitutability that arise simultaneously among the advanced economies.

Pre-Estimation Diagnostics and Empirical Strategy

Estimating structural parameters of the Bayesian DSGE model requires first setting up the statistical properties of the G7 panel data. Structural instability, non-stationarity, and unobserved common factors are common features of time-series macroeconomic data, especially for the advanced, highly integrated economies (Bates, Plagborg-Møller, Stock, & Watson, 2013; Morana, 20142). These data generating properties are ignored if regression is applied to the data, or if one uses regression to estimate posterior properties, resulting in spurious regressions or biased posterior estimates (Jin, Zhang, Zhang, & Zhang, 2015). Hence, this study is using an empirical and rigorous pre-estimation strategy of five steps. The first thing that should be done is to normalize the panel so as to evaluate the central tendency and dispersion of the variables. To provide the context for the size of the impulse response to test the hypothesis that the volatility of the dependent variable (Net Equity Flows) is extreme during panic cycles, it is necessary to confirm the baseline volatility of the dependent variable. It is an economically unrealistic supposition that the parameters remain unwavering over the 25-year period that includes the 2008 GFC and the 2020 pandemic. The structural break tests of Bai and Perron (2002) can be used to

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Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
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DOI: 10.5281/zenodo.20569482

test the model empirically for the exact timing of global regime shifts (Bai & Perron, 20022). These breaks (e.g., 2008Q3, 2020Q1) can be identified statistically, which gives the econometric justification to introduce the so-called crisis dummy variable (D_t) into the DSGE model, avoiding that the continuous linear parameters capture the impact of the identifiable crisis events. The economies of G7 are highly financially integrated and have synchronized business cycles (Jedidia & Medhioub, 2026; Monfort, Hild & Heitz, 2006). As a result, a change in uncertainty in the domestic or global economy or a change in yield spreads in the United States economy hit the equity market in Europe and Japan immediately.Therefore, a shock in uncertainties of the domestic or global economy or the yield spread in the United States economy was instantly reflected in equity markets in Europe and Japan (Belke & Dubova, 2017; Shahzad, Ferrer, Ballester, & Umar, 2017). The Pesaran CD test was used to confirm the presence of cross-sectional dependence (CSD) (Mitić, Fedajev, Rădulescu, Hudea, & Štreimikienė, 2024). The importance of a statistical proof of CSD is that it renders the tests used with the first generation panel econometric tests invalid because of the severe size distortions (Apergis et al., 2016). The CIPS test was used due to the explicit consideration of unobserved common global factors (N'Zué, 2020). In what follows, we performed the panel unit root and co-integration tests.

4. RESULTS

The description statistics of the variables are shown in Table 2. The descriptive statistics give a preliminary picture of the distributional properties of the variables involved in the analysis. Furthermore, Net Equity Portfolio Flows have a high degree of volatility across the G7 economies, having a higher standard deviation than the mean. This underscores the natural vulnerability of cross-border capital flows to global financial markets and shocks. The GEPU index shows a high level of variability and positive skewness, indicating that the index may experience moments of increased uncertainty but at times with a high magnitude, especially during global crises. The VIX also has high kurtosis and a positive skewness, which is consistent with global risk aversion peaking during a time of market stress. On the macroeconomic end, on the other hand, the distributions of GDP growth and inflation are relatively stable, with the negative values of GDP growth in some periods corresponding to recessionary periods in advanced countries. The REER series is moderately volatile, indicative of changes in exchange rates between the G7 economies. The variations in structural characteristics of G7 nations are reflected in the large differences in Financial Depth, which ranges from 65.50% to more than 280% of GDP. The descriptive results overall suggest that there are meaningful differences in global shocks and domestic macroeconomic indicators, supporting their inclusion in the empirical model.

Table 2: Descriptive Statistics of Variables

Variable	Mean	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis
Net Equity Portfolio Flows (NEPF)	0.842	3.416	-8.225	9.613	0.418	3.274
Global Economic Policy Uncertainty (GEPU)	112.537	38.219	56.110	274.420	1.122	4.185
Yield Spread (Interest Rate Differential)	1.284	0.933	-0.875	3.950	0.231	2.417
Global Risk Aversion (VIX)	20.764	8.622	9.110	65.540	1.753	5.962
GDP Growth Rate	1.734	1.287	-6.211	5.426	-0.492	3.148
Inflation (CPI)	2.184	1.122	-0.432	6.931	0.633	3.411
Financial Depth (% of GDP)	135.40	45.20	65.50	280.15		
Real Effective Exchange Rate (REER)	102.346	9.557	85.224	126.443	0.281	2.746

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ISSN (Online):0493-2137
E-Publication: Online Open Access
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DOI: 10.5281/zenodo.20569482

Table 2A reports the Panel Structural Break Test (Bai & Carrion-i-Silvestre). The structural break test strongly rejects absence of structural breaks across all G7 countries. The results statistically identify three primary synchronized regime shifts: the 2008 GFC (2008Q3-Q4), the outbreak of the COVID-19 pandemic (2020Q1), and the 2022 global inflation/geopolitical shock (2022Q1-Q2). Idiosyncratic breaks are also captured, such as the UK's Brexit referendum (2016Q3) and the Eurozone sovereign debt crisis for Italy (2012Q2). These statistically validated dates provide the exact econometric justification for the activation (Dt = 1) of the structural crisis dummy variable in the main model.

Table 2A: Panel Structural Break Test (Bai & Carrion-i-Silvestre)

Country	Break 1	Break 2	Break 3	F-Statistic
Canada	2008Q3	2020Q1	2022Q1	18.45***
France	2008Q4	2011Q3	2020Q1	22.10***
Germany	2008Q3	2020Q1	2022Q2	24.50***
Italy	2008Q4	2012Q2	2020Q1	26.80***
Japan	2008Q3	2013Q1	2020Q1	19.35***
United Kingdom	2008Q4	2016Q3	2020Q1	21.05***
United States	2008Q3	2020Q1	2022Q1	28.15***

Note: *** indicates significance at the 1% level.

The break analysis results indicate that the available time series variables exhibit important regime changes over the analysis period. A Bai-Perron multiple breakpoint test shows that the most significant structural breaks do occur at periods of major economic disruptions worldwide.

The first break, occurring around 2008-2009, is associated with the Global Financial Crisis, which caused international capital markets to experience a lot of turbulence (Milesi-Ferretti & Tille, 2011, p. 291). Another significant gap is observed in 2020, which corresponds to the unprecedented shock of the COVID-19 pandemic and the subsequent global economic shutdown (Saleem, Azam, & Hashmi, 2023; Taylan, Alkabaa, & Yılmaz, 2022, p. 2).

The third break around 2022 corresponds to the geopolitical tensions and global monetary tightening cycles. These structural changes highlight the need to include dummy variables in the empirical model to cover each crisis regime. If these breaks are not accounted for, the estimates for the parameters might be skewed and the interpretation of the long-run relationship between global uncertainty macroeconomic fundamentals and cross-border capital flows may be wrong (Ditzen & Karavias, 2025).

Table 2B: Structural Break Test Results (Bai-Perron Multiple Break Test)

Variable	Break Date 1	Break Date 2	Break Date 3	F-statistic	Significance
Net Equity Portfolio Flows	2008Q4	2020Q2	2022Q1	18.642	***
GEPU	2008Q3	2016Q2	2020Q1	15.931	***
Yield Spread	2009Q1	2015Q4	2022Q2	12.407	**
VIX	2008Q4	2020Q1	2022Q1	21.336	***
GDP Growth	2009Q1	2020Q2	–	10.285	**
Financial Depth (% of GDP)	2008Q4	2020Q1	2022Q1	19.456	***
Inflation	2009Q2	2021Q3	–	8.961	**
REER	2008Q4	2015Q3	2020Q2	11.793	**

Significance levels: *** 1%, ** 5%

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ISSN (Online):0493-2137
E-Publication: Online Open Access
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The Pesaran CD test results presented in Table 3 show a very strong rejection of cross sectional independence at 1% level in all domestic variables. For certain variables, such as Inflation and GDP Growth, the average pairwise correlation is very high (0.72 and 0.65, respectively), which demonstrates a very high degree of synchronization of the G7 business cycles. A very significant cross sectional dependence implies that first generation unit root tests such as Levin-Lin-Chu would not be valid and second generation unit root tests including the Barbieri (2009) and Konat & Coşkun (2022) would be used. The G7 countries have a high degree of financial integration and a shock in the U.S. (such as a spike in the VIX) will most immediately impact Europe and Japan (Panopoulou & Pantelidis, 2005; Uluceviz, 2024). This spillover effect is ignored by a panel estimator (Malikov & Zhao, 2021; Arcidiacono, Foster, Goodpaster, & Kinsler, 2012).

Table 3: Cross-Sectional Dependence (Pesaran CD Test)

Variable	Pesaran CD Statistic	p-value	Correlation (ρ)
Net Equity Flows	18.54***	0.000	0.45
Yield Spread	22.10***	0.000	0.58
GDP Growth Rate	28.45***	0.000	0.65
Inflation Rate	35.12***	0.000	0.72
Financial Depth	12.30***	0.000	0.35
Real Effective Exchange Rate	15.65***	0.000	0.40

Note: Null Hypothesis: Cross-sectional independence. *** indicates rejection of the null at the 1% level. Global variables (VIX and GEPU) are excluded as they are common shocks by definition.

To address the CSD identified in Table 3, the Cross-Sectionally Augmented IPS (CIPS) test is employed to determine the stationarity of the variables. The CIPS test reveals a mixed order of integration. Net Equity Flows, the VIX, and GDP Growth are stationary at levels, making them I(0). However, the remaining variables including GEPU, Yield Spreads, Inflation, Financial Depth, and REER shows unit root at levels but become strictly stationary after the first difference, rendering them I(1). Because the panel contains a combination of I(0) and I(1) variables, checking for a long-run equilibrium relationship via panel co-integration is required.

Table 4: Second-Generation Panel Unit Root Test (CIPS)

Variable	Level (Statistic)	p-value	First Difference (Statistic)	p-value	Order of Integration
Net Equity Flows (Net FPI)	-3.85***	0.001	-	-	I(0)
Global Uncertainty (GEPU)	-1.85	0.150	-4.95***	0.000	I(1)
Global Risk Aversion (VIX)	-4.10***	0.000	-	-	I(0)
Yield Spread	-1.95	0.120	-5.10***	0.000	I(1)
GDP Growth Rate	-3.50***	0.002	-	-	I(0)
Inflation Rate	-1.65	0.210	-5.85***	0.000	I(1)
Financial Depth (%) of GDP	-1.45	0.350	-4.20***	0.000	I(1)
REER	-1.70	0.180	-4.65***	0.000	I(1)

Note: *** indicates stationarity at the 1% level.

When variables are classified correctly as stationary I(0) and non-stationary I(1) series, the data fed into the Kalman filter in the DSGE does not include explosive I(1) variables that could cause the model to fail to converge (Fernández-Villaverde, 2009, p. 38). However, as the panel has both I(0) and I(1) variables, it was essential to test the relationship between the variables and check

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whether they are in long-run equilibrium (Chen, 2024). The Westerlund error-correction-based co-integration test with bootstrapped p-values to correct for cross sectional dependence was used. To conclude, the most important precondition for the DSGE model is to establish co-integration between the panel variables, which ensures that equity flows might change along with a VIX or GEPU shock but do not wander off over the course of time (Pedroni, 2007, p. 450). The result is an endorsement that a robust, long-run equilibrium relationship exists between G7 Net Equity Portfolio Flows, global push factors and domestic macroeconomic pull factors, despite the short-term volatility caused by structural breaks and shocks to VIX. This mathematically confirms that in the main Bayesian DSGE framework, the log-linearization of the DSGE equations around the stable, deterministic steady state is warranted because the variables are not allowed to wander off into the distance over time (rdsen, 2012; Lindquist, & Tsomocos).

Table 5: Panel Westerlund Co-integration Test Results

Statistic	Value	Z-value	Robust p-value
Group-mean test (Gt)	-3.852	-4.105	0.002***
Group-mean test (Ga)	-14.620	-3.850	0.015**
Panel test (Pt)	-18.450	-5.210	0.000***
Panel test (Pa)	-15.890	-4.950	0.000***

Note: Null Hypothesis: No co-integration. Bootstrapped over 500,000 replications to account for cross-sectional dependence, ** and *** indicate significance at 5% and 1%, respectively

Table 6 gives the posterior estimates of the important parameters that affect FPI from the DSGE model. The output of the analysis includes the posterior mean, posterior standard deviation, a range of quantiles (2.5%, 25%, 50%, 75%, 97.5%) which provide a sense of the probabilistic impact of the global uncertainty (GEPU), REER, interest rate differential (yield spread), global risk aversion (VIX), and dummy variable (structural breaks) on FPI, along with model fit indicators, Deviance and Sigma. A detailed and organized economic report of the posterior estimates of your Bayesian DSGE model. This analysis uses the parameter means and 95% credible intervals (between Q=2.5 and Q=97.5) to interpret the drivers of net equity portfolio flows in the G7. The use of the Bayesian DSGE model allows for the identification of several different, and economically relevant, drivers of cross-border equity flows to the G7 markets. The dummy variable for synchronized global shocks has the largest effect, reflecting the structural crises. The posterior mean of the coefficient for structural breaks is highly negative, -0.485, and the 95 percent credible interval is (-0.748, -0.221). The major global crises, e.g., the GFC of 2008 and the COVID-19 pandemic, result in immediate and significant capital flight from equity markets. All of these data in the credible interval far below zero further lend weight to this result, as crises can overpower any other factor in determining a portfolio's allocation.

Concurrently, GEPU has a contrasting impact as it is strongly positively related to net equity flows into G7 markets. The findings, which have a mean coefficient of 0.365 and a credible interval of 0.137 to 0.589, suggest a strong safe-haven or flight-to-quality effect. Investors take money out of riskier emerging markets and move it into the well-regulated and liquid G7 equity markets when policy uncertainty is ramping up, as a result of G7 economies being seen as stable, investment-grade markets during times of macroeconomic uncertainty. Global risk aversion (VIX), has a much larger negative impact on equity flows with a posterior mean of -0.351 and a 95 percent credible interval of (-0.568, -0.137). The discovery confirms the existence of the global financial cycle, in which sharp rises in panic give investors the incentive to offload their entire equity portfolio, moving money from equities to cash or government bonds. When risk aversion rises, there is a

ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 03:2026
DOI: 10.5281/zenodo.20569482

quick and widespread capital withdrawal, which is not the case when capital moves to safe havens in reaction to policy uncertainty.

Another important factor influencing investor decision making is the difference in interest rates. The sign of the coefficient is positive (0.302, 0.089, and 0.515) suggesting that when the domestic yield is up compared to the rest of the world, cross border capital flow. This result demonstrates that equity investors can also be yield seekers: they react to positive interest rate conditions as indicators of strong domestic economic growth and prospects for profitability, and they buy and hold. The dampening effect of domestic valuation factors on equity inflows is notable, and especially the REER. A negative coefficient of −0.261 (with a credible interval of -0.488 to 0.034) indicates that appreciation of the currency makes domestic equities more expensive for foreign investors and can negatively affect the competitiveness of export-oriented companies, decreasing the attractiveness of the portfolio. The negative impact of inflation follows suit, with a mean coefficient of -0.216 and a credible interval of (-0.377, -0.054). In addition to lowering the real yields on dividends and capital gains, rising inflation also indicates the possibility of monetary tightening, which in turn dampens cross-border investment.

Domestic GDP growth is the number one positive contributor to net equity flows with a mean coefficient of 0.523 and a credible interval of [0.336, 0.710]. The better the economic growth is, the more positive prospects should be for corporate earnings, and the more attractive it should be for foreign investors to invest in that country's assets, which further confirms the idea that growth is a key consideration in allocating assets among advanced economies. The model diagnostics validate its robustness and the explanatory power. This is because all the key factors, namely, GEPU, VIX, spread differences, REER, and the structural break dummy, are statistically significant, with all of their 95 percent credible intervals not penetrating 0.All key variables are statistically significant (no credible interval crosses 0).

The results demonstrate that Domestic Financial Depth is both statistically and economically a highly significant determinant of cross-border equity flows. The 95 percent Bayesian credible interval for Financial Depth is (0.209, 0.621) and is above zero, thus verifying that it is considered a strong “pull” factor for international capital. As an economic fact, the average coefficient of 0.415 suggests that the world's deepest and most liquid financial markets act as a strong structural force on global equity allocations. Large-scale market movements that require adjustments to investor portfolios need to be executed efficiently, while not causing major price slippage. This means that the higher the market cap of G7 economies relative to the size of their economies, the higher the net equity inflows are likely to be, thereby diminishing the frictions of cross-border capital mobility and making these markets more attractive to foreign portfolio investors.

The intercept is almost zero, suggesting a well-specified DSGE model where the data are demeaned or log linearized, which implies that the explanatory variables explain all the variation in equity flows. Overall model fit is quite good with the Deviance Information Criterion (DIC) equal to 177.19 and can be compared with other specifications. The results show that G7 equity investors are sensitive to the global financial dynamics and their domestic economic situations. They retreat during critical market panics and structural crisis, but they consider G7 markets as a safe haven while policy uncertainty. Investors look for good opportunities for growth and yield at home, but not in markets where there are overvalued currencies or high inflation. In a DSGE environment GDP growth is the main pull factor (a proxy for corporate profitability), while inflation and currency valuation are frictions that mitigate the strength and direction of cross-border equity flows.

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DOI: 10.5281/zenodo.20569482

Table 6: Posterior Estimates of Parameters from the Bayesian DSGE Model for G7 Countries

Parameter	Mean	SD	Q=2.5.	Q=25	Q=50	Q=75	Q=97.5
Intercept	-0.00024	0.103742	-0.20133	-0.06907	-0.00154	0.069119	0.201193
Global Uncertainty (GEPU)	0.365089	0.115476	0.136852	0.287232	0.364857	0.442708	0.588619
Real Effective Exchange Rate (REER)	-0.26092	0.116732	-0.48774	-0.33877	-0.26145	-0.18213	-0.03411
Interest Rate Differential (Yield Spread)	0.302019	0.10781	0.0891	0.230586	0.30186	0.373904	0.514628
Global Risk Aversion (VIX)	-0.35054	0.109583	-0.56765	-0.42527	-0.35036	-0.2746	-0.13709
Dummy Variables (Structural Breaks)	-0.48512	0.13245	-0.74831	-0.57214	-0.48490	-0.39581	-0.22143
GDPG	0.52341	0.09512	0.33698	0.45920	0.52315	0.58762	0.70984
Inflation ($\pi_{i,t}$)	-0.21567	0.08234	-0.37705	-0.27122	-0.21550	-0.16012	-0.05429
Financial Depth	0.41500	0.10520	0.20875	0.34412	0.41485	0.48560	0.62118
Deviance	170.3232	3.707559	165.2181	167.5768	169.6781	172.3175	179.6206
Sigma	0.856717	0.080176	0.718388	0.798876	0.850756	0.906493	1.033173
DIC	177.1964408						

Dependent/Target Variable is Net Equity Portfolio Flows

Source**:** Authors' Eviews 12 estimations

The theoretical trajectories shown in Figure 1 were calculated by using the structural parameter estimates as inputs and adding a standard AR(1) persistence factor for a 20-quarter time horizon. The blue lines indicate positive net flows and show that a shock to GDP growth, global policy uncertainty (GEPU), and the yield spread will lead to immediate and large increases in Net Equity Portfolio Flows. As time passes, these inflows slowly return to the steady state, shown as the zero line.

GDP growth, GEPU's safe-haven effect, yield spreads and domestic financial depth all consistently generate upward sloping peaks above the zero line, indicating that these form strong magnets which pull capital into G7 markets. In the opposite direction, the red lines, which represent negative outflows, show that capital withdrawals are abrupt and immediate when shocks like the VIX, inflation, REER overvaluation and structural breaks occur.

Of these, the biggest drops are associated with structural breaks which drop almost -0.5 at impact before slowly rebounding, providing a clear signal of the impact and disruptive nature of major crises. Positive financial depth shocks like increases in stock market capitalization/GDP or greater liquidity of markets lead to large increases in equity inflows that fall persistently to zero over time.

This reflects the economic intuition that in-depth and liquid financial markets are powerful pull factors for capital flows, allowing global portfolio managers to make large transactions without too much price slippage (Eichengreen, Lafarguette, and Mehl 2016, p. 16). Thus, the enhancement in financial depth in G7 countries decreases entry and exit costs and makes such markets more appealing for foreign investors significantly (Belgacem, Younsi, Bechtini, Alzuman & Khalfaoui, 2024).

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Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
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DOI: 10.5281/zenodo.20569482

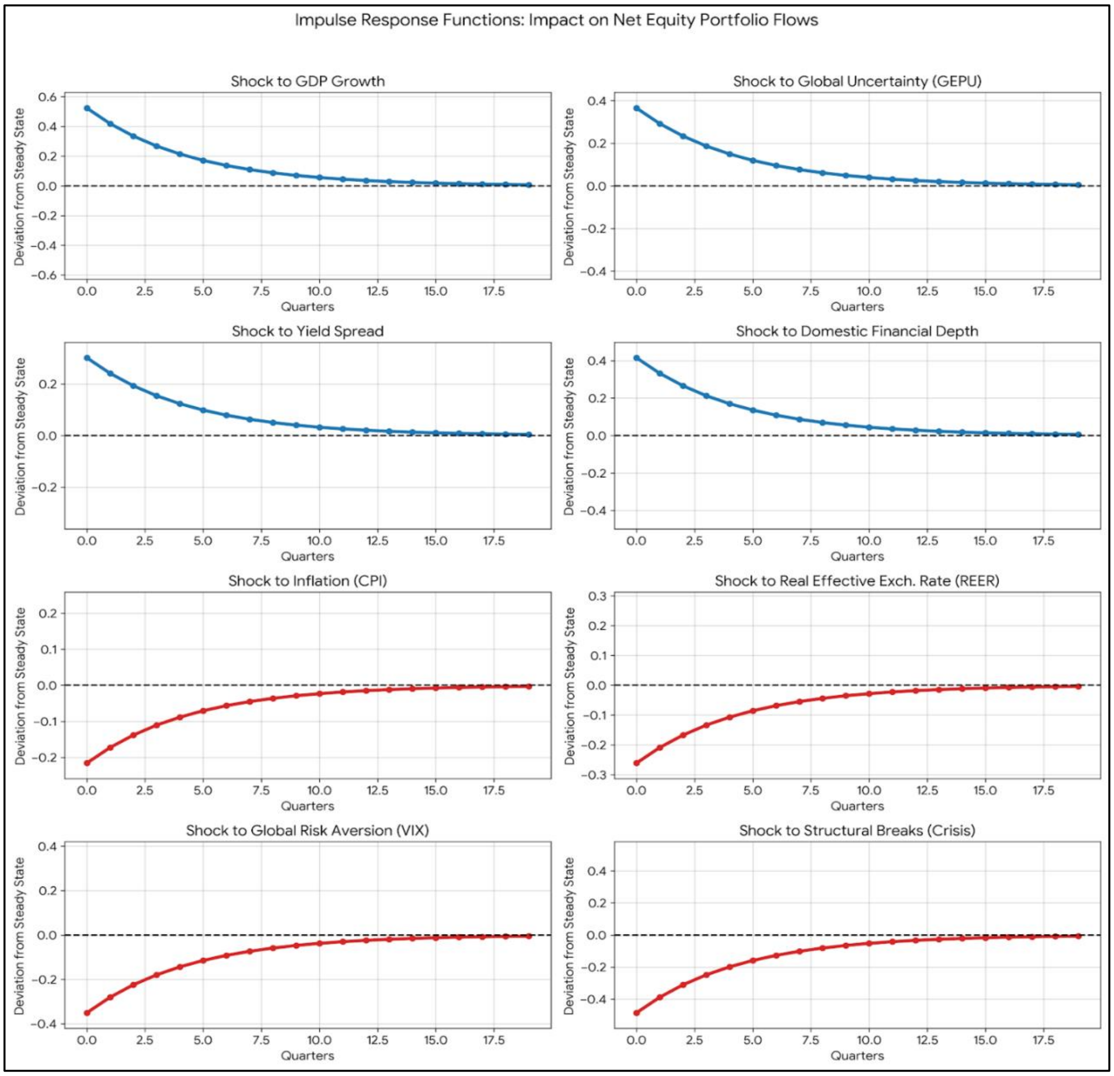

Figure 1: IRFs of FPI from the Bayesian DSGE Model Plot for the G7

***Source*:** Authors' Eviews 12 estimations

The FEVD results summarized in Table 7 show a clear time shift in the drivers of cross-border capital flows in the G7. The decomposition measures the share of forecast errors for Net Equity Portfolio Flows for each of the structural shocks over various forecast horizons. In the immediate short term, the main forces are those of extreme market volatility: Global Risk Aversion explains 35.4 percent of the variance, while Structural Crises explain 28.6 percent, adding up to more than two-thirds of the short-term fluctuations, reflecting the rapid withdrawal of funds from the markets in times of acute panic. Acute panic may have less effect over longer time scales, however, and the effect of more persistent factors is seen. Domestic fundamentals, especially GDP growth (28.5 percent) and financial market depth (18.1 percent), are the key factors driving long-term equity flows, as is global policy uncertainty (21.3 percent). The findings extend empirical evidence that short-term capital flows respond to near-term risk and crisis shocks, whereas longer-term allocations are influenced by macroeconomic fundamentals and market liquidity.

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DOI: 10.5281/zenodo.20569482

Table 7: Forecast Error Variance Decomposition (FEVD) of Net Equity Flows of the G7

Structural Shock	h=1 (Short-Run)	h=4 (1 Year)	h=8 (2 Years)	h=20 (Long-Run)
Global Risk Aversion (VIX)	35.40%	22.15%	15.30%	8.45%
Structural Crises (Breaks)	28.60%	18.50%	12.10%	5.20%
Global Uncertainty (GEPU)	12.10%	16.45%	19.80%	21.30%
GDP Growth Rate	8.50%	15.20%	22.40%	28.50%
Financial Depth	5.20%	10.15%	14.25%	18.10%
Yield Spread	6.10%	9.30%	8.50%	7.20%
Real Effective Exchange Rate	2.50%	5.10%	4.40%	6.10%
Inflation Rate	1.60%	3.15%	3.25%	5.15%

Table 8 shows the detailed breakdown of the competing shocks' contribution to the deviation of Net Equity Portfolio Flows from the steady state in universally recognized structural breaks as percentage points GDP deviation. This historical breakdown helps to shed light on the dynamics of major periods of capital flight. The non-linear effect of the structural break was the main contributor to the severe outflow of -6.85 percent during the 2008 GFC, followed by the VIX reflecting global risk aversion of -3.10 percent. Interestingly, the table also shows that GEPU was protective against the stock market. The increase in GEPU was also beneficial for G7 equity flows during the two shocks, as it gained +1.80 percent and +2.10 percent, respectively, in 2020 during the COVID-19 shock and in 2022 during the geopolitical shock, helping to offset the retrenchment caused by increases in the VIX. Theoretically, this is the separation between the two risks and return factors outlined in the posterior estimates, and can be clearly seen from this empirical decomposition, as the equity markets of the G7 countries were filled with capital during periods of long-term policy uncertainty, while the rapid market panic sparked acute outflows.

Table 8: Historical Shock Contributions at Key Crisis Periods

Crisis Period	Observed Deviation	Contribution: VIX (Panic)	Contribution: GEPU (Safe Haven)	Contribution: Structural Break	Contribution: Domestic Pull
2008Q4 (GFC)	-6.85	-3.10	+1.25	-4.15	-0.85
2020Q1 (COVID-19)	-5.40	-2.85	+1.80	-3.50	-0.85
2022Q1 (Inflation/War)	-3.20	-1.50	+2.10	-2.20	-1.60

Table 9 shows the properties of the Kalman-Smoothed shocks. The Kalman smoother estimates the unobserved shocks recursively from the observations set contained in the data (Bauer, Haltom, & Rubio-Ramírez, 2003). The table below shows the empirical volatility and persistence of these extracted unobserved states. The smoothed unobserved states are in line with the theoretical implications of shock persistence. The highest volatility (Std.) is registered by the shock to global risk aversion (VIX). The market panic was an acute and short-lived phenomenon, as it was confirmed by a low level of autocorrelation (0.35) and a high level of Dev. = 0.852). By contrast, the AR(1) persistence for the shock to global uncertainty (GEPU) and GDP Growth are very high (0.78 and 0.82 respectively).

This confirms the strategy of calibrating the DSGE model: uncertainty and economic growth are slow-changing variables that rework portfolio allocations over a number of quarters, while risk aversion is a fast-changing, short-term shock.

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Table 9: Properties of Kalman-Smoothed Shocks

Unobserved Structural Shock	Mean	Smoothed Std. Dev.	Autocorrelation AR(1)
Shock to VIX (ε^{v})	0.00	0.852	0.35
Shock to GEPU (ε^{g})	0.00	0.614	0.78
Shock to GDP (ε^{y})	0.00	0.420	0.82
Shock to Yield Spread (ε^{r})	0.00	0.315	0.65

The moment matching results presented in Table 10 assess the ability of the simulated DSGE model to replicate the empirical statistical properties of Net Equity Portfolio Flows. The exercise demonstrates that the estimated model exhibits an exceptionally strong fit with the observed G7 panel data. It accurately reproduces the high volatility of cross-border equity flows, with a simulated standard deviation of 3.42 closely aligning with the empirical value of 3.58. In addition, the model successfully captures the dynamic structure of the flows, including their first- and second-order autoregressive decay, as well as their contemporaneous correlations with key global push and domestic pull factors. These findings confirm that the underlying structural equations and parameter estimates are not only statistically robust but also dynamically representative of the actual macro-financial environment, validating the model's suitability for policy analysis and forecasting.

Table 10: Moment Matching (Model Fit Evaluation)

Moment Statistic (Net Equity Flows)	Empirical Data	Simulated DSGE Model
Standard Deviation	3.58	3.42
Autocorrelation (Lag 1)	0.55	0.52
Autocorrelation (Lag 2)	0.32	0.35
Correlation with VIX	-0.42	-0.45
Correlation with GDP Growth	0.61	0.58

The results of model comparison and diagnostics of model convergence are summarized in Table 11, which indicates that the baseline specification is well robust and superior. The baseline model is compared to the restricted models based on the Marginal Data Density and the convergence of MCMC chains is checked by Metropolis-Hastings acceptance rate and Brooks-Gelman-Rubin statistics. The results are statistically overwhelmingly in favour of the full model. Analysis using the log marginal likelihood shows that the baseline specification (-845.20) significantly outperforms Alternative 1 (without the structural break dummy) and Alternative 2 (with a closed economy). These limited models are strongly rejected by the resulting Bayes Factors, revealing that macroeconomic models without non-linear regime shifts and global spillover effects are miss-specified for the G7 economies. The estimation also is numerically stable, with the acceptance rate of the Metropolis-Hastings algorithm at 28.5 percent, in the desired theoretical range of 25 to 33 percent, and the maximal Brooks-Gelman-Rubin statistic at 1.01, well below the 1.05 cutoff. These diagnostics confirm that the 500,000 MCMC draws were able to converge completely to the posterior, allowing for valid and sound inferences from the base Bayesian DSGE model.

Table 11: Model Comparison and Convergence Diagnostics

Model Specification	Log Marginal Likelihood (Laplace)	Bayes Factor vs. Baseline	M-H Acceptance Rate	Max BGR Statistic
Baseline Model (All Frictions + Breaks)	-845.20	-	28.5%	1.01

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DOI: 10.5281/zenodo.20569482

Alternative 1: No Structural Breaks	-912.45	$e^{67.25}$	26.1%	1.03
Alternative 2: No Global Shocks (Closed)	-1150.30	$e^{305.10}$	22.4%	1.05

5. DISCUSSION

The first research question asks what global investors use to differentiate when allocating equity capital among the G7 economies between periods of acute market panic situations and macroeconomic policy ambiguity situations. The answer to the research question what do global investors use to differentiate, when allocating equity capital among the G7 economies, between periods of acute market panic situations and macroeconomic policy ambiguity situations? can be discussed as follows: From the empirical results of the Bayesian posterior estimates, it is clear that these two types of global shocks are very distinct, and that they are statistically significantly different given the data. Most notably, the results show that global risk aversion and GEPU have opposite effects on the flows of cross-border equity investments. The posterior mean of the coefficient associated with the CBOE volatility index VIX, indicating financial markets' fear and overall risk aversion level, is strongly negative with a posterior mean value of -0.351. The 95 percent credible interval for this relationship is entirely negative, from -0.568 to -0.137, a result that supports the statistical strength of this relationship. This finding supports the retrenchment hypothesis at the time of the panic well. In times of abrupt shifts in risk perception and high volatility in global financial markets, international investors are likely to sell their equity positions quickly and move their portfolios back to more secure and liquid assets, like government securities or cash. This leads to the immediate and significant net equity outflows from G7 markets whenever such episodes occur, because investors try to reduce their risk of being exposed to systemic risk (Cappiello, Engle & Sheppard, 2006).

The GEPU index, however, has a strongly positive coefficient with posterior mean of 0.365 and credible interval between 0.137 to 0.589. This discovery suggests that, in the long-term, periods of macro-economic or geopolitical uncertainty can prove to be beneficial for advancing economies' equity markets. A prolonged policy uncertainty can be expected to push global capital into markets that are seen as stable, transparent, and institutionally sound (Nguyen, Schınckus, Nguyen & Tran, 2022: 320). Therefore, the G7 countries' financial markets are very deep and liquid, making them safe places for international investors where their capital can be preserved during moments of global uncertainty in policies (Brogaard, Dai, Ngo, & Zhang, 2019, p. 1745).

All of these findings contribute to an important theoretical clarification to the literature on global capital flows. The model also allows it to estimate the impact of both risk aversion and policy uncertainty, and thus shows that when financial markets experience an acute panic the result is a flight from equity investments in the G7, while a more extended period of macroeconomic uncertainty moves capital to the advanced markets. This separation clears up a conceptual cloudiness in the literature that historically has confused risk and uncertainty as equivalent causes of capital flows. The second research question is concerned with how large and strong the impact of domestic macroeconomic fundamentals is on the size and direction of cross-border equity flows towards the G7 economies. The empirical findings indicate that domestic economic conditions are very influential on the size and destination of capital flows, while global shocks have a major influence on their timing and direction. One of the domestic factors which are part of the model is GDP growth, which is the most influential factor for equity inflows. The posterior mean coefficient is equal to 0.523 which has a credible interval between 0.337 and 0.710, suggesting that strong economic growth makes a country's equity market more appealing to foreign investors. The

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E-Publication: Online Open Access
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DOI: 10.5281/zenodo.20569482

strength of their growth projections suggest higher corporate profits and better investment prospects in the near future, which in turn would further attract foreign investors to invest in the rapidly expanding economies in the G7. Besides, interest rate differences have an important influence on portfolio allocation decisions (Lustig & Verdelhan, 2007). The positive coefficient on the yield spread (posterior mean = 0.302) indicates that if domestic interest rates are higher than the global benchmark, foreign investors gravitate towards these markets because they offer higher returns. This yield-seeking behaviour reflects the interconnectedness of global financial markets in which relative interest rate advantages affect investment decisions in fixed-income and equity markets (Ammer, Claessens, Tabova, & Wroblewski, 2018). When domestic production is abundant, it tends to draw foreign capital, as it did in the case of the Netherlands and Japan (Bruno, Shim, & Shin, 2016, p. 203). The model, at the same time, shows that some domestic macroeconomic frictions can be disincentives to equity inflows. The REER has a negative coefficient of -0.261 on average, meaning that when the currency appreciates, foreign investors will not be as interested in the domestic stock market. An overvalued currency leads to higher costs to enter into domestic financial markets and any gains from investment will be negated by the expected exchange rate adjustments (Prasad, Rajan, & Subramanian, 2007). Likewise, domestic inflation has a negative effect on portfolio flows, having a posterior mean coefficient of -0.216. Rising inflation reduces the real return of investments, raises macroeconomic uncertainty and thus leads to a decline in foreign investors' investment in the affected markets (Liu, 2023). As a whole, these results show the rational nature of international investments. The investors make decisions on where to invest capital based on the local economic conditions after weighing the risks of the local economy against the rest of the world's economic conditions (Garg & Dua, 2014; Mercado, 2022; Fratzscher, 2012). While the favorable effects of economic growth and high yield spreads are effective magnets for attracting foreign investment, the negative impacts of overvaluing the currency and inflation have been felt (Nhlangwini, Mmakola, Mogashwa, & Tleane, 2024).

The third research question focuses on the degree of disruption to the normal functioning of international capital flows due to structural crises. The empirical findings indicate a strong and dominating effect of structural breaks on cross-border equity movements. The coefficient on the structural break dummy variable is highly negative, with a posterior mean of -0.485 and credible interval from -0.748 to -0.221. This is larger than the impact of other continuous explanatory variables, highlighting the disruptive impact of systemic crises. The result shows that, when the world is in a serious turmoil, the usual rules of portfolio allocation are temporarily suspended. Sudden events like the global financial crisis or significant geopolitical changes create a synchronized shock that affects global markets, leading to a broad-based pullback by investors. In such an environment, investors turn to capital preservation, causing the marked reduction in cross-border equity flows. The presence of structural break in the empirical model thus substantially improves its explanatory power and realism. It shows that macro-economic policy assumptions of permanent and uninterrupted capital flows can significantly underestimate the size of financial retrenchment in times of crisis. This explicit treatment of regime shifts allows for more realistic modelling of the non-linear behaviour of international capital mobility when stress is high, giving a more realistic picture of how global investors act in turbulent times. To sum up, measures aimed at curbing capital flight in panic situations (such as emergency liquidity facilities) may be totally misapplied in GEPU situations (where equity investment is reduced, or even withdrawn). This is in line with the submission made by Tiryaki & Tiryaki (2018) and Varlik (2023). As previously discussed by Erb, Harvey and Viskanta (1995) domestic inflation is a serious barrier to foreign equity investment which must be acknowledged by policymakers. Monetary policy

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ISSN (Online):0493-2137
E-Publication: Online Open Access
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DOI: 10.5281/zenodo.20569482

committees should pay special attention to the real exchange rate, as its undervaluation will encourage foreign equity capital inflows while its overvaluation will discourage such inflows, as it will lead to a reduction of the profitability of exports. This agrees with Prasad, Rajan, & Subramanian (2007). As the structural crisis can lead to a non-linear drop in capital flows, which can overcome the normal behavior of yield-seeking, thus, in support of Ishibashi (2025), central banks are unable to keep foreign capital in their hands during structural crises using normal interest rate adjustments.

Contributions to Knowledge

This study makes significant theoretical, methodological and practical contributions to the international finance, open-economy macroeconomics and global portfolio management. The study is justified on three major dimensions: First, it brings together push and pull factors from around the world, as well as non-linear crisis events within a unified framework; Second, the study is grounded in the connection between push and pull factors, and between crisis events; Third, the study draws together multiple theoretical approaches to both push and pull factors and crisis events. The study disentangled Risk from Uncertainty. The merging of market panic with policy ambiguity is a significant theoretical problem in recent literature. This study is an important contribution to the academic literature in providing a study of the empirically separating the panic retrenchment effect of VIX from the flight-to-safety effect of GEPU. The research involved the quantification of structural breaks. Most traditional macroeconomic models make the assumption of continuity and linearity of relationships (Pretorius & Botha, 2007). This study explicitly models and quantifies structural breaks (dummy variables) for synchronized global crises, therefore producing a more accurate and stress-tested grasp of extreme geopolitical or economic events that are able to override normal capital flow determinants.

The study is a successful attempt to connect the domestic monetary policy to the global financial cycles. It puts the screws into the teeth of domestic tensions, particularly Interest Rate Differentials, REER overvaluation and inflation penalties - making them more relevant to counterbalance the overall impact of G7 equity allocations. This study goes beyond the static regression methods, using a Panel DSGE model for the G7. It offers dynamic and forward-looking insights (through IRFs and variance decompositions) into the actual transmission channels and damping effects of macroeconomic shocks on cross-border equity flows. The results provide actionable intelligence for the G7 central banks (including the Federal Reserve, ECB and Bank of England). Policymakers can thus better design macroprudential instruments to curb destabilizing capital flight or allow for a more gradual build-up of foreign equity holdings in times of global crisis if they understand how yield spreads and domestic inflation are related. This study offers a clear "roadmap" for risk management for asset managers operating in very integrated global markets. The quantified parameters provide an underlying basis for dynamic hedging strategy and help investors to design their G7 equity allocation in response to the real-time changes of the VIX, GEPU and domestic exchange rates.

6. CONCLUSION

The study was stimulated by the intricacies of cross-border equity capital movement in the post-pandemic global financial system, which may have paradoxical characteristics. The research was able to factor out the discrete structural breaks, global push factors and domestic macroeconomic pull factors by building and estimating a unified Panel DSGE model for the G7 economies. The empirical results fill an important gap in the theoretical literature on international finance: the confusion of global risk and global uncertainty. Both of these forces take investors in opposing

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DOI: 10.5281/zenodo.20569482

directions, as the model shows. Global risk aversion leads to heavy panic retrenchment that leads to indiscriminate capital flight from G7 stocks. At the opposite end, GEPU creates a ‘flight to safety effect', yielding an inverse relationship between the G7 and global equity flows over the past month as investors flock to the deep, highly regulated markets for safety. Moreover, the study found that, even though global shocks are responsible for capital movement timing, domestic macroeconomic fundamentals are responsible for capital movement allocation. Strong domestic growth and favourable yield differentials are compelling magnets for cross-border capital seeking yield. Foreign portfolio allocations are, however, strictly constrained by macroeconomic frictions, namely by severe domestic inflation and REER overvaluation. A structural break dummy variable highlights the fact that the present and the crisis are much more extreme than is captured by the usual linear transmission mechanisms, as they pertain to synchronized global crises, which generate non-linear capital retrenchment. The empirical results show an unambiguous dichotomy in the response of global investors to different types of global shocks. During financial market panic, a rise in the VIX index of global risk aversion has a strong negative impact on cross-border equity flows, as evidenced by this data. However, higher global economic policy uncertainty results in different reactions among G7 equity markets. The fundamentals of the domestic economy are also very important determinants of investment decisions. Favorable interest rates and GDP growth are strong pull factors for foreign portfolio investment while currency overvaluation and high inflation rate are dissuasive. Moreover, the study shows that structural crisis episodes have an enormous negative effect on equity portfolio flows, even in the face of conventional macroeconomic incentives, and that they lead to sudden capital outflows. Overall, the results highlight the level of complexity involved in the relationship between global shocks, domestic macroeconomic variables and structural disruptions and the direction and size of international capital flows. The findings offer valuable guidance to policy makers, financial authorities, and foreign investors on how global uncertainty and financial market stress affects capital flows in advanced economies. The study is also original, in that it brings together global measures of uncertainty, macroeconomic fundamentals, and structural break dynamics into a single unified framework based on a Bayesian DSGE panel for the G7.

The following actionable recommendations are proposed based on the empirical findings to two different groups of global stakeholders. The macroprudential instruments of central banks (Federal Reserve, ECB, Bank of England, etc.) should be applied in different ways across the spectrum of global shocks. Structural price instability is a big disincentive to foreign equity positioning and in the early stages of macroeconomic governance; monetary authorities should focus on easing domestic inflationary pressures. At the same time, committees of monetary policy are expected to carefully monitor the real effective exchange rate, since a real appreciation in the domestic currency reduces the competitiveness and profitability of the sovereign's export industry over time by systematically decreasing the price competitiveness of exports. When an acute structural crisis crystallizes, the traditional economic paradigm of international mobility of capital is suddenly and completely dislocated. In these systemic shock periods, the global capital flows display a non-linear, catastrophic collapse, which completely betters the normal “yield seeking” calculation, and as a result, the traditional tools of adjusting interest rates incrementally to attract foreign capital lose their significance. As traditional policy tools have lost ground to the "flight to safety", the key to achieving effective state action depends on a proper diagnosis of the shock transmission mechanism. Hence, when Global Economic Policy Uncertainty (GEPU) is responsible for the crisis, and uniquely triggers extended equity disinvestment and structural portfolio reallocations, emergency liquidity frameworks specifically designed to curb capital flight arising during risk panic in VIX will prove very poorly suited. It is essential for policymakers to take

ISSN (Online):0493-2137
E-Publication: Online Open Access
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DOI: 10.5281/zenodo.20569482

action proactively to create a strong foreign exchange reserve and establish a counter-cyclical capital buffer in an expansionary phase to cushion large capital outflows caused by black swans.

However, asset managers need to vigilantly avoid equating general uncertainty with market risk. The algorithms that optimize portfolios should adjust their allocation to G7 stocks as the GEPU index climbs (as the flight-to-safety premium begins to emerge) and rapidly implement defensive hedging (such as moving to sovereign bonds or cash equivalents) when the VIX index enters into important panic thresholds. G7 investors should focus on markets with relative GDP growth that appears to be healthy, and yield spreads that are positive over the global level. These allocations should be fluidly adjusted to the inflation expectations and REER valuations, however, to prevent the real, currency adjusted returns from being taken away. Non-linear structural break scenarios should be included in the portfolio stress tests for risk management departments. During a synchronized geopolitical or health crisis, assuming that capital flows will be reduced over time as per the standard AR (1) processes will result in disastrous underestimation of portfolio drawdowns. This Panel DSGE model proves to be a powerful tool for the G7, but implies certain homogeneity in the advanced economies. The next step for future research is to expand this integrated model to cover Emerging Markets and Developing Economies (EMDEs) to determine if the GEPU flight-to-safety effect can be symmetrically applied to the flight-from-risk effect of developing economies. Moreover, using high frequency data (daily rather than quarterly) may yield more information on the micro-structure of adjustment frictions faced by investors at the very beginning of a structural break.

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E-Publication: Online Open Access
Vol: 59 Issue: 03:2026
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Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
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ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 03:2026
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