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Dollar Dominance and International Spillovers of US Financial Shocks

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Contents

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This paper investigates how the global dominance of the US dollar amplifies the cross-border transmission of financial shocks originating in the United States. I develop a small open economy DSGE model that embeds the dollar's central role in international trade and finance and calibrate it to the Korean economy. Key parameters are estimated by matching impulse responses to a shock in the excess bond premium (EBP), a standard measure of US financial conditions. The analysis shows that two core functions of the dollar in international finance —its role as a safe asset through dollar-denominated bonds and its centrality in financing working capital for global supply chains —constitute the primary channels through which US financial shocks spill over internationally. In the absence of these mechanisms, the output losses from US financial shocks would be more than two-thirds smaller. Finally, the results suggest that shifting trade invoicing from the dollar to the domestic currency can also significantly dampen these spillovers, reducing output losses by roughly one-fourth.

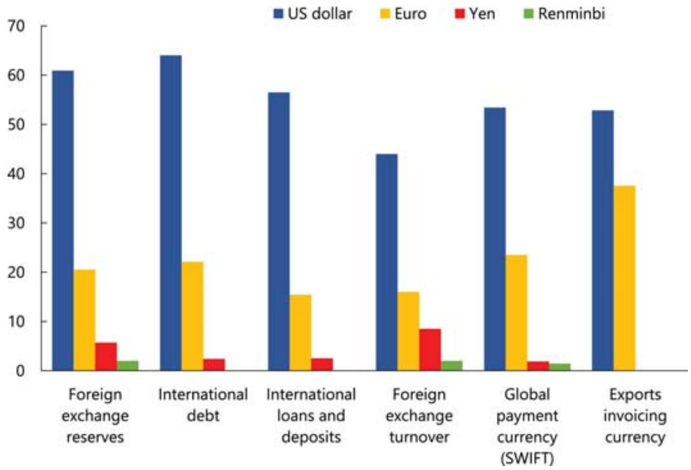
Keywords: Dominant Currency Pricing, Dominant Currency Financing, Dollar Dominance, DSGE

JEL Classification: E32, F30, H22

I. Introduction

The pervasive influence of the US dollar in global trade and finance significantly affects how macroeconomic shocks spread worldwide. As shown in Figure 1, the dollar holds a dominant position in several areas, including international debt and loans, foreign exchange reserves and transactions, and trade invoicing. Although this dominance has been extensively studied, the precise mechanisms through which it amplifies the impact of US-originating shocks remain a subject of ongoing debate. This paper makes a novel contribution in this strand of research by investigating how US financial risks ripple through other economies under dollar dominance. To explore this, we develop a tractable small open economy DSGE model that incorporates three key elements underpinning the US dollar's unique role in the global economy. The first element is related to the dollar usage in trade invoicing, known as "dominant currency pricing" (DCP), while the other two elements are related to its role in cross-border financial transactions, which we call "dominant currency financing" (DCF).

Figure 1. Dollar Dominance



Note: The figure shows the share of major currencies in international trade and finance transactions. Source: Gopinath and Itskhoki (2022).

(Dollar Invoicing in International Trade) One of the critical functions of the dollar is its role as the dominant invoicing currency in international trade. Recent studies including Boz et al. (2022) reveal that the share of global trades invoiced in dollars does exceed the volume of trades associated with the United States. Significantly, even excluding dollar commodity exports, the percentage of exports invoiced in dollars consistently surpasses 20%. This invoicing practice underscores the dollar's vital role in facilitating global trade, affecting the degree of exchange rate pass-through and imported inflation (Gopinath and Itskhoki 2022).

(Dollar Borrowing in GVC Activity) Beyond trade invoicing, the dollar plays a crucial role in financing global value chain (GVC) activities. Bruno and Shin (2023) and Akinci, Benigno, Pelin and Turek (2024) highlight the impacts of dollar financing on credit-intensive GVC operations and international trade. This effect operates through the availability of dollar-based working capital required for participating in GVCs. Dollar fluctuations influence financial conditions, thereby affecting international trade and the broader economy.

(Dollar Bonds as Safe Asset) Another vital aspect of dollar dominance in international financial markets is the perception of US government bonds as a safe-haven asset. Studies by Miranda-Agrippino and Rey (2022), Bodenstein et al. (2023), and Kekre and Lenel (2024) demonstrate that US Treasuries are regarded as the world's safe assets, particularly amidst financial crises. During global "flight-to-safety" periods, demand for US Treasuries rises, prompting dollar appreciation. Even when the US faces financial stress, heightened global risk aversion tends to drive demand for these safe dollar assets, as exemplified during the 2008 financial crisis. This strong dollar during crises exacerbates global trade contractions by interacting with the dollar' role in trade invoicing and working capital financing.

In this paper, we develop a tractable small open economy DSGE model that embeds the unique role of the US dollar in international trade and finance. Building on Gopinath, Boz, Casas, Díez, Gourinchas and Plagborg-Møller (2020), the model assumes that firms set both export and import prices predominantly in dollars and rely on domestic and imported intermediate inputs, capturing global production sharing. To reflect the credit-intensive nature of global value chains

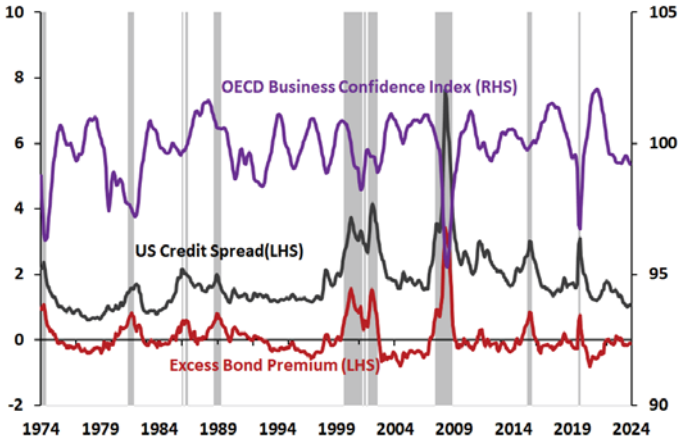
(GVCs), following Akinci, Benigno, Pelin and Turek (2024), we incorporate firms' use of dollar-denominated working capital loans to finance production inputs. In addition, inspired by Bodenstein et al. (2023) and Kekre and Lenel (2024), we introduce the dollar's safe-haven role during financial distress, allowing agents' preferences for dollar bonds to shift in response to flight-to-safety shocks. These demand shifts, in turn, affect exchange rates and real activity, underscoring the dollar's multifaceted influence in the global economy. The model is calibrated to the Korean economy, a typical small open economy with deep integration into global trade. Korea holds a comparative advantage in high-tech manufacturing industries such as electronics, automobiles, and shipbuilding, and is central to global supply chains in these sectors. Despite its large trade volume, Korea remains highly reliant on the US dollar in both trade and financial transactions. Unlike many emerging markets prone to sudden stops, Korea maintains sizable dollar reserves and its firms are less dollar-indebted than before the 1997 Asian financial crisis. Nonetheless, the economy remains vulnerable to fluctuations in capital flows driven by global flight-to-safety episodes. Moreover, Korean firms rely heavily on imported intermediates, many of which are financed through dollar-denominated working capital loans (Bruno and Shin 2023).[1] These features make Korea a pertinent case for analyzing how US shocks propagate internationally through the dollar's dominant role.

A distinctive contribution of this study is to combine the modeling framework with an impulse response matching approach to estimate key parameters specific to the Korean economy. We calibrate parameter values by aligning the model's responses with empirical impulse responses of core macroeconomic variables to US financial shocks. As a measure of US financial conditions, we employ the excess bond premium (EBP) proposed by Gilchrist and Zakrajšek (2012). As emphasized by Anderson and Cesa-Bianchi (2024), the EBP, net of firms' default premia, captures the component of borrowing costs linked to the risk-bearing capacity of financial intermediaries. Obstfeld and Zhou (2022) further highlight the EBP's role as a global sentiment indicator, reflecting the global reach of US

1) As shown in Appendix A, Korean industries with higher dependence on imported intermediates also tend to carry larger short-term dollar liabilities.

financial markets.[2)] Figure 2 illustrates the close link between the EBP and the global business cycle, showing that increases in the EBP are associated with declines in the OECD Composite Business Confidence Indicator (CBCI).[3)]

Figure 2. Global Business Cycle vs. EBP



Note: The shaded areas indicate the period when the EBP exceeds the one standard deviation of its historical values from January 1973 to September 2024. Source: OECD and Federal Reserve.

Using our estimated model, which incorporates both dominant currency financing (DCF) and dominant currency pricing (DCP), we conduct an impulse response analysis to examine how US financial risks—captured by an exogenous rise in the excess bond premium (EBP)—propagate internationally. The results show that an increase in the EBP generates a sizable contraction in real economic activity, depressing consumption, investment, exports, and the use of intermediate inputs through its effects on global demand and exchange rates. Inflationary pressures from higher import prices prompt the home central bank to raise its policy rate, further weakening domestic demand. To disentangle the underlying mechanisms, we separately examine the two channels associated with DCF. First, the safe-haven role of dollar bonds explains much of the observed de-

2) Bodenstein et al. (2023) evaluate the EBP's predictive content for several proxies of global risk aversion, including the "global financial cycle" factor of Miranda-Agrippino and Rey (2022), the VIX, and the "convenience yield" on US government bonds relative to comparable G-10 sovereigns. They find the EBP has strong predictive power across all measures.

3) This relationship is stronger than that observed for US corporate bond spreads, with the EBP–CBCI correlation at –0.572 compared to –0.358 for credit spreads.

cline in consumption and investment. Absent this channel, the EBP shock would not trigger dollar appreciation, nor would domestic interest rates rise. Second, through the working capital channel, tighter US financial conditions constrain collateral for dollar-denominated working capital loans used to finance imported intermediate inputs. Given the heavy reliance of production on these inputs, the resulting contraction generates a significant and persistent output decline. While the safe-haven channel drives the initial downturn in the first few quarters, the working capital channel prolongs the effects. Overall, without these two DCF channels, the output losses from US financial shocks would be reduced by more than two-thirds. Our analysis further suggests that shifting export invoicing from the dollar to the producer currency can mitigate the spillovers of US financial shocks, lowering output losses by roughly one-fourth. The mechanism operates through expenditure switching: with export prices fixed in the producer currency, a depreciation of the home currency raises the competitiveness of domestic goods abroad, thereby boosting exports. Finally, we show that under dollar dominance, US monetary tightening propagates globally through similar mechanisms. In the absence of DCF or DCP, the adverse effects of a US interest rate hike on domestic output are reduced by about 30% relative to the benchmark case.

This paper contributes to several strands of the literature emphasizing the pivotal role of the US dollar in the global economy. A notable area examines the dollar's status as the dominant currency for trade invoicing, despite a declining share of the US in global trade. Recent studies by Gopinath et al. (2020), Boz et al. (2022), Mukhin (2022), and McLeay and Tenreyro (forthcoming) explore the mechanisms underlying the emergence of dominant currency pricing and its macroeconomic implications —particularly regarding exchange rate pass-through and international monetary transmission.[4] Building on this literature, we take into account the prevalent use of the dollar in trade invoicing, also observed in Korean trade data (Son 2023), and analyze how dollar appreciation, driven by

4) McLeay and Tenreyro (forthcoming) argue that, unlike prior studies, dollar dominance in trade invoicing may not weaken the effectiveness of monetary policy of non-dollar countries in boosting exports, as goods priced in dollars tend to have more flexible prices and higher trade elasticities.

US financial shocks, affects real economic outcomes depending on the invoicing currency. Another key research area focuses on the dollar's dominance in international finance. Studies such as Bruno, Kim and Shin (2018), Bruno and Shin (2023), and Akinci, Benigno, Pelin and Turek (2024) highlight the dollar's critical role in financing GVC activities, illustrating how dollar fluctuations affect international trade through credit conditions. Additionally, Obstfeld and Zhou (2022) and Bodenstein et al. (2023) analyze the macroeconomic effects and transmission mechanisms of global risk shocks, often proxied by the EBP, and the role of dollar bonds as a safe asset during periods of heightened risk. Similarly, Georgiadis, Müller and Schumann (2024) empirically demonstrate how global risk shocks are amplified by increased demand for safe assets, leading to dollar appreciation. In this paper, we develop a unified framework that integrates these two dimensions of the dollar's role in international finance, allowing for an assessment of the quantitative significance of each channel in the transmission of US financial shocks. This study shares some features with the work of Bodenstein et al. (2023). Both emphasize the safe-haven role of dollar bonds during global flight-to-safety episodes and employ the EBP as a measure of US financial risks. However, while Bodenstein et al. (2023) model global financial intermediaries that provide inter-temporal financing to domestic producers, we focus on intra-temporal working capital loans needed to finance production inputs, motivated by Bruno and Shin (2023) and Akinci, Benigno, Pelin and Turek (2024). Additionally, we introduce collateral constraints for working capital loans, similar to Mendoza (2010). Estimating the key parameters through impulse response matching, we find that this collateral constraint framework provides an accurate representation of how the Korean economy responds to US financial shocks.

The remainder of the paper is organized as follows. Section 2 describes the model. Section 3 summarizes parameter calibration and estimation results using IRF matching. Section 4 presents the impulse response analysis of our model with a focus on the EBP shock. Section 5 presents further results for US monetary policy shock. Section 6 discusses and section 7 concludes.

II. Model

Our model incorporates credit-intensive global supply chains and the unique role of the US dollar into the standard small open economy New Keynesian framework. It consists of a small open home economy (H), and two foreign economies —the United States (U) that issues the dominant currency, the dollar, and the rest of the world ('ROW', R). We use the symbol U and \$ interchangeably to represent the US dollar. The home country is populated by households, a wholesale firm, and retail firms. Following Gopinath et al. (2020), we account for the crucial role of the dollar in trade invoicing, dominant currency pricing (DCP), by allowing firms to set their export prices in either the producer's currency, the local currency, or the vehicle currency, i.e., the dollar. In our model, international financial markets are incomplete, and households in the home country are allowed to trade only one-period risk-free international bonds denominated in dollars. We introduce two components that highlight the dollar's dominant role in international finance, dominant currency financing (DCF). First, US dollar bonds serve as a safe asset, providing extra utility to households, particularly during periods of global financial distress. Second, the wholesale firm relies on intra-period working capital loans to purchase its production inputs, with a portion of these loans denominated in dollars. Prices and wages are rigid under Calvo's staggered price framework. Home monetary policy follows the standard Taylor rule, where the policy interest rate adjusts to deviations of inflation and overall output from their respective steady states.[5)]

5) Our framework assumes a flexible exchange rate regime, as adopted by Korea since 1997, wherein monetary policy is primarily driven by domestic economic conditions. Nonetheless, even under such regimes, the home country's monetary policy may still be influenced by fluctuations in US interest rates and the risk premium associated with foreign bond holdings. These can limit the country's ability to implement monetary policy independently, as they often necessitate adjustments in response to US monetary policy shifts or financial market development, reflecting the constraints posed by capital mobility and global financial integration.

1. Households

Households supply labor to firms and earn wages in return. They also receive dividends from both wholesale and retail firms, which are detailed in the following sections. $C_{H,t}$ denotes the household's consumption of final goods, $B_{H,t}$ denotes the household's holdings of home currency bonds, and $B^{\$}_{H,t}$ is their holdings of dollar-denominated bonds. We assume that households derive utility from their holdings of dollar bonds as a safe asset. This utility arises from the liquidity and safety these assets provide, closely following Bodenstein et al. (2023) and Kekre and Lenel (2024). The household's lifetime utility function is:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{{C_{H,t}}^{1-\phi_C}}{1-\phi_C} + \varphi \zeta_t^{GFS} v\left(\frac{B^{\$}_{H,t}}{P^*_{U,t}} \right) - \varsigma \frac{L_{H,t}(h)^{1+\phi_L}}{1+\phi_L} \right] \tag{II.1}$$

As in Bodenstein et al. (2023), the second term in equation (II.1) captures the utility derived from dollar bond holdings ($v'(\cdot) > 0$, $v''(\cdot) < 0$). This utility fluctuates with US financial risks (ζ_t^{GFS}).[6] The parameter φ determines the extent to which these global shocks impact households' preference for dollar bonds. We do not impose any prior restrictions on this parameter, such as $\varphi >$ 0, allowing it to be determined by the data instead. The household's budget constraint is given by:

$$\begin{aligned} & P_{H,t} C_{H,t} + \frac{B_{H,t}}{(1+i_t)} + \frac{\xi^{\$}_{H,t} B^{\$}_{H,t}}{(1+i^*_t)\Psi_{H,t}} \\ & \leq W_t(h) L_{H,t}(h) + B_{H,t-1} + \xi^{\$}_{H,t} B^{\$}_{H,t-1} + \Pi_{H,t} + i_{\Gamma,t} \Gamma_{H,t} \end{aligned} \tag{II.2}$$

where i_t and i^*_t denote the net returns from holding home currency bonds and dollar bonds, respectively. $W_t(h)$ and $L_{H,t}(h)$ denote nominal wage and labor

6) Bodenstein et al. (2023) refer to this as "global flight-to-safety" shocks.

supply. $\xi^{\$}_{H,t}$ denotes the exchange rate for the home currency against the US dollar. $\Pi_{H,t}$ is the sum of dividends received from wholesale and retail firms. The last term in the budget constraint is the interest payment received from the wholesale firm that uses home-currency working capital loans $\Gamma_{H,t}$ at the lending rate of $i_{\Gamma,t}$. In our setup, the wholesale firm borrows home currency working capital from the households, and takes dollar-denominated working capital loans from abroad, which is described in the following section. The consumption bundle $C_{H,t}$ consists of home-produced final goods ($C_{HH,t}$) and imported final goods from country U ($C_{UH,t}$), and from country R ($C_{RH,t}$):

$$C_{H,t} \equiv \left[(\omega_H)^{\frac{1}{\eta}} C_{HH,t}{}^{\frac{\eta-1}{\eta}} + (\omega_U)^{\frac{1}{\eta}} C_{UH,t}{}^{\frac{\eta-1}{\eta}} + (\omega_R)^{\frac{1}{\eta}} C_{RH,t}{}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} \tag{II.3}$$

with the home consumer price index (CPI) derived as:

$$P_{H,t} = \left[\omega_H P_{HH,t}{}^{1-\eta} + \omega_U P_{UH,t}{}^{1-\eta} + \omega_R P_{RH,t}{}^{1-\eta} \right]^{\frac{1}{1-\eta}} \tag{II.4}$$

where ω_j is the weight assigned to country j's final goods in the consumption bundle ($j \in \{H, U, R\}$) and η determines the elasticity of substitution between domestic and imported final goods. The first-order conditions for consumption and the holdings of domestic and foreign bonds are given in Appendix B. $\Psi_{H,t}$ is the risk premium associated with the holdings of foreign bonds.

2. Labor Supply

We assume that the individual household is a monopoly supplier of a differentiated labor service, $L_{H,t}(h)$. This service is sold to a representative, competitive employment agency that combines specialized labor into a homogeneous labor input using a CES aggregator:

$$L_{H,t} \equiv \left[\int_0^1 L_{H,t}(h)^{\frac{\nu-1}{\nu}} dh \right]^{\frac{\nu}{\nu-1}} \tag{II.5}$$

The demand for individual labor service $L_{H,t}(h)$ is:

$$L_{H,t}(h) = \left[\frac{W_t(h)}{W_t} \right]^{-\nu} L_{H,t} \tag{II.6}$$

where $W_t = \left[\int_0^1 W_t(h)^{1-\nu} dh \right]^{\frac{1}{1-\nu}}$ is the aggregate wage rate.

3. Wholesale Firm

(Production technology) There is a representative wholesale firm that produces output using capital $K_{H,t}$, intermediate inputs $Z_{H,t}$, and labor $L_{H,t}$. Its production function is:

$$Y_{w,t} = A_{H,t}(K_{H,t})^{\alpha}(Z_{H,t})^{\gamma}(L_{H,t})^{1-\alpha-\gamma} \tag{II.7}$$

The wholesaler accumulates capital according to a standard law of motion for physical capital with adjustment costs:

$$K_{H,t+1} = I_{H,t} - \frac{\psi_K}{2} \left(\frac{I_{H,t}}{K_{H,t}} - \delta \right)^2 K_{H,t} + (1-\delta)K_{H,t} \tag{II.8}$$

where δ is the depreciation rate of capital. As in the consumption bundle, the investment bundle $I_{H,t}$ consists of home-produced goods ($I_{HH,t}$), and imported final goods from country U ($I_{UH,t}$) and from country R ($I_{RH,t}$):

$$I_{H,t} \equiv \left[(\omega_H)^{\frac{1}{\eta}} I_{HH,t}^{\frac{\eta-1}{\eta}} + (\omega_U)^{\frac{1}{\eta}} I_{UH,t}^{\frac{\eta-1}{\eta}} + (\omega_R)^{\frac{1}{\eta}} I_{RH,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} \tag{II.9}$$

where ω_j is the weight assigned to country j's goods in the investment goods basket. Similarly, the intermediate input bundle $Z_{H,t}$ is defined as:

$$Z_{H,t} \equiv \left[(\omega_H)^{\frac{1}{\eta}} Z_{HH,t}^{\frac{\eta-1}{\eta}} + (\omega_U)^{\frac{1}{\eta}} Z_{UH,t}^{\frac{\eta-1}{\eta}} + (\omega_R)^{\frac{1}{\eta}} Z_{RH,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} \tag{II.10}$$

The demand for home and imported goods for both investment and intermediate input bundles can be derived analogously to that for consumption in equation (II.3) with the common aggregate price index $P_{H,t}$ in equation (II.4).

(Working Capital) The wholesale firm takes home currency loans ($\Gamma_{H,t}$) to finance a fraction of wage bills as well as the purchase of domestic final goods used for investment and intermediate input bundles. Motivated by literature such as Bruno, Kim and Shin (2018) and Akinci, Benigno, Pelin and Turek (2024), the firm also relies on dollar-denominated loans ($\Gamma^*_{H,t}$) to finance the purchase of foreign goods for investment and intermediate input bundles:

$$\Gamma_{H,t} \equiv \theta_w \left[P_{HH,t}(Z_{HH,t} + I_{HH,t}) + W_t L_{H,t} \right] \tag{II.11}$$

$$\Gamma^*_{H,t} \equiv \theta_w \left[P_{UH,t}(Z_{UH,t} + I_{UH,t}) + P_{RH,t}(Z_{RH,t} + I_{RH,t}) \right] \tag{II.12}$$

Note that we model the size of dollar financing as being proportional to the import contents of both investment and intermediate input bundles. This setup is supported by Korean industry-level data in Appendix A, which show that short-term foreign currency debts, mostly in dollars, are highly correlated with the industry-specific use of imported intermediate inputs in dollars.

Taken together, the wholesale firm's profit in nominal terms is given by:

$$\Pi_{w,t} = P_{w,t}Y_{w,t} - P_{H,t}Z_{H,t} - P_{H,t}I_{H,t} - W_tL_{H,t} - i_{\Gamma,t}\Gamma_{H,t} - i^*_{\Gamma,t}\Gamma^*_{H,t} \tag{II.13}$$

For dollar working capital ($\Gamma^*_{H,t}$), we adopt collateral constraints in the spirit of Kiyotaki and Moore (1997), wherein the amount a firm can borrow is bound to a fraction (κ_t) of the market value of its capital stock:[7)]

$$(1 + i^*_{\Gamma,t})\Gamma^*_{H,t} \leq \kappa_t Q_t K_{H,t} \tag{II.14}$$

where the steady-state value of κ_t is denoted by $\overline{\kappa}$, and Q_t is the price of capital. We introduce two channels through which US financial shocks (ζ_t^{GFS}) impact the wholesaler's access to working capital loans. First, we model that a rise in ζ_t^{GFS} directly reduces the loan-to-value ratio κ_t for dollar working capital loans ($\sigma_\kappa > 0$):[8)]

$$\kappa_t = \rho_\kappa \kappa_{t-1} + (1 - \rho_\kappa)\overline{\kappa} - \sigma_\kappa \zeta_t^{GFS} \tag{II.15}$$

This setup aims to capture the direct impact of US financial conditions on domestic firms' access to dollar credit by affecting the risk-taking capacity of international lenders in a parsimonious manner, without explicitly modelling financial intermediaries.

Second, we also consider the indirect channel whereby US financial shocks translate into a rise in the credit spread in home financial markets. We define the home credit spread rp_t as the difference between the interest rate charged

7) Our model is similar to that of Mendoza (2010), in which a firm's working capital is used to cover wage bills and the purchase of intermediate inputs, as well as the cost of physical investment, with the loan amount being subject to collateral constraints.

8) In this setting, we assume that the interest rate charged for dollar borrowing is equal to the risk-free rate ($i^*_{\Gamma,t} = i^*_t$). We confirm that there is no quantitative difference when we set $i^*_{\Gamma,t}$ as the risk-free rate plus the EBP.

for domestic working capital loans and the home risk-free rate $(rp_t \equiv i_{\Gamma,t} - i_t)$. Its dynamic process is given by:

$$rp_t = \rho_r rp_{t-1} + \sigma_r \zeta_t^{GFS} \tag{II.16}$$

We will estimate the parameters related to the link between US financial risks and the wholesaler's access to working capital loans (ρ_κ, σ_κ, ρ_r, σ_r) via impulse response matching to the EBP shock in the later section.

4. Retail Firms

There is a continuum of retailers indexed by $f \in [0,1]$. They purchase some wholesale output, $Y_{w,t}(f)$, and repackage it into a specialized variety at no cost, so that $Y_{H,t}(f) = Y_{w,t}(f)$. They sell it domestically and export it to country $j \in \{U,R\}$:

$$Y_{H,t}(f) = Y_{HH,t}(f) + \sum_k \sum_j Y_{Hj,t}^k(f) \tag{II.17}$$

(Profit maximization with invoicing currency) Firms can set their export prices either in the producer currency $(k = H)$, in the destination currency $(k = j)$, or in the vehicle currency —the US dollar $(k = \$ = U)$. The demand for each individual variety in both home and foreign markets is given by:

$$Y_{HH,t}(f) = \left[\frac{P_{HH,t}(f)}{P_{HH,t}}\right]^{-\varepsilon} Y_{HH,t} \quad ; \quad Y_{Hj,t}^k(f) = \left[\frac{P_{Hj,t}^k(f)}{P_{Hj,t}^k}\right]^{-\varepsilon} Y_{Hj,t}, \qquad j \in \{U,R\} \tag{II.18}$$

where $Y_{HH,t}$ is domestic absorption of home retail goods, and $Y_{HU,t}$ and $Y_{HR,t}$ are the aggregate exports of retail products to country U and R, respectively.

We consider a Calvo pricing environment, where retail firms are randomly allowed to reset their prices with probability $1-\delta_p$. We assume that the firm's export prices are sticky in the currency of invoicing, while all domestic prices are sticky in the home currency. Firms choose optimal reset prices for each destination, $\bar{P}_{HH,t}(f)$, $\bar{P}^k_{HU,t}(f)$ and $\bar{P}^{k'}_{HR,t}(f)$, to maximize the present discounted value (PDV) of their profits $\Pi_{H,t}(f)$:[9)]

$$\mathbb{E}_t \sum_{s=t}^{\infty} \delta_p^{s-t} \Lambda_{t,s} \left[\bar{P}_{HH,t}(f) Y_{HH,s|t}(f) + \sum_k \sum_j \xi^k_{H,t} \bar{P}^k_{Hj,t}(f) Y^k_{Hj,s|t}(f) - P_{w,s} Y_{H,t}(f) \right] \tag{II.19}$$

subject to equation (II.17) and (II.18). Here, $Y^k_{Hj,s|t}(f)$ is the quantity of exports sold in destination country j invoiced in currency k, and shipped at time s by firm f, which resets its prices $\bar{P}^k_{Hj,t}(f)$ at time $t \le s$.

5. Aggregate Exports

The aggregate foreign demand for home final goods for each destination is given by:

$$Y^U_{HU,t} = \left[\frac{P^U_{HU,t}}{P^*_{U,t}} \right]^{-\rho} D^*_{U,t} \quad ; \quad Y^U_{HR,t} = \left[\frac{\xi^U_{H,t} P^U_{HR,t}}{\xi^R_{H,t} P^*_{R,t}} \right]^{-\rho} D^*_{R,t} \quad ; \quad Y^R_{HR,t} = \left[\frac{P^R_{HR,t}}{P^*_{R,t}} \right]^{-\rho} D^*_{R,t} \tag{II.20}$$

where $P^*_{U,t}$ and $P^*_{R,t}$ are the CPIs for each destination, and $D^*_{U,t}$ and $D^*_{R,t}$ are their respective aggregate import demand, which follow an AR(1) process:

9) The total dividend that the household receives from wholesale and retail firms is $\Pi_{H,t} = \Pi_{w,t} + \int_0^1 \Pi_{H,t}(f) df$.

$$\log D_{j,t}^{*} = (1-\rho_X^{*})\log \overline{D_j^{*}} + \rho_X^{*}\log D_{j,t-1}^{*} + \sigma_X^{*} m_{j,t}^{*}, \qquad j \in \{U,R\} \tag{II.21}$$

where $\overline{D_j^{*}}$ denotes the steady-state level of import demand, and $m_{j,t}^{*}$ is the growth rate of country j's aggregate imports, which also appears in the foreign VAR block that follows.

The domestic currency export price index for destination j is given by:

$$\log(P_{Hj,t}) = \sum_k \vartheta_{Hj}^{k}\left[\log(P_{Hj,t}^{k}) + \log(\xi_{H,t}^{k})\right], \qquad j \in \{U,R\} \tag{II.22}$$

where ϑ_{Hj}^{k} denotes the fraction of exports from the home country to country j that are invoiced in currency k.

6. Aggregate Imports

The aggregate imports from U and R are:

$$Y_{jH,t} = \sum_k \vartheta_{jH}^{k} Y_{jH,t}^{k} \tag{II.23}$$

$$Y_{jH,t}^{k} = \omega_j \left[\frac{P_{jH,t}^{k}}{P_{H,t}}\right]^{-\eta} (C_{H,t} + Z_{H,t} + I_{H,t}), \qquad j \in \{U,R\} \tag{II.24}$$

where given that the domestic economy is sufficiently small, the foreign goods' domestic prices are assumed to be equal to the foreign CPI adjusted by the exchange rate:

$$P_{jH,t}^{k} = \xi_{H,t}^{k} P_{j,t}^{*}, \qquad j \in \{U,R\} \tag{II.25}$$

The aggregate import price index for each origin country is:

$$\log(P_{jH,t}) = \sum_k \vartheta_{jH}^k \log(P_{jH,t}^k) \tag{II.26}$$

where ϑ_{jH}^k denotes the fraction of imports into the home country from country j that are invoiced in currency k.

7. Monetary Policy

The domestic risk-free interest rate is set by the home country's central bank according to a Taylor rule as following:

$$i_t = \rho_M i_{t-1} + (1-\rho_M)\left[\bar{i} + \phi_\pi(\pi_{H,t} - \overline{\pi}_H) + \phi_y(y_{H,t} - \bar{y}_H)\right] + \varepsilon_t^M \tag{II.27}$$

where $\pi_{H,t} \equiv P_{H,t}/P_{H,t-1} - 1$, and $y_{H,t} \equiv \log(Y_{H,t})$. ϕ_π and ϕ_y capture the sensitivities to domestic price inflation and the domestic output gap, respectively. The monetary policy shock ε_t^M follows an AR(1) process.

8. Modified UIP Condition

Our model departs from the traditional uncovered interest parity (UIP) condition in two ways. First, following Adolfson, Laséen, Lindé and Villani (2008), we allow for a negative correlation between the risk premium and the expected change in the nominal exchange rate to generate the hump-shaped response of the exchange rate.[10] To incorporate this, we adopt the following form of the risk

10) The traditional UIP posits that the interest rate differential should compensate for expected exchange rate depreciations. This implies that an increase in foreign interest rates would initially lead to a depreciation of the home currency as investors adjust their portfolios to favor foreign currency. If pure UIP held, this initial depreciation would then be followed by an appreciation to offset the rise in foreign interest rates.

premium ($\Psi_{H,t}$) charged for holding dollar bonds in equation (II.2):

$$\Psi_{H,t}(a_{H,t}, S^{\$}_{H,t}) = \exp\left[-\psi_a(a_{H,t} - \overline{a_H}) - \rho_s\left(\frac{\mathbb{E}_t S^{\$}_{H,t+1}}{S^{\$}_{H,t}}\frac{S^{\$}_{H,t}}{S^{\$}_{H,t-1}} - 1\right)\right] \tag{II.28}$$

where the first term in the bracket denotes a portfolio cost associated with the households' net foreign asset holdings ($a_{H,t} \equiv \frac{\xi^{\$}_{H,t}B^*_{H,t}}{P_{H,t}Y_{H,t}}$), which helps ensure stationarity in the model (Schmitt-Grohé and Uribe 2003). The second term involving the real exchange rate ($S^{\$}_{H,t} \equiv \frac{\xi^{\$}_{H,t}P^*_t}{P_{H,t}}$), which is motivated by Adolfson, Laséen, Lindé and Villani (2008), is aimed at accounting for the observed patterns that the risk premium is negatively correlated with the expected change in the exchange rate (often referred to as the "forward premium puzzle").[11] We confirm that this specification is more consistent with the data than the standard UIP condition ($\rho_s = 0$). Another modification is related to the influence of US financial conditions ζ^{GFS}_t that affect the household's preference for dollar bonds, as discussed in the previous section. As a result, our modified UIP condition in a log-linear form is derived as:

$$r_t - r^*_t = (1-\rho_s)\mathbb{E}_t\Delta s^{\$}_{H,t+1} - \rho_s\Delta s^{\$}_{H,t} + \varphi\zeta^{GFS}_t + \psi_{a,t} \tag{II.29}$$

where $r_t \equiv i_t - \mathbb{E}_t[\pi_{H,t+1}]$, $r^*_t \equiv i^*_t - \mathbb{E}_t[\pi^*_{t+1}]$, and $\psi_{a,t} \equiv -\psi_a(a_{H,t} - \overline{a_H})$. On the right-hand side, the parameter ρ_s in the first two terms is aimed at generating the hump-shaped response of the exchange rate as supported by empirical data. The third term ($\varphi\zeta^{GFS}_t$) captures the risk premium associated with global flight-to-safety sentiments. The parameters ρ_s and φ are to be estimated.

11) This setup can be interpreted as domestic investors requiring a lower future return on their holdings of dollar bonds relative to domestic bonds if the future exchange rate is easier to predict; that is, if the home currency is expected to depreciate consecutively (Adolfson, Laséen, Lindé and Villani 2008).

9. H-R Exchange Rate

For the real exchange rate between the home and the rest of the world (ROW) currencies ($S^R_{H,t}$), we adopt the following reduced-form relationship with the home-dollar exchange rate ($S^U_{H,t}$), similar to Gopinath et al. (2020):

$$\log(S^R_{H,t}) = \zeta_R \log(S^U_{H,t}) + \varepsilon^R_{H,t} \tag{II.30}$$

The parameter ζ_R is calibrated to the data in the later section.

10. Foreign VAR Block

We build a separate VAR block to capture the dynamic stochastic processes for foreign variables interacting with one another. The block consists of US import demand $m^*_{U,t}$, ROW import demand $m^*_{R,t}$, world CPI inflation $\pi^*_t \equiv \Delta\log(P^*_{U,t}) = \Delta\log(P^*_{R,t})$, the US interest rate i^*_t, and a measure of US financial risks ζ^{GFS}_t, where:

$$X^*_t = AX^*_{t-1} + Bu_t,$$
$$X^*_t = \left[m^*_{U,t}, \quad m^*_{R,t}, \quad \pi^*_t, \quad i^*_t, \quad \zeta^{GFS}_t\right]'$$

We use the growth rates of US and ROW imports deflated by their respective CPIs as a measure of import demand, and the log difference of OECD CPI as the world price inflation. The US interest rate is defined as the 2-year US Treasury bond yield, which is de-trended using Hodrick–Prescott (HP) filtering to ensure stationarity. Following the emerging literature, we use the EBP as a proxy for ζ^{GFS}_t. We independently estimate the foreign VAR with one lag using quarterly data for the period from the first quarter of 1980 to the fourth quarter of 2023.

An interesting pattern obtained from the estimated foreign VAR is the interplay between the US interest rate and the EBP, as shown in Appendix A. When the EBP rises, there tends to be a subsequent drop in the US interest rate (refer to Figure A.2). This indicates that global risk aversion, heightened by US financial shocks, increases demand for dollar bonds as a safe asset, thereby driving down bond yields. On the flip side, an increase in the US interest rate is associated with a subsequent rise in the EBP (see Figure A.3), which can exacerbate the negative impacts of US monetary tightening on both US and global demand via worsening global financial conditions. This highlights the importance of considering the interaction between the US interest rate and the EBP when assessing the effects of each shock.

11. Market Clearing Conditions

Home final output $Y_{H,t}$ is consumed, invested, used as intermediate inputs, and exported to country U and R:

$$Y_{H,t} = \underbrace{C_{HH,t} + I_{HH,t} + Z_{HH,t}}_{(=Y_{HH,t})} + Y_{HU,t} + Y_{HR,t} \tag{II.31}$$

The Balance of Payments (BoP) condition for the home country is given by:

$$\xi^{\$}_{H,t}\left[\frac{B^{*}_{H,t}}{(1+i^{*}_{t})\Psi_{H,t}} - B^{*}_{H,t-1}\right] + i^{*}_{\Gamma,t}\Gamma^{*}_{H,t}$$
$$= P_{HU,t}Y_{HU,t} + P_{HR,t}Y_{HR,t} - P_{UH,t}Y_{UH,t} - P_{RH,t}Y_{RH,t} \tag{II.32}$$

III. Calibration and Estimation

1. Calibration

We determine the structural parameters of the model through a combination of calibration and estimation. Several preference and production parameters are calibrated to standard values, as summarized in Table 1. The discount factor, β, is set at 0.995, consistent with a long-run real interest rate of 2% as in Akinci and Queralto (2023). Other preference parameters —including risk aversion (ψ_C), the Frisch elasticity of labor supply (ψ_L), the disutility of labor (ς), and the elasticity of substitution across labor varieties (ν) —are chosen to fall within the ranges commonly used in small open economy DSGE models.[12)]

On the production side, factor shares are calibrated using Korea's 2020 input–output table: capital (α) at 0.15, intermediate inputs (γ) at 0.60, and labor ($1-\alpha-\gamma$) at 0.25. The depreciation rate of capital (δ) is set to the conventional value of 0.025. The capital adjustment cost parameter (ψ_K) is chosen such that the elasticity of Tobin's Q with respect to the investment–capital ratio, $\psi_K\delta$, equals 0.25, following Akinci and Queralto (2023). The home bias parameter (ω_H) is set at 0.780, based on Korea's average import-to-GDP ratio of 38% over 2000–2022. The shares of final goods imports from the US (ω_U) and the rest of the world (ROW, ω_R) are calibrated to 0.033 and 0.187, respectively, in order to match the US share of Korea's total imports (15%). The fraction of production costs financed by working-capital loans (θ_w) is set to 1, following Akinci, Benigno, Pelin and Turek (2024). The steady-state loan-to-collateral value ratio for dollar working-capital loans ($\overline{\kappa}$) is calibrated to 0.12, yielding an investment-to-output ratio of 26%, consistent with the average observed during 2000–2022. Parameters governing nominal rigidities take standard values: price rigidity (δ_p) of 0.75 and wage rigidity (δ_W) of 0.85. Monetary policy parameters are also chosen in line with the literature. Finally, ζ_R is set to 0.30 based on the data, implying that a 10 percentage point depreciation of the home currency against the US dollar is associated with a 3 percentage point depreciation against the composite ROW currency.

12) Christiano, Eichenbaum and Evans (2005) set the elasticity of labor substitution ν at 21, corresponding to a wage markup of 1.05. We set ν at 11.

Table 1. Calibrated Parameters

Parameter		Value	Source/target
Household preferences			
Discount factor	β	0.995	Literature
Risk aversion	ϕ_C	2.00	Literature
Frisch elasticity of labor	ϕ_L	0.50	Literature
Disutility of labor	ς	1.00	Literature
Labor subst. elast.	ν	11	Literature
Production			
Capital share	α	0.15	Input-output table for Korea
Intermediate input share	γ	0.60	Input-output table for Korea
Labor share	$1-\alpha-\gamma$	0.25	Input-output table for Korea
Depreciation rate	δ	0.025	Literature
Capital adjustment cost	ψ_K	10.00	Literature
Home final goods share	ω_H	0.780	Matched to steady-state M/Y
US final goods share	ω_U	0.033	US share of Korea's imports
ROW final goods share	ω_R	0.187	ROW share of Korea's imports
Rigidities			
Price	δ_p	0.75	Literature
Wage	δ_W	0.85	Literature
Monetary rule			
Inertia	ρ_r	0.80	Literature
Inflation sensitivity	ϕ_π	1.40	Literature
Output gap sensitivity	ϕ_y	0.15	Literature
Credit constraints			
Working capital ratio	θ_w	1.00	Literature
Loan-to-value ratio	$\overline{\kappa}$	0.12	Targeted to steady-state I/Y
Exchange rate co-movement	ζ_R	0.30	Matched to data

For the invoicing currency shares in exports (ϑ^k_{Hj}) and imports (ϑ^k_{jH}), we rely on Korea's trade settlement data for 2020. As reported in Table 2, Korean exporters predominantly adopt dominant currency pricing (DCP), with more than 80% of exports to both the US and the rest of the world invoiced in US dollars. The dollar likewise accounts for a large share of Korea's import invoicing.

2. Estimation via IRF-Matching

We estimate the remaining parameters, which include the elasticity of substitution between domestic and foreign goods in imports η and exports ρ, as well as the sensitivities of exchange rates φ and of the collateral ratio for dollar

Table 2. Share of Currency Invoicing

	Exports		Imports	
	US	ROW	US	ROW
US dollar (USD)	$\vartheta^{U}_{HU} = 1.00$	$\vartheta^{U}_{HR} = 0.80$	$\vartheta^{U}_{UH} = 1.00$	$\vartheta^{U}_{RH} = 0.80$
Korean won (KRW)	$\vartheta^{H}_{HU} = 0.00$	$\vartheta^{H}_{HR} = 0.05$	$\vartheta^{H}_{UH} = 0.00$	$\vartheta^{H}_{RH} = 0.10$
Others	$\vartheta^{R}_{HU} = 0.00$	$\vartheta^{R}_{HR} = 0.15$	$\vartheta^{R}_{UH} = 0.00$	$\vartheta^{R}_{RH} = 0.10$

Notes: The table summarizes the invoicing share of each currency in Korean exports and imports for 2020. Source: The Bank of Korea.

working capital loans σ_κ to US financial risks ζ^{GFS}_t. These are the key parameters shaping the influence of dollar dominance in the transmission of US financial shocks. As mentioned in the introduction, we use the EBP proposed by Gilchrist and Zakrajšek (2012) as a proxy for US financial risks ζ^{GFS}_t.

The estimation process is carried out in two steps. First, we generate empirical impulse responses for the main components of Korea's national accounts —namely consumption, investment, exports, and imports —to a rise in the EBP. We also generate the impulse responses of the exchange rate for the Korean won against the US dollar as well as the home credit spread. In the second step, we estimate the target parameters by minimizing the distance between the model's impulse response functions and the empirical counterparts. Let $IR^m(\mu)$ represent the mapping from μ to the model's impulse response functions, and let IR^e denote the empirical estimates. We focus on the responses over the first 20 quarters after the shock. The estimator μ is defined as the solution to the following optimization problem:

$$J \equiv \min_{\mu} \left[IR^e - IR^m(\mu)\right]' \Sigma^{-1}_{IR^e} \left[IR^e - IR^m(\mu)\right] \tag{III.1}$$

where Σ_{IR^e} is a diagonal matrix containing the sample variances of the IR^e estimates along its diagonal. These variances provide the basis for the confidence intervals. By using this specific form of Σ_{IR^e}, μ is determined in such a way to maximize the likelihood that $IR(\mu)$ lies inside these confidence intervals. All variables are quarterly series, and the estimation period is from the first quarter of 2000 to the fourth quarter of 2023.[13)]

Table 3. Estimated Parameters via IRF-Matching

Parameter		Estimates	(s.e.)
Home/foreign elasticity of substitution in exports	ρ	1.145	(0.076)
Home/foreign elasticity of substitution in imports	η	0.789	(0.014)
Exchange rate sensitivity to EBP	φ	3.229	(0.022)
Exchange rate persistence	ρ_s	0.582	(0.003)
Export elasticity to foreign import demand	σ_X^*	1.200	(0.015)
Export demand persistence	ρ_X^*	0.679	(0.008)
Collateral ratio sensitivity to EBP	σ_κ	0.036	(0.002)
Collateral ratio persistence	ρ_κ	0.895	(0.003)
Home credit spread sensitivity to EBP	σ_r	0.475	(0.007)
Home credit spread persistence	ρ_r	0.093	(0.015)

Notes: The table shows the estimated parameters via impulse response matching for a shock to the EBP. The numbers in parentheses denote one standard errors.

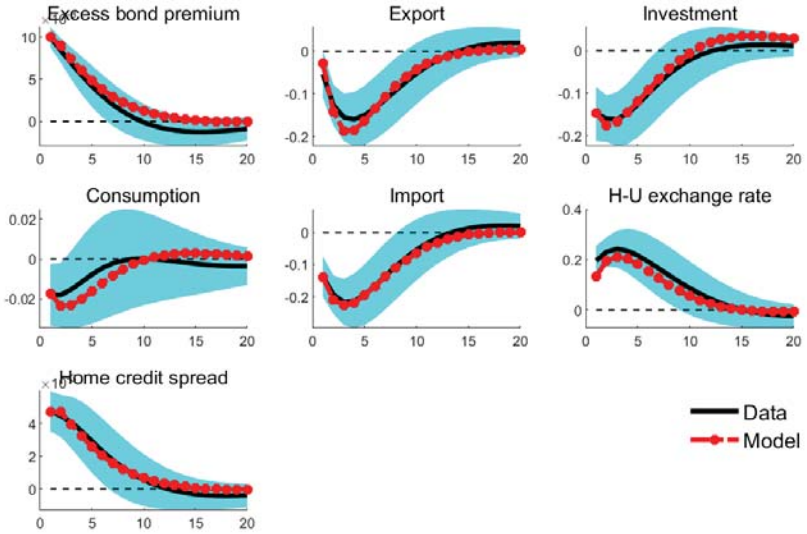
Table 3 shows the parameter estimates obtained from the IRF-matching procedure, with standard errors in parentheses. The estimated elasticity of substitution between foreign and domestic goods for exports ρ and imports η are 1.145 and 0.789, respectively. The sensitivity of the exchange rate to the EBP φ is estimated to be 3.229, indicating that a 10 percentage point increase in the EBP leads to a depreciation of the Korean won against the dollar by approximately 32.3 percentage points on impact.[14)] The estimated parameter for exchange rate persistence ρ_s is 0.582, similar to Adolfson, Laséen, Lindé and Villani (2008). The elasticity of exports to foreign import demand σ_X^* is estimated at 1.200, while export demand persistence ρ_X^* is 0.679. The sensitivity of the loan-to-collateral value ratio for dollar working capital to the EBP, σ_κ, is estimated at 0.036, implying that an increase in the EBP reduces the dollar amount that a firm can

13) The empirical VAR with one lag includes eight quarterly variables: the 2-year US Treasury yield, the EBP, Korean exports, investment, consumption, imports, the real exchange rate for the Korean won against the US dollar, and the home credit spread between the 3-year corporate bond yield and the government bond yield. Non-financial variables are expressed in real terms. All variables except for the EBP are HP-filtered. The ordering of variables is as listed above. Additionally, we assume block exogeneity whereby foreign variables influence Korean variables but are not affected by the latter.

14) In their analysis using the trade-weighted exchange rates across 34 countries, Bodenstein et al. (2023) report a much smaller value of 0.3 for this parameter. Conversely, Obstfeld and Zhou (2022) find that a 10 percentage point rise in the EBP is associated with a dollar appreciation against G-10 currencies of about 44 percentage points over the quarter, which is comparable to our estimate.

borrow against its capital stock in equation (II.15). The collateral ratio itself moves with inertia, with $\rho_\kappa = 0.895$, indicating that a temporary shock to the EBP could have an enduring effect on domestic firms' access to dollar financing. Finally, a 10 percentage point rise in the EBP is estimated to increase the home credit spread by about 4.7 percentage points ($\sigma_r = 0.475$) on impact. Unlike the collateral ratio, the home credit spread exhibits a far smaller persistence, with $\rho_r = 0.093$.

Figure 3. Impulse Response Matching to EBP Shocks



Notes: The figures plot the model's impulse responses to the EBP shock (red circles) and the empirical responses (black solid lines) with 90% confidence bands in the shaded areas.

Figure 3 compares the impulse responses generated by our model, using the estimated parameters, with those from the empirical VAR. Overall, the responses of the model closely align with their empirical counterparts, with most estimates falling within the confidence bands.

IV. Impulse Responses to EBP Shocks

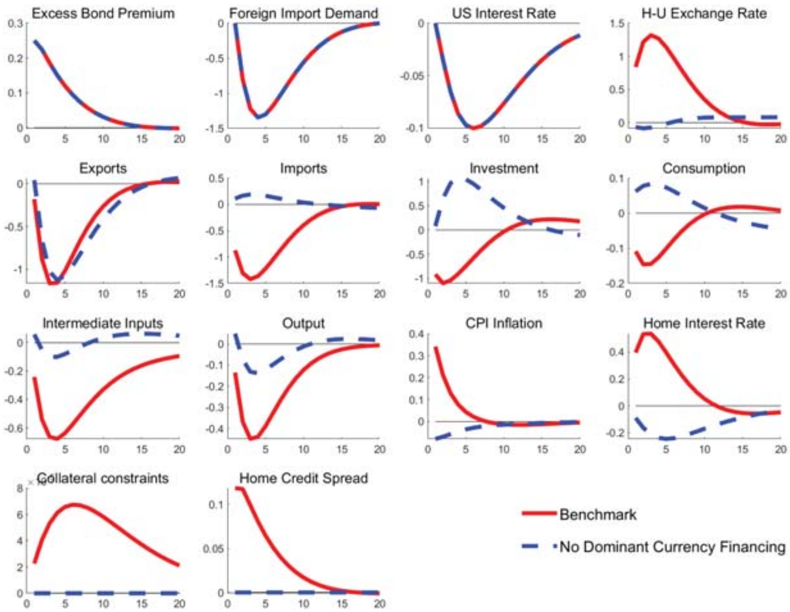
In this section, we use our estimated model to evaluate the impact of US financial shocks, characterized by a rise in the EBP, on the domestic economy. We analyze the impulse responses of key economic variables in the benchmark model, which includes the dollar's global role in both international trade and finance, and compare these to alternative models that exclude a particular channel of interest.

1. The Influence of DCF in Transmitting EBP Shocks

Figure 4 reports the impulse responses to an unanticipated increase in the EBP of annualized 0.25 percentage points. The solid red lines represent the benchmark model with both dominant currency pricing (DCP) and dominant currency financing (DCF). On the foreign side, the EBP shock generates a sharp contraction in global trade and an appreciation of the dollar against the home currency. US interest rates fall, reflecting flight-to-safety demand for dollar-denominated bonds. Consistent with the IRF-matching results, the EBP shock also induces broad setbacks in Korea's real economy. The depreciation of the home currency raises import prices, adding to inflationary pressures and depressing import demand. To counter inflation, the domestic central bank raises its policy rate, even as US rates decline. Investment and exports fall by roughly 1 percentage point on average in the first four quarters, while consumption declines by about 0.1 percentage points. Higher domestic interest rates, combined with the EBP shock's tightening of collateral constraints on dollar borrowing, further restrict firms' use of intermediate inputs and production. As a result, output falls by just over 0.3 percentage points on average during the first year and remains below steady state for an extended period.

The blue dashed lines illustrate the alternative model without DCF, which excludes both the safe-haven role of US bonds and the effect of the EBP on

Figure 4. IRFs to EBP Shocks: Role of Dominant Currency Financing



Notes: The figures plot the impulse responses of key variables to an annualized 0.25 percentage point rise in the EBP. The red solid lines are from the benchmark model, and the blue dashed lines are from the counterfactual with no dominant currency financing ($\varphi = \sigma_\kappa = \rho_\kappa = 0$).

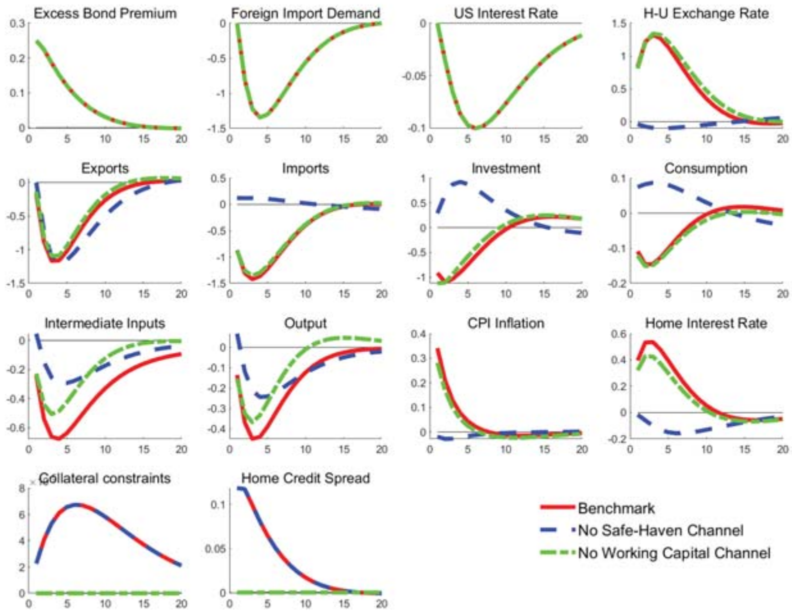
collateral constraints for dollar working-capital loans ($\varphi = \sigma_\kappa = \rho_\kappa = 0$).[15] The results differ markedly from the benchmark. Exports remain largely tied to foreign import demand, but the exchange rate is stable, preventing import-driven inflation. Domestic interest rates fall, which stimulates investment and consumption —sharply contrasting with the baseline. The use of intermediate inputs declines modestly in the short run. Overall, the output loss is more than two-thirds smaller than in the benchmark model and converges back to steady state more quickly.

15) One could argue for eliminating the link between the EBP and the home credit spread ($\rho_r = \sigma_r = 0$) in equation (II.16). However, our results indicate that nearly all of the working-capital effects operate through the collateral-constraint channel. We therefore focus on σ_κ and ρ_κ in this case.

2. Which Specific Channel of DCF Matters?

The preceding analysis demonstrated that dominant currency financing (DCF) amplifies the adverse effects of US financial shocks on the home economy. This section investigates which of the two key channels of DCF —the dollar's appreciation through its safe-haven role or the tightening of collateral constraints on dollar borrowing —contributes more to these spillovers.

Figure 5. IRFs to EBP Shocks: Specific Channels Within DCF



Notes: The figures plot the impulse responses of key variables to an annualized 0.25 percentage point rise in the EBP. The red solid lines are from the benchmark model. The blue long dashed lines are from an alternative without the dollar's safe-haven channel ($\varphi = 0$) and the green short dashed lines are from that without the working capital channel ($\sigma_\kappa = \rho_\kappa = 0$).

We first examine the safe-haven channel by comparing the benchmark model with an alternative specification that removes the utility gains from holding dollar bonds ($\varphi = 0$). The blue dashed lines in Figure 5 indicate that the safe-haven function of dollar bonds is largely responsible for the decline in investment and consumption following the EBP shock. In the absence of this channel, the dollar does not appreciate, and there are no inflationary pressures from higher import prices, as observed in the benchmark model. Instead, the home central bank responds to weaker demand by cutting its policy rate, which stimulates investment and consumption. Imports remain stable because import prices do not rise without currency depreciation, and the use of intermediate inputs declines only moderately. When the safe-haven channel is active, however, depreciation of the home currency due to flight-to-safety demand for dollar bonds raises the required amount of dollar working capital (equation (II.12)), thereby tightening collateral constraints (equation (II.14)). Consequently, without the safe-haven channel, output contracts much less during the first ten quarters after the shock. This highlights how the safe-haven mechanism exacerbates the central bank's trade-off: currency depreciation, driven by capital flows into dollar bonds, fuels import-driven inflation and limits the scope for monetary easing despite falling output.

We next consider the working capital channel by severing the link between the EBP and collateral constraints on dollar borrowing ($\sigma_{\kappa} = \rho_{\kappa} = 0$), while retaining the safe-haven function of dollar bonds. The green short-dashed lines show that the most pronounced difference arises in the use of intermediate inputs, which falls by less than in the benchmark. This reflects the fact that under equation (II.15), tighter US financial conditions directly reduce firms' dollar borrowing capacity, constraining purchases of imported intermediates. Since intermediate inputs account for around 60% of production, their contraction has a large effect on output. Without this channel, the use of intermediates recovers to steady state more rapidly than in other scenarios. By contrast, investment and consumption closely track the benchmark responses, as they are mainly driven by the safe-haven channel operating through exchange rates and domestic interest rates.

Taken together, these results suggest that the safe-haven channel is the dominant driver of the sharp initial decline in output, whereas the working capital channel exerts a more persistent influence over the medium term. Specifically, output falls the least in the first five quarters when the safe-haven mechanism is absent, but converges to the benchmark trajectory by the eighth quarter. By contrast, without the working capital channel, output consistently tracks a higher path than in the benchmark and returns to steady state more quickly, mirroring the recovery of intermediate inputs.

3. PCP to Insulate from US Financial Shocks?

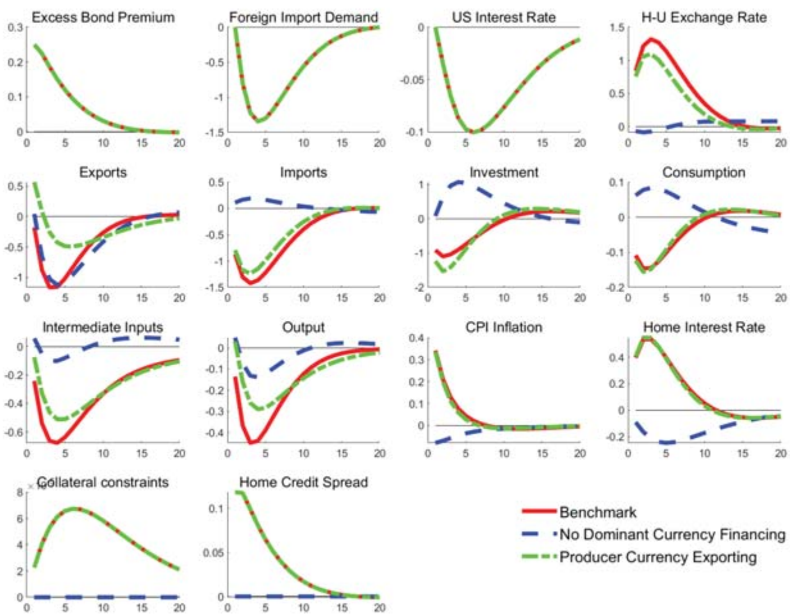
Thus far, the analysis has focused on the dollar's role in international finance as a channel for the spillover of US financial shocks. As emphasized in the introduction, however, another critical dimension of dollar dominance lies in its pervasive use as the currency of trade invoicing. In this section, we assess the extent to which reducing the dollar's role in export invoicing can mitigate these spillovers. As an illustrative scenario, we simulate impulse responses under the assumption that firms invoice exports to both the US and the rest of the world (ROW) in the producer currency rather than in dollars, while maintaining the existing currency composition of imports. This setting reflects a well-established finding in the literature that exporters largely determine invoicing choices.[16)]

Figure 6 shows that switching to producer-currency pricing (PCP) in exports, depicted by the green dashed lines, has a noticeable effect on export dynamics. Exports exhibit a slight increase following the EBP shock because, with export prices fixed in the producer currency, a depreciation of the home currency —driven by flight-to-safety demand for dollar bonds —induces expenditure switching toward home-produced goods in foreign markets. By contrast, the responses of consumption and investment remain largely unchanged, as they are primarily shaped by channels linked to dominant currency financing. Overall, the increase in exports reduces the output loss by roughly one-fourth relative to the benchmark case with dominant-currency pricing (DCP), suggesting that invoicing exports in the producer currency can materially dampen the spillovers of US financial shocks.[17)]

16) See Amiti, Itskhoki and Konings (2022) and Crowley, Han and Son (2021) for empirical evidence.

17) If exports were more sensitive to relative price movements, depreciation of the home currency under PCP would generate a larger shift in expenditure toward domestic goods. Consistent with this, Appendix Figure A.4 shows that when the price elasticity of exports is set to 2—as is common in the literature—rather than our relatively low estimate of 1.145, the export response under PCP is stronger, resulting in a smaller output loss following the EBP shock.

Figure 6. IRFs to EBP Shocks: Producer Currency Invoicing

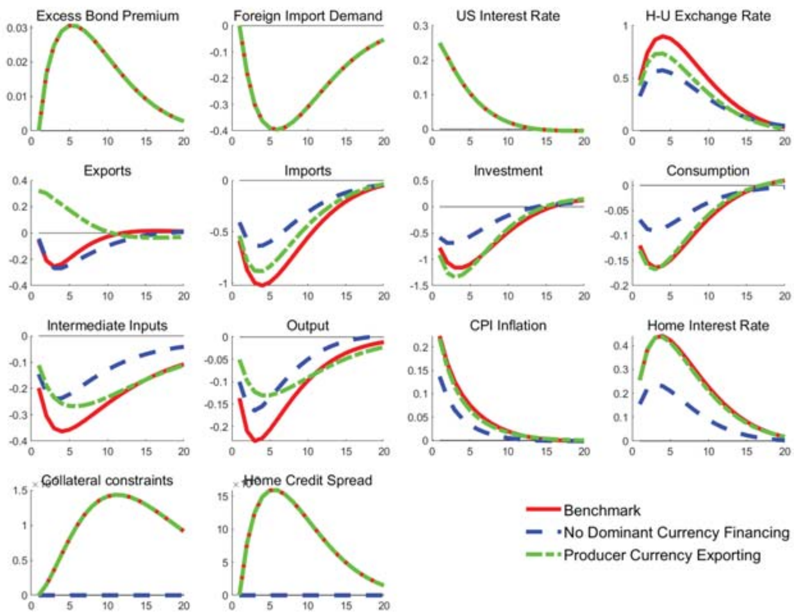


Notes: The figures plot the impulse responses of key variables to an annualized 0.25 percentage point rise in the EBP. The red solid lines are from the benchmark case. The blue long dashed lines are from the counterfactual without dominant currency financing ($\varphi = \sigma_\kappa = \rho_\kappa = 0$), and the green short dashed lines are from the counterfactual with PCP in exports.

V. Impulse Responses to US Monetary Policy

As a final step, we examine how US monetary policy affects the home economy under dollar dominance. Figure 7 reports the impulse responses to an annualized 0.25 percentage point increase in the US policy rate. In the benchmark DCP–DCF case (solid red lines), the rate hike strengthens the dollar, raising import prices and generating inflationary pressure. The home central bank responds by tightening its policy rate, which reduces investment and consumption. These transmission mechanisms closely resemble those observed through the safe-haven channel following an EBP shock. In addition, tighter US policy weakens global demand, further depressing exports. Under DCP, the export contraction is more severe because the dollar's appreciation raises the destination prices of home exports in ROW markets, reducing external demand. Importantly, the adverse effects of US monetary tightening are amplified by a concurrent rise in the EBP, which reflects tighter US financial conditions. As a result, output falls by roughly 0.2 percentage points on average during the first four quarters.

Figure 7. IRFs to US Monetary Tightening



Notes: The figures plot the impulse responses of key variables to an annualized 0.25 percentage point increase in the US interest rate. The red solid lines are from the benchmark case. The blue long dashed lines are from the counterfactual without dominant currency financing ($\varphi = \sigma_\kappa = \rho_\kappa = 0$), and the green short dashed lines are from the counterfactual with PCP in exports.

The case without DCF (blue long-dashed lines) displays a notably different adjustment. Here, the US rate hike generates a smaller dollar appreciation, milder inflationary pressure, and thus only a moderate increase in the home interest rate. Collateral constraints on dollar borrowing are unaffected. Consequently, the output decline is about 30% smaller on average over ten quarters compared with the benchmark, accompanied by more moderate drops in investment, consumption, and the use of intermediate inputs.

Finally, we consider a scenario in which exports are invoiced in the producer currency (PCP), departing from DCP. The green dashed lines show that PCP provides a short-term buffer: home currency depreciation significantly boosts exports, cushioning the output decline. Notably, the export response persists longer than under an EBP shock with PCP. This reflects the fact that a US interest rate hike leads to a sustained appreciation of the dollar, which maintains expenditure switching toward home goods for an extended period. By contrast, in the case of an EBP shock, the exchange rate quickly reverses as US rates subsequently fall. This suggests that PCP is relatively more effective in offsetting the negative effects of US monetary tightening than of EBP shocks. In the longer run, however, output converges back to steady state more quickly when DCF is absent, underscoring the central role of dominant currency financing in shaping the propagation of US shocks.

VI. Discussion

As analysed above, the dollar's dominance serves as a key channel through which economic shocks originating in the US spill over to the global economy. This occurs through its three primary functions: as the global safe-haven currency, as the working-capital currency for participation in GVCs, and as the invoicing currency in international trade. Some point to a "stealth erosion" of dollar dominance, noting the gradual decline in the dollar's share of international reserves (Arslanalp, Eichengreen and Simpson-Bell 2022). More recently, large emerging economies such as China, Russia, and Brazil have pursued initiatives to reduce their reliance on the dollar-centric international monetary system. There also exists a countervailing view that the dollar's international role is unlikely to change substantially in the near term. This perspective emphasizes the strong path dependence of the international monetary system and the absence of a credible alternative reserve currency. Historical precedent supports this view: even after the decline of Britain's global economic standing, it took considerable time for the dollar to replace sterling in international trade and finance. Similarly, the euro, despite being introduced in 1999, has remained largely a regional currency (Mukhin 2022).

For small open economies like Korea, mitigating the domestic repercussions of US-origin shocks under dollar dominance requires targeted policy efforts. First, Korea should enhance the attractiveness and credibility of its government bonds by seeking inclusion in the World Government Bond Index (WGBI). Such inclusion would reduce the intensity of "flight-to-safety" capital flows into US Treasuries during periods of financial stress and ease the resulting upward pressure on the won-dollar exchange rate, thereby mitigating adverse effects on the domestic economy. Second, Korea should pursue the long-term internationalization of the Korean won through regional cooperation with other Asian economies. Greater use of the won in cross-border transactions would help reduce the exposure of Korea's exports and imports to fluctuations in the dollar.[18)]

Finally, further research is needed on the global spread of dollar stablecoins and their implications for the dollar's international role. If stablecoins pegged to the dollar gain broader acceptance in cross-border trade settlements, the dollar's role in GVC financing and trade invoicing could strengthen. Their proliferation may also bolster foreign demand for US government bonds, which serve as the primary collateral backing these instruments. However, the implications for the dollar's safe-haven role remain uncertain.[19)]

VII. Concluding Remarks

In this paper, we examine how the global dominance of the US dollar amplifies the international transmission of financial shocks originating in the United States. Using a small open economy DSGE model calibrated to the Korean econ-

18) Concrete policy measures may include expanding bilateral local-currency swap arrangements and promoting offshore issuance of won-denominated bonds, thereby fostering the Korean won's development as a regional settlement currency.

19) For instance, excessive issuance of US government bonds or regulatory gaps that permit a "coin run" could increase volatility in US bond prices, thereby weakening the dollar's credibility as a reserve currency.

omy and incorporating the dollar's distinct roles in international trade and finance, we demonstrate the central importance of dollar dominance in propagating US financial shocks abroad. Our findings highlight two core aspects of dominant currency financing —the role of dollar-denominated bonds as safe-haven assets and the dollar's pivotal position in financing working capital for GVC activities —as the main channels of transmission. Model simulations show that, absent these channels, the impact of US financial shocks on output would be reduced by more than two-thirds, underscoring their critical importance. Our results also suggest that shifting trade invoicing from the dollar to the domestic currency can substantially dampen these spillover effects as well.

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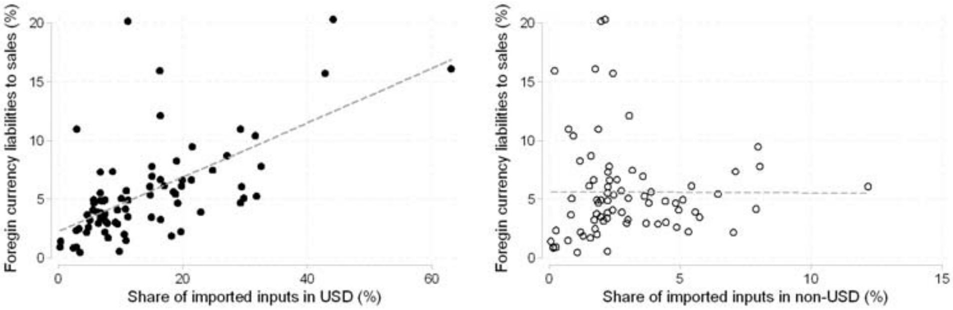
Appendix

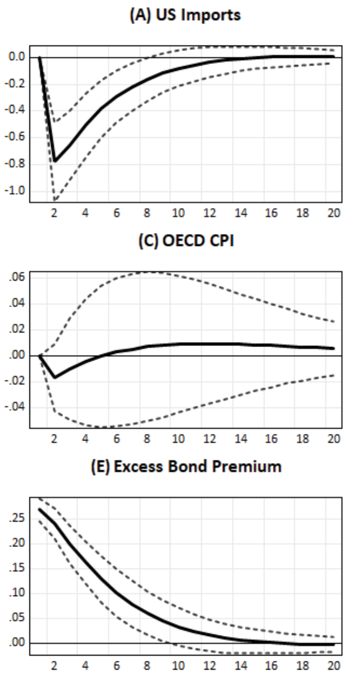
A. More Figures and Tables

Figure A.1. Foreign Currency Debts vs Imported Inputs for Korean Manufacturing Industries



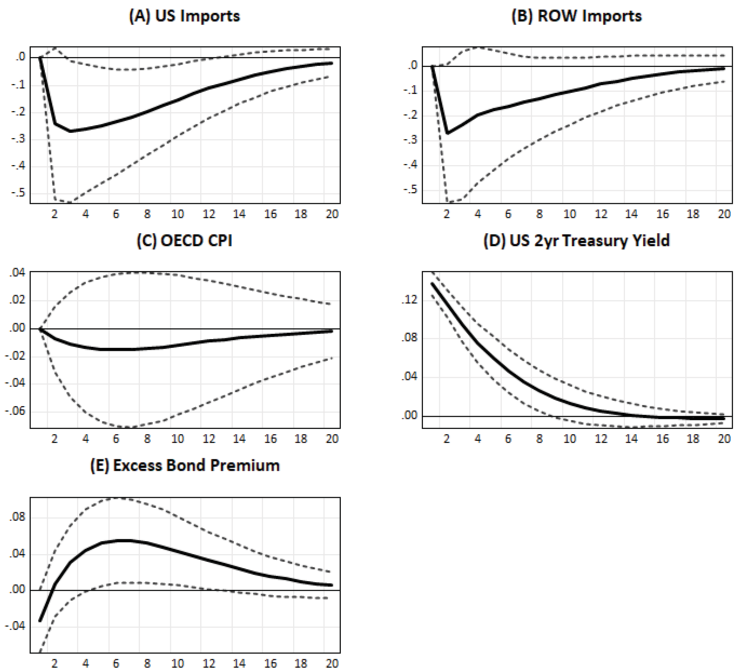
Note: The figures plot the ratio of foreign currency debts to sales and the share of imported inputs in dollars (left panel) and in non-US currencies —the euro, the Japanese yen, and the Korean won combined (right panel). Sources: KIS-VALUE database and Korea Customs Service.

Figure A.2. Impulse Responses to EBP Shocks in Foreign VAR Block



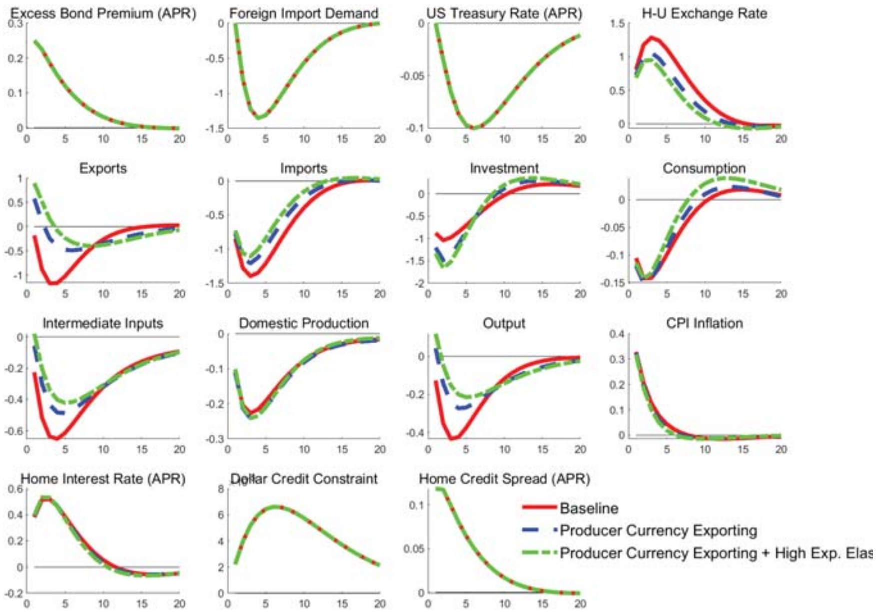
Notes: The figures plot the empirical impulse responses of foreign variables to a one standard deviation increase in the excess bond premium (EBP) within the foreign VAR block. The dashed lines indicate 90% confidence intervals.

Figure A.3. Impulse Responses to US interest rate shock in foreign VAR block



Notes: The figures plot the empirical impulse responses of foreign variables to a one standard deviation increase in the US interest rate within the foreign VAR block. The dashed lines indicate 90% confidence intervals.

Figure A.4. IRFs to EBP Shocks: PCP with Trade Elasticity



Notes: The figures plot the impulse responses of key variables to an annualized 0.25 percentage point rise in the EBP. The red solid lines are from the benchmark case. The blue and green dashed lines are from the counterfactuals under PCP in exports with the price elasticity of exports at 1.145, and at 2.0, respectively.

B. Equilibrium Conditions

We start by defining the real exchange rate $S^U_{H,t}$ and $S^R_{H,t}$:

$$S^U_{H,t}(\equiv S^{\$}_{H,t}) = \frac{\xi^U_{H,t}P^*_{U,t}}{P_{H,t}} \quad ; \quad S^R_{H,t} \equiv \frac{\xi^R_{H,t}P^*_{R,t}}{P_{H,t}}$$

1. Households

Household optimization problem is given by:

$$\begin{aligned}\mathcal{L}^h_t =& \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \Bigg\{ \frac{C_{H,t}{}^{1-\phi_C}}{1-\phi_C} + \varphi \zeta^{GFS}_t v(b^{\$}_{H,t}) - \varsigma \frac{L_{H,t}(h)^{1+\phi_L}}{1+\phi_L} \\ & - P_{H,t}\mu^C_{H,t}\Bigg[C_{H,t} + \frac{b_{H,t}}{(1+i_t)} + \frac{S^{\$}_{H,t}b^{\$}_{H,t}}{(1+i^*_t)\Psi_{H,t}} \\ & - \frac{W_t(h)}{P_{H,t}}L_{H,t}(h) + \frac{b_{H,t-1}}{1+\pi_{H,t}} + \frac{S^{\$}_{H,t}b^{\$}_{H,t-1}}{1+\pi^*_{U,t}} + \frac{\Pi_{H,t}}{P_{H,t}} + i_{\Gamma,t}\frac{\Gamma_{H,t}}{P_{H,t}} \Bigg]\Bigg\}\end{aligned}$$

where $b_{H,t} \equiv \frac{B_{H,t}}{P_{H,t}}$ and $b^{\$}_{H,t} \equiv \frac{B^{\$}_{H,t}}{P^*_{U,t}}$ denote real bond holdings.

The household's marginal utility of consumption $\lambda_{H,t}$ equals:

$$\lambda_{H,t} \equiv C^{-\phi_C}_{H,t} = \mu^C_{H,t}P_{H,t} \tag{B.1}$$

where $\mu^C_{H,t}$ is the Lagrange multiplier associated with the household's budget constraint.

$\Lambda_{H,t,s}$ denotes the stochastic discount factor (SDF) between time t and s:

$$\Lambda_{H,t,s} = \beta^{s-t}\frac{\lambda_{H,s}}{\lambda_{H,t}}$$

The first-order condition for home currency bonds $B_{H,t}$ and dollar bonds $B^*_{H,t}$:

$$1 = \mathbb{E}_t\Lambda_{H,t,t+1}\frac{1+i_t}{1+\pi_{H,t+1}} \tag{B.2}$$

$$1 = \mathbb{E}_t\Lambda_{H,t,t+1}\frac{(1+i^*_t)\Psi_{H,t}}{1+\pi^*_{U,t+1}}\frac{S^{\$}_{H,t+1}}{S^{\$}_{H,t}} + \varphi\zeta_t^{GFS}\frac{\partial v(b^{\$}_{H,t})}{\partial b^{\$}_{H,t}}\frac{(1+i^*_t)\Psi_{H,t}}{\lambda_{H,t}S^{\$}_{H,t}} \tag{B.3}$$

The household's wage setting is subject to

$$L_{H,t}(h) = \left[\frac{W_t(h)}{W_t}\right]^{-\nu} L_{H,t}$$

$$W_t(h) = \begin{cases} W_{t-1}(h) & \text{with probability } \delta_W \\ \overline{W}_t(h) & \text{with probability } 1-\delta_W \end{cases}$$

The first-order condition for optimal reset wage ($\overline{W}_t(h) = \overline{W}_t$) is given by:

$$\mathbb{E}_t\sum_{s=t}^{\infty}\delta_W^{s-t}\Lambda_{t,s}L_{H,s}W_s^{\nu(1+\phi_L)}\left[\frac{\nu}{\nu-1}\varsigma\frac{L^{\phi_L}_{H,s}}{\Lambda_{t,s}} - \frac{\overline{W}_s^{1+\nu\phi_L}}{W_s^{\nu\phi_L}}\right] = 0 \tag{B.4}$$

Wage Phillips curve is then derived as:

$$\pi_{W,t} = \beta \mathbb{E}_t \pi_{W,t+1} + \frac{(1-\delta_W)(1-\beta\delta_W)}{\delta_W}\left[\log(MRS_t) - \log\left(\frac{W_t}{P_{H,t}}\right) + \mu_W\right] \tag{B.5}$$

where $\pi_{W,t} \equiv \log W_t - \log W_{t-1}$ and $MRS_t \equiv \varsigma C_{H,t}^{-\phi_C} / L_{H,t}^{\phi_L}$ is the average marginal rate of substitution between consumption and leisure, and $\mu_W \equiv \log(\frac{\nu}{\nu-1})$.

Home consumer price index (CPI) is:

$$P_{H,t} = \left[\omega_H {P_{HH,t}}^{1-\eta} + \omega_U {P_{UH,t}}^{1-\eta} + \omega_R {P_{RH,t}}^{1-\eta}\right]^{\frac{1}{1-\eta}} \tag{B.6}$$

2. Wholesale Firm

$$Y_{w,t} = A_{H,t}(K_{H,t})^{\alpha}(Z_{H,t})^{\gamma}(L_{H,t})^{1-\alpha-\gamma} \tag{B.7}$$

$$\Pi_{w,t} = P_{w,t}Y_{w,t} - P_{H,t}Z_{H,t} - P_{H,t}I_{H,t} - W_t L_{H,t} - i_{\Gamma,t}\Gamma_{H,t} - i^*_{\Gamma,t}\Gamma^*_{H,t} \tag{B.8}$$

$$\Gamma_{H,t} \equiv \theta_w\left[P_{HH,t}(Z_{HH,t} + I_{HH,t}) + W_t L_{H,t}\right] \tag{B.9}$$

$$\Gamma^*_{H,t} \equiv \theta_w\left[P_{UH,t}(Z_{UH,t} + I_{UH,t}) + P_{RH,t}(Z_{RH,t} + I_{RH,t})\right] \tag{B.10}$$

Given these, the wholesale firm maximizes its profit:

$$\mathcal{L}_{w,t} = \mathbb{E}_0 \sum_{t=0}^{\infty} \Lambda_{H,0,t} \Big\{ P_{w,t} A_{H,t} (K_{H,t})^{\alpha} (Z_{H,t})^{\gamma} (L_{H,t})^{1-\alpha-\gamma} - P_{H,t} Z_{H,t} - P_{H,t} I_{H,t} - W_t L_{H,t} - i_{\Gamma,t} \Gamma_{H,t} - i^*_{\Gamma,t} \Gamma^*_{H,t}$$
$$+ Q_t \left[I_{H,t} - \frac{\psi_K}{2} \left(\frac{I_{H,t}}{K_{H,t}} - \delta \right)^2 K_{H,t} + (1-\delta) K_{H,t} - K_{H,t+1} \right]$$
$$+ \mu_{w,t} \left[\kappa_t Q_t K_{H,t} - (1 + i^*_{\Gamma,t}) \Gamma^*_{H,t} \right] \Big\}$$

Normalizing $P_{H,t} = 1$,

$$R^k_{H,t} = \alpha \frac{P_{w,t} Y_{w,t}}{K_{H,t}} \tag{B.11}$$

$$K_{H,t+1} = I_{H,t} - \frac{\psi_K}{2} \left(\frac{I_{H,t}}{K_{H,t}} - \delta \right)^2 K_{H,t} + (1-\delta) K_{H,t} \tag{B.12}$$

$$(1-\alpha-\gamma) \frac{P_{w,t} Y_{w,t}}{L_{H,t}} = (1 + \theta_w i_{\Gamma,t}) W_{H,t} \tag{B.13}$$

$$\gamma \frac{P_{w,t} Y_{w,t}}{X_{H,t}} = 1 + \theta_w \left[\omega_H P^{1-\eta}_{HH,t} (1 + i_{\Gamma,t}) + (1 + \mu_{w,t}) (\omega_U P^{1-\eta}_{UH} + \omega_R P^{1-\eta}_{RH}) (1 + i^*_{\Gamma,t}) \right] \tag{B.14}$$

$$Q_{H,t} \left[1 - \psi_K \left(\frac{I_{H,t}}{K_{H,t}} - \delta \right) \right] = 1 + \theta_w \left[\omega_H P^{1-\eta}_{HH,t} (1 + i_{\Gamma,t}) + (1 + \mu_{w,t}) (\omega_U P^{1-\eta}_{UH} + \omega_R P^{1-\eta}_{RH}) (1 + i^*_{\Gamma,t}) \right] \tag{B.15}$$

$$Q_{H,t} = \mathbb{E}_t \frac{1+\pi_{H,t+1}}{1+i_t} \left\{ R^k_{t+1} + Q_{H,t+1} \left[1 - \delta + \kappa_{t+1}\mu_{w,t+1} - \frac{\psi_K}{2} \left(\frac{I_{H,t+1}}{K_{H,t+1}} - \delta \right)^2 + \psi_K \left(\frac{I_{H,t+1}}{K_{H,t+1}} - \delta \right) \frac{I_{H,t+1}}{K_{H,t+1}} \right] \right\} \tag{B.16}$$

$$(1+i^*_{\Gamma,t})\Gamma^*_{H,t} = \kappa_t Q_t K_{H,t} \tag{B.17}$$

The stochastic process for κ_t and $rp_t (\equiv i_{\Gamma,t} - i_t)$:

$$\kappa_t = \rho_\kappa \kappa_{t-1} + (1-\rho_\kappa)\overline{\kappa} - \sigma_\kappa \zeta_t^{GFS} \tag{B.18}$$

$$rp_t = \rho_r rp_{t-1} + \sigma_r \zeta_t^{GFS} \tag{B.19}$$

3. UIP Condition

The risk premium associated with the holdings of dollar bonds:

$$\Psi_{H,t}(a_{H,t}, S^{\$}_{H,t}) = \exp\left[-\psi_a(a_{H,t} - \overline{a_H}) - \rho_s \left(\frac{\mathbb{E}_t S^{\$}_{H,t+1}}{S^{\$}_{H,t}} \frac{S^{\$}_{H,t}}{S^{\$}_{H,t-1}} - 1 \right) \right] \tag{B.20}$$

with $a_{H,t} \equiv \frac{\xi^{\$}_{H,t} B^{\$}_{H,t}}{P_{H,t} Y_{H,t}}$.

Log-linearizing equation (B.2) and (B.3) in which $\zeta^{GFS} = 0$ and normalizing $v(\cdot)$ such that $\frac{1}{\beta}\frac{v'(\cdot)}{\lambda_H} = 1$ at the steady-state, the modified version of the UIP condition is derived as:

$$r_t - r_t^* = (1-\rho_s)\mathbb{E}_t \Delta s^{\$}_{H,t+1} - \rho_s \Delta s^{\$}_{H,t} + \varphi \zeta_t^{GFS} + \psi_{a,t} \tag{B.21}$$

where $r_t \equiv i_t - \mathbb{E}_t[\pi_{H,t+1}]$, $r_t^* \equiv i_t^* - \mathbb{E}_t[\pi^*_{U,t+1}]$, and $\psi_{a,t} \equiv -\psi_a(a_{H,t} - \overline{a_H})$.

4. H-R Exchange Rate

The relationship between $S^U_{H,t}$ and $S^R_{H,t}$:

$$\log(S^R_{H,t}) = \zeta_R \log(S^U_{H,t}) + \varepsilon^R_{H,t} \tag{B.22}$$

5. Aggregate Exports

Aggregate exports to country U and R:

$$Y_{HU,t} = \sum_k \vartheta^k_{HU} Y^k_{HU,t} \tag{B.23}$$

$$Y_{HR,t} = \sum_k \vartheta^k_{HR} Y^k_{HR,t} \tag{B.24}$$

Domestic currency price of exports $\widetilde{P^k_{Hj,t}}$:

$$\widetilde{P^U_{HU,t}} = \frac{\xi^U_{H,t} P^U_{HU,t}}{P_{H,t}}, \quad \widetilde{P^H_{HR,t}} = \frac{P^H_{HR,t}}{P_{H,t}}, \quad \widetilde{P^U_{HR,t}} = \frac{\xi^U_{H,t} P^U_{HR,t}}{P_{H,t}}, \quad \widetilde{P^R_{HR,t}} = \frac{\xi^R_{H,t} P^R_{HR,t}}{P_{H,t}}$$

It is assumed that exports to the US are invoiced in either the dollar (U) or the producer currency (H). Exports by invoicing currency k and destination j are given by:

$$Y^{U}_{HU,t} = \left(\frac{\widetilde{P^{U}_{HU,t}}}{S^{U}_{H,t}}\right)^{-\rho} D^{*}_{U,t} \tag{B.25}$$

$$Y^{H}_{HU,t} = \left(\frac{\widetilde{P^{H}_{HU,t}}}{S^{U}_{H,t}}\right)^{-\rho} D^{*}_{U,t} \tag{B.26}$$

$$Y^{U}_{HR,t} = \left(\frac{\widetilde{P^{U}_{HR,t}}}{S^{R}_{H,t}}\right)^{-\rho} D^{*}_{R,t} \tag{B.27}$$

$$Y^{R}_{HR,t} = \left(\frac{\widetilde{P^{R}_{HR,t}}}{S^{R}_{H,t}}\right)^{-\rho} D^{*}_{R,t} \tag{B.28}$$

$$Y^{H}_{HR,t} = \left(\frac{\widetilde{P^{H}_{HR,t}}}{S^{R}_{H,t}}\right)^{-\rho} D^{*}_{R,t} \tag{B.29}$$

Foreign demand from U and R:

$$\log D^{*}_{U,t} = (1-\rho^{*}_{X})\log \overline{D^{*}_{U}} + \rho^{*}_{X}\log D^{*}_{U,t-1} + \sigma^{*}_{X} m^{*}_{U,t} \tag{B.30}$$

$$\log D^{*}_{R,t} = (1-\rho_{X})\log \overline{D^{*}_{R}} + \rho^{*}_{X}\log D^{*}_{R,t-1} + \sigma^{*}_{X} m^{*}_{R,t} \tag{B.31}$$

Export price inflation in terms of local currency:

$$\pi^{U}_{HU,t} = (\widetilde{p^{U}_{HU,t}} - s^{U}_{H,t}) - (\widetilde{p^{U}_{HU,t-1}} - s^{U}_{H,t-1}) + \pi^{*}_{t} \tag{B.32}$$

$$\pi^{H}_{HU,t} = \widetilde{p^{H}_{HU,t}} - \widetilde{p^{H}_{HU,t-1}} + \pi_{H,t} \tag{B.33}$$

$$\pi^{U}_{HR,t} = (\widetilde{p^{U}_{HR,t}} - s^{U}_{H,t}) - (\widetilde{p^{U}_{HR,t-1}} - s^{U}_{H,t-1}) + \pi^{*}_{t} \tag{B.34}$$

$$\pi^{R}_{HR,t} = (\widetilde{p^{R}_{HR,t}} - s^{R}_{H,t}) - (\widetilde{p^{R}_{HR,t-1}} - s^{R}_{H,t-1}) + \pi^{*}_{t} \tag{B.35}$$

$$\pi^{H}_{HR,t} = \widetilde{p^{H}_{HR,t}} - \widetilde{p^{H}_{HR,t-1}} + \pi_{H,t} \tag{B.36}$$

The first-order condition for retailers' optimal price setting in exports is given by:

$$\mathbb{E}_t \sum_{s=t}^{\infty} \delta_p^{s-t} \Lambda_{H,s|t} Y_{Hj,s}^k \left[\xi_{H,s}^k \bar{P}_{Hj,t}^k - \frac{\varepsilon}{1-\varepsilon} P_{w,s} \right] = 0$$

where all reset prices are the same across firms in each destination ($\bar{P}_{Hj,t}^k = \bar{P}_{Hj,t}^k(f)$). Denoting $MC_{H,t} \equiv P_{w,s}$, Phillips curve for export is derived as:

$$\pi_{HU,t}^U = \beta \mathbb{E}_t \pi_{HU,t+1}^U + \frac{(1-\theta_p)(1-\beta\theta_p)}{\theta_p} (mc_{H,t} - \widetilde{p_{HU,t}^U} + \mu) \tag{B.37}$$

$$\pi_{HU,t}^H = \beta \mathbb{E}_t \pi_{HU,t+1}^H + \frac{(1-\theta_p)(1-\beta\theta_p)}{\theta_p} (mc_{H,t} - \widetilde{p_{HU,t}^H} + \mu) \tag{B.38}$$

$$\pi_{HR,t}^U = \beta \mathbb{E}_t \pi_{HR,t+1}^U + \frac{(1-\theta_p)(1-\beta\theta_p)}{\theta_p} (mc_{H,t} - \widetilde{p_{HR,t}^U} + \mu) \tag{B.39}$$

$$\pi_{HR,t}^H = \beta \mathbb{E}_t \pi_{HR,t+1}^H + \frac{(1-\theta_p)(1-\beta\theta_p)}{\theta_p} (mc_{H,t} - \widetilde{p_{HR,t}^H} + \mu) \tag{B.40}$$

$$\pi_{HR,t}^R = \beta \mathbb{E}_t \pi_{HR,t+1}^R + \frac{(1-\theta_p)(1-\beta\theta_p)}{\theta_p} (mc_{H,t} - \widetilde{p_{HR,t}^R} + \mu) \tag{B.41}$$

where $\mu \equiv \log\left(\frac{\varepsilon}{\varepsilon-1}\right)$.

Export price index in home currency for destination U and R:

$$\log(P_{HU,t}) = \sum_k \vartheta_{HU}^k \log(\widetilde{P_{HU,t}^k}) \tag{B.42}$$

$$\log(P_{HR,t}) = \sum_k \vartheta_{HR}^k \log(\widetilde{P_{HR,t}^k}) \tag{B.43}$$

6. Aggregate Imports

Aggregate imports from country U and R:

$$Y_{UH,t} = \sum_k \vartheta^k_{UH} Y^k_{UH,t} \tag{B.44}$$

$$Y_{RH,t} = \sum_k \vartheta^k_{RH} Y^k_{RH,t} \tag{B.45}$$

Imports by invoicing currency and origin country:

$$Y^U_{UH,t} = \omega_U \left(\frac{P^U_{UH,t}}{P_{H,t}} \right)^{-\eta} (C_{H,t} + Z_{H,t} + I_{H,t}) \tag{B.46}$$

$$Y^U_{RH,t} = \omega_R \left(\frac{P^U_{RH,t}}{P_{H,t}} \right)^{-\eta} (C_{H,t} + Z_{H,t} + I_{H,t}) \tag{B.47}$$

$$Y^R_{RH,t} = \omega_R \left(\frac{P^R_{RH,t}}{P_{H,t}} \right)^{-\eta} (C_{H,t} + Z_{H,t} + I_{H,t}) \tag{B.48}$$

Domestic price of imports:

$$P^U_{UH,t} / P_{H,t} = S^U_{H,t} \tag{B.49}$$

$$P^U_{RH,t} / P_{H,t} = S^U_{H,t} \tag{B.50}$$

$$P^R_{RH,t} / P_{H,t} = S^R_{H,t} \tag{B.51}$$

$$\pi^U_{UH,t} = \log P^U_{UH,t} - \log P^U_{UH,t-1} \tag{B.52}$$

$$\pi^U_{RH,t} = \log P^U_{RH,t} - \log P^U_{RH,t-1} \tag{B.53}$$

$$\pi^R_{RH,t} = \log P^R_{RH,t} - \log P^R_{RH,t-1} \tag{B.54}$$

Aggregate import prices across invoicing currencies:

$$\log(P_{UH,t}) = \sum_k \vartheta^k_{UH} \log(P^k_{UH,t}) \tag{B.55}$$

$$\log(P_{RH,t}) = \sum_k \vartheta^k_{RH} \log(P^k_{RH,t}) \tag{B.56}$$

7. Domestic Absorption

Demand for home goods:

$$Y_{HH,t} = \omega_H \left[\frac{P_{HH,t}}{P_{H,t}}\right]^{-\eta} (C_{H,t} + Z_{H,t} + I_{H,t}) \tag{B.57}$$

The first-order condition for retailers' optimal price setting in domestic markets is given by:

$$\mathbb{E}_t \sum_{s=t}^{\infty} \delta_p^{s-t} \Lambda_{H,s|t} Y_{HH,s} \left[\bar{P}_{HH,t} - \frac{\varepsilon}{1-\varepsilon} P_{w,s}\right] = 0$$

where all reset prices are the same across firms ($\bar{P}_{HH,t} = \bar{P}_{HH,t}(f)$). Again denoting $MC_{H,t} \equiv P_{w,s}$, Phillips curve for home price is given by:

$$\pi_{HH,t} = p_{HH,t} - p_{HH,t-1} + \pi_{H,t} \tag{B.58}$$

$$\pi_{HH,t} = \beta \mathbb{E}_t \pi_{HH,t+1} + \frac{(1-\theta_p)(1-\beta\theta_p)}{\theta_p}(mc_{H,t} - p_{HH,t} + \mu) \tag{B.59}$$

8. Market Clearing Conditions

Final goods market:

$$Y_{H,t} = Y_{HH,t} + Y_{HU,t} + Y_{HR,t} \tag{B.60}$$

Balance of Payments (BoP):

$$S^{\$}_{H,t}\left[\frac{b^{\$}_{H,t}}{(1+i^*_t)\Psi_{H,t}} - b^{\$}_{H,t-1}\right] + i^*_{\Gamma,t}\Gamma^*_{H,t}$$

$$= P_{HU,t}Y_{HU,t} + P_{HR,t}Y_{HR,t} - P_{UH,t}Y_{UH,t} - P_{RH,t}Y_{RH,t} \tag{B.61}$$

⟨Abstract in Korean⟩

달러패권과 미국발 충격의 글로벌 파급

손민규 *

본 논문은 글로벌 달러패권(dollar dominance)이 미국발 경제 충격의 국제적 영향을 어떻게 증폭시키는가를 분석하였다. 이를 위해 국제교역 및 금융에 있어 달러화의 핵심적 기능이 고려된 소규모 개방경제 동태확률일반균형(DSGE) 모형을 구축하였다. 동 모형은 한국 경제의 특성을 고려한 것으로서, 특히 미국 금융여건의 척도인 채권초과프리미엄(excess bond premium) 충격에 대한 주요 변수들의 반응과 우리나라의 실제 데이터로부터 도출된 충격반응간 괴리가 최소화되도록(impulse response matching) 주요 모수를 추정하였다. 모의실험 결과, 미국발 금융리스크 충격이 국내 경제로 파급되는 데에는 달러화의 글로벌 안전자산 통화 및 수출입 운전자금 통화로서의 기능이 주요한 경로로 작용하는 것으로 나타났다. 이러한 달러화의 국제금융통화 기능이 없을 경우, 미 금융리스크 충격이 우리 생산에 미치는 부정적 영향이 3분의 2 이상 줄어들었다. 또한 무역결제에 있어 달러화를 대신하여 원화를 이용할 경우 미 금융리스크 충격의 국내 파급 영향이 4분의 1가량 줄어드는 것으로 나타났다.

핵심 주제어: 달러패권, 기축통화, 통화정책, 동태확률일반균형모형

JEL Classification: E32, F30, H22

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제2019 –1	Deciphering Monetary Policy Board Minutes through Text Mining Approach: The Case of Korea	Ki Young Park · Youngjoon Lee · Soohyon Kim
2	The Impacts of Macroeconomic News Announcements on Intraday Implied Volatility	Jieun Lee · Doojin Ryu
3	Taking a Bigger Slice of the Global Value Chain Pie: An Industry–level Analysis	Chong–Sup Kim · Seungho Lee · Jihyun Eum
4	Trend Growth Shocks and Asset Prices	Nam Gang Lee
5	Uncertainty, Attention Allocation and Monetary Policy Asymmetry	Kwangyong Park
6	Central Bank Digital Currency and Financial Stability	Young Sik Kim · Ohik Kwon
7	은행의 수익 및 자산구조를 반영한 통화정책 위험선호경로	김의진 · 정호성
8	혁신기업에 대한 산업금융 지원: 이론모형 분석	강경훈 · 양준구
9	가계부채 제약하의 통화정책: 2주체 거시모형(TANK)에서의 정량적 분석	정용승 · 송승주
10	Alchemy of Financial Innovation: Securitization, Liquidity and Optimal Monetary Policy	Jungu Yang
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14	특허자료를 이용한 우리나라 지식전파의 지역화 분석	이지홍・남윤미
15	Overhead Labour and Skill-Biased Technological Change: The Role of Product Diversification	Choong Hyun Nam
16	Does the Number of Countries in an International Business Cycle Model Matter?	Myunghyun Kim
17	High-Frequency Credit Spread Information and Macroeconomic Forecast Revision	Bruno Deschamps・Christos Ioannidis・Kook Ka
18	경제 분석을 위한 텍스트 마이닝	김수현・이영준・신진영・박기영
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22	Identifying Government Spending Shocks and Multipliers in Korea	Kwangyong Park・Eun Kyung Lee
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25	Uncertainty, Credit and Investment: Evidence from Firm-Bank Matched Data	Youngju Kim・Seohyun Lee・Hyunjoon Lim
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2	달러라이제이션이 확산된 북한경제에서 보유외화 감소가 물가·환율에 미치는 영향	문성민 · 김병기
3	상태공간 벡터오차수정모형을 이용한 월별 GDP 추정: 깁스표본추출 접근	김기호
4	우리나라 외환시장 오퍼레이션의 행태 및 환율변동성 완화 효과	박준서 · 최경욱
5	Common Factor Augmented Forecasting Models for the US Dollar-Korean Won Exchange Rate	Hyeongwoo Kim · Soohyon Kim
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7	북한의 광물 수출과 품목별 수입: 대중무역을 중심으로	김병연 · 김민정 · 김다울
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11	House Prices and Household Consumption in Korea	Seungyoon Lee
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13	산업구조조정이 고용 및 성장에 미치는 영향	서병선 · 김태경
14	Cross-border Trade Credit and Trade Flows During the Global Financial Crisis	Moon Jung Choi · Sangyeon Hwang · Hyejoon Im

30	Wage and Employment Effects of Immigration: Evidence from Korea	Hyejin Kim
제2021-1	외국인력 생산성 제고 방안—직업훈련 프로그램의 노동시장 성과 분석을 중심으로	김혜진 · 이철희
2	한국경제의 추세 성장률 하락과 원인	석병훈 · 이남강
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4	The Effects of Monetary Policy on Consumption: Workers vs. Retirees	Myunghyun Kim · Sang-yoon Song
5	북한지역 토지자산 추정에 관한 연구: 프레임워크 개발 및 탐색적 적용	임송
6	김정은 시대 북한의 금융제도 변화 - 북한 문헌 분석을 중심으로 -	김민정 · 문성민
7	Chaebols and Firm Dynamics in Korea	Philippe Aghion · Sergei Guriev · Kangchul Jo
8	한국의 화폐환상에 관한 연구	권오익 · 김규식 · 황인도
9	재원조달 방법을 고려한 재정지출 효과 분석 : 미국의 사례를 중심으로	김소영 · 김용건
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12	우리 수출의 글로벌 소득탄력성 하락 요인 분석	김경근
13	북한의 경제체제에 관한 연구: 실태와 평가	양문수 · 임송
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9	북한 수출입단가지수 추정: 북중무역 데이터를 중심으로	이종민 · 김민정
10	탄소배출을 감안한 국가별 녹색 총요소생산성 분석	안상기
11	북한 소비자 지급수단 조사 및 분석	이주영
12	Selection into Outsourcing versus Integration Strategies for Heterogeneous Multinationals	Sangho Shin
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14	Technological Change, Job Characteristics, and Employment of Elderly Workers: Evidence from Korea	Jongwoo Chung · Chulhee Lee
15	Machine-Learning-Based News Sentiment Index (NSI) of Korea	Beomseok Seo · Younghwan Lee · Hyungbae Cho
16	빅데이터를 이용한 실시간 민간소비 예측	신승준 · 서범석
17	Fixed Effects Quantile Estimations with Extended Within Transformation and their Application	Ki-Ho Kim
18	글로벌 금융위기 이후 가계소비행태 변화 분석: 세대별 소비행태를 중심으로	최영준
19	Optimal Monetary Policy under Heterogeneous Consumption Baskets	Seunghyeon Lee

20	통화정책 충격이 생산과 물가에 미치는 효과의 국가별 차이 및 결정요인	임근형 · 나승호 · 오다운
제2023–1	Shocks, Frictions, and Inequality in Korean Business Cycles	Seungcheol Lee · Ralph Luetticke · Morten O. Ravn
2	소득동질혼과 가구구조가 가구소득 불평등에 미치는 영향: 국제비교를 중심으로	박용민 · 허 정
3	Dominant Currency Pricing: Evidence from Korean Exports	Minkyu Son
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9	북한 장기 수출입 데이터 재구축 및 분석 : 1962~2018년	김민정 · 김다울
10	Econometric Forecasting Using Ubiquitous News Text: Text–enhanced Factor Model	Beomseok Seo
11	Changes in Inflation Dynamics in Korea: Global Factor, Country Factor, and their Propagation	Yun Jung Kim · Noh–Sun Kwark
12	Financial Technologies and the Effectiveness of Monetary Policy Transmission	Iftekhar Hasan · Boreum Kwak·Xiang Li

26	국내 기후변화 물리적 리스크의 실물경제 영향 분석	이지원
27	Point and Risk estImation using an enSemble of Models for Nowcasting: PRISM-Now	Beomseok Seo · Hyungbae Cho · Dongjae Lee
28	Does the Target Matter? Evidence from Labor Supply Decisions of Fishermen	Eseul Choi
29	북한이탈주민 조사를 통해 본 북한 출산율 하락 추세와 남북한 인구통합에 대한 시사점	이주영 · 김선중
제**2024** -1	The Evolution of the Response of Credit Spread Variables to Monetary Policy Shocks	Do wan Kim
2	Uncertainty and the Impacts of Structural Oil Shocks on the Korean Economy	Soojin Jo · Myungkyu Shim
3	수출대상국의 무역기술장벽(TBT)이 한국 수출에 미치는 영향 분석: 수출의 내·외연적 한계와 산업 특성에 따른 비교	장용준 · 신상호
4	개인 특성별 이질적 인플레이션율과 실질 소비 탄력성	유재인 · 민찬호 · 정호성
5	실업경험이 가계소비에 미치는 장기효과 분석	최영준
6	Central Bank Digital Currency, Real Effect and Welfare	Seonghoon Cho
7	우리나라 노동시장 상황과 인플레이션 간의 관계 변화	허준영 · 채민석
8	Is there an information channel of monetary policy?	Oliver Holtemöller · Alexander Kriwoluzky · Boreum Kwak
9	Inflation Disagreement and Monetary Transmission in Korea	Boreum Kwak· Seri Shim·Peter Tillmann
10	Using Density Forecast for Growth-at-Risk to Improve Mean Forecast of GDP Growth in Korea	Yoosoon Chang · Yong-gun Kim · Boreum Kwak · Joon Y. Park
11	수익률곡선 추세와 기간 프리미엄	강규호 · 구병수
12	Digital Literacy and Physical Cash Demand during the COVID-19 Pandemic	Kyeongtae Lee · Jaevin Park
13	Exploring the Natural Interest Rate in Korea: A Multi-Model Approach	Kyeongtak Do · Ju Hyun Ahn · Hae Ri Jung