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Global perspectives

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Macro-financial linkages in East Asia in Global perspectives

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Abstract:

This paper explores the unique property of macro-financial linkages in East Asia since the 2000s in comparison with other emerging market regions. First, we estimate a dynamic common factor model to identify global, factors dominating their macroeconomic and financial cycles and examine the interactions between their macroeconomic and financial factors. We refer to some representative financial markets as stock markets, housing markets, and public bond markets. Then, we quantify the relative importance of global and domestic financial factors to macroeconomic cycles for each economy. Moreover, we examine whether the relative importance of these financial factors changes across crisis periods.

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1. Introduction

In recent years, not only have the relationships between finance and macroeconomy in some countries strengthened, but they have also become globalised. Economic fluctuations are linked to fluctuations in financial variables, such as asset prices, and fluctuations in financial variables in one country are linked to fluctuations in financial variables in other countries. The global financial crisis of 2008 is a typical example of global macro-finance.

However, the strength of the global macro-finance relationship can vary among countries. It also depends on the type of global financial cycle. The purpose of this study is to examine the global macro-finance relationship in emerging economies. This study first identifies global financial cycles using financial data from G-7 countries. Then, by estimating the vector autoregression (VAR) model, which includes global and domestic financial and macroeconomic factors for each emerging country, this study analyses the extent to which domestic and global financial fluctuations can explain the macroeconomic fluctuations of each country.

The research questions examined in this study are as follows: Which emerging economies are more vulnerable to global fluctuations in which types of financial markets? Have the sensitivities of emerging economies to global fluctuations in financial markets changed before and after the global financial crisis?

To answer these questions, this study adopts the following approach: First, we identify the common fluctuations in financial asset prices among the G-7 developed countries as global financial fluctuations. We focus on three types of financial markets: housing, stock, and bond markets. We identified variable-specific global factors by estimating the dynamic factor model. We then estimate the VAR model for each country. Based on the estimated parameters, we evaluate the factors that contribute to the fluctuation of real GDP growth in each country by analysing variance decomposition.

The remainder of this paper proceeds as follows: In Section 2, we introduce previous studies and related literature, and present the features and originality of this study. In Section 3, we introduce an empirical method to examine the sensitivity of each emerging economy to global financial fluctuations. In Section 4, we present the analysis results, and finally, Section 5 concludes.

2. Literature Survey

This study is related to the literature on the interaction between the financial sector and the real economy. Much of this literature focuses on financial crises, financial boom followed by bust (i.e. financial cycle), and interactions between financial and business cycles (Claessens and Kose, 2018). Claessens, Kose, and Terrones (2011) analyse cycles in credit, housing prices, and equity prices in 21 advanced countries over the period 1960 to 2007. They found key features of financial cycles, such as duration and amplitude. I focus on their findings of cycles in credit and house prices tending to be highly synchronised within countries. Claessens, Kose, and Terrones (2012) analyse the interaction between financial and business cycles based on data from 44 countries over the period 1960–2010. They confirmed that recessions associated with housing and equity price busts tend to be longer and deeper than do those associated with other recessions.

The strong synchronisation between credit and housing price cycles may be due to an increase in mortgage lending to households. Jordà, Schularick, and Taylor (2014) examine the long-run database on bank credit that distinguishes between credit to businesses and to households, in 17 advanced economies after 1870. They find that the composition of bank lending has changed; that is, the share of households lending has increased since 1950. Some studies argue that increasing household credit has a negative impact on the real economy, unlike corporate credit (Mian et al., 2015; Jordà et al., 2020). Studies confirm the increasing share of bank lending to households not only in developed

countries but also in some emerging countries (Enya,2016).

Second, this study is also related to the literature on co-movements in real economies, capital inflows and financial variables across countries (Kose, Otrok, and Whiteman, 2003; Rey, 2015; Igan and Loungani, 2012). Rey (2015) demonstrates co-movements in capital inflows and outflows, asset prices, and credit growth between countries, that is, global financial cycles, based on data from 53 countries over the period 1990–2013. Some studies have identified global cycles across countries in a particular financial market. Hirata et al. (2012) identify global fluctuations in the housing market across 18 advanced economies over the past 40 years.

The following studies examine the drivers of global fluctuations. Analysing factor augmented VAR (FAVAR), Hirata et al. (2012) find that the drivers of global housing fluctuations are global interest rate shocks, which includes some global factors. Igan and Loungani (2012) find that the main common drivers of house price changes in 22 advanced countries are affordability, income, and credit. Milcheva and Zhu (2016) also highlight the importance of bank credit and bank integration, measured by cross-border bank flows, as a driving force for the global housing price cycle. Using global Bayesian VAR analysis, which estimates the VAR model including global financial variables, Miranda-Agrippino and Rey (2015) find that US monetary policy shocks drive global financial cycles.

Furthermore, this study is also related to the literature on the impact of global financial shocks on emerging economies. Many studies analyse the impacts of global factors on capital flows in emerging economies (Cerutti, Claessens, and Rose, 2017; Enya, Kohsaka, and Sugimoto, 2019). However, few studies empirically analyse the linkages between global and domestic financial factors and real economies, that is, global macro-finance. Ha et al. (2020) examine global macroeconomic and financial cycles and the spillovers between them, for G-7 countries, over the period 1985–2019. By estimating Bayesian dynamic factor models, they find that some global cycles are specific to each financial variable, such as housing prices, stock prices, and interest rates. Then, they find spillovers

from global housing and stock factors to global macroeconomic factors and the important role of global macroeconomic factors in explaining business cycle fluctuations.

The focus of this study is similar to that of Ha et al. (2020). This study differs from previous studies in the following ways: First, we focus on global macro-finance in emerging economies. We evaluate the relative importance of global and domestic financial factors in explaining macroeconomic fluctuations in emerging economies. Second, we estimate dynamic factor models using the maximum likelihood (ML) method to identify global factors. The ML method can obtain statistically significant factors.

3. Methodology

3-1. Models for capturing global factors

This study estimates a dynamic factor model to capture global financial and real economic factors around the world. All co-movements among financial and macroeconomic variables in our dynamic factor model are captured by a set of k latent variables F_t . Let Y_t denote an $n \times 1$ vector of observable data. The dynamic factor model is defined as follows:

$$Y_t = \beta F_t + \Gamma_t \quad (1)$$

$$\Gamma_t = \Psi(L)\Gamma_{t-1} + U_t \quad (2)$$

$$F_t = \Phi(L)F_{t-1} + V_t \quad (3)$$

where $E_t(U_t U_t') = \Omega$ and $E_t(V_t V_t') = I_k$. Γ_t is an $n \times 1$ vector of idiosyncratic components, which captures the movement in each observable series that are specific to that time series. Each element of Γ_t is assumed to follow an independent $AR(q)$ process; hence, $\Psi(L)$ is a block

diagonal lag polynomial matrix. Ω is a covariance matrix restricted to the diagonal. The latent factors are denoted by the $k \times 1$ vector F_t , whose dynamics follow an $AR(p)$ process. The $n \times k$ matrix β contains the factor loadings that measure the response of each observable variable to each factor ($k < n$).

When $m = kp$, which is the dimension of the state vector F , it comprises an $m \times 1$ vector of unobservable factors and its lags, and $\Phi(L)$ is a matrix lag polynomial. We assume that the variance covariance matrix in Eq. (3) is an identity matrix for normalisation purposes. We also assume that $\Phi(L)$ is a block diagonal, meaning that the latent factors are uncorrelated.²

By employing this dynamic factor model, we identify a few common factors that drive global, variable-specific, and country-specific fluctuations in the financial and macroeconomic time series. The estimated factors can capture common fluctuations across the entire dataset, that is, the global factor, or across subsets of the data, that is, variable -or country-specific factors.

In this analysis, we estimate Eqs (1), (2), and (3) using the ML method. The maximum number of iterations is 100. If the ML method does not converge within the maximum iteration number in the calculation, we regard it as a sign of the absence of a common factor. Based on this principle, we do not detect one global factor among all three financial variables—housing price, stock price, and interest rate—across G7 countries.

3-2. Methods for analysing a global macro-finance in emerging economies

With recent financial developments, the linkage between the financial sector and the macroeconomy has strengthened not only in developed countries but also in emerging countries. The progress of economic and financial globalisation has increasingly affected foreign financial fluctuations. Thus, both domestic and foreign financial fluctuations affect macroeconomic fluctuations

² By relaxing this assumption, we can model spillovers across different factors.

in emerging countries. This study evaluates the impacts of domestic and foreign financial fluctuations on macroeconomic fluctuations in emerging countries, namely, global macro-finance.

This study uses a variance decomposition analysis to assess the relative importance of global financial and macroeconomic cycles and domestic financial cycles in macroeconomic fluctuations in emerging economies. We estimate a VAR model for each emerging country and then apply standard VAR forecasting formulas to calculate the variance decompositions. We consider the VAR model that includes the following variables for each emerging country: The first is domestic macro-and financial variable group. It includes domestic real GDP and domestic financial variables such as housing prices, stock prices, short-term interest rates, and real effective exchange rates. The second is the global macro-and financial variable group. It includes the global real GDP and global financial variables. We use global factors specific to real GDP as global real GDP and use global factors specific to housing prices, stock prices, and short-term interest rates, as global financial variables. Thus, we apply the VAR model consisting of five domestic variables and four global variables for each emerging economy. The lag order is 2.

3-3. Data

We examine financial and macroeconomic variables in the G-7 economies over the period 1989 Q2–2019 Q4 to identify global financial and macroeconomic fluctuations. We focus on quarterly price fluctuations of three financial assets: housing, stock, and bond markets, and real GDP. We use housing price data from the property price database of BIS and other price data and real GDP from the OECD's main economic indicators database.

Figure 1: Real Housing price Changes for the G-7 economies

Figure 2: Real Stock price Changes for the G-7 economies

Figure 3: Real Short-term interest rate Changes for the G-7 economies

Figure 4: Real GDP Changes for the G-7 economies

Figure 1 to 4 show quarterly changes in real housing prices, real stock prices, real short-term interest rates, and real GDP in the G-7 countries in the period 1989–2019. In many G-7 countries, except for Japan and Germany, the growth rate of house prices increased from the 1990s to the mid-2000s and then declined significantly in 2008. Stock price and real short-term interest rate fluctuations appear to be more volatile and more synchronised across countries than other variables, especially after 2000. The growth rates of stock price in most G-7 countries fell sharply around early 2000 and then around 2008. The growth rates of real GDP in the G-7 countries do not seem to be so synchronised, but their fluctuations are relatively modest and stable.

After identifying the global factors, we analyse global macro-financial linkages in emerging countries. For emerging countries, we use real housing prices, stock prices, short-term interest rates, and real effective exchange rate variables as domestic financial variables and real GDP as domestic macroeconomic variables. The five emerging countries to analyse are South Korea, Malaysia, Thailand, Colombia, and Hungary. Although it is difficult to obtain housing price data for emerging countries, we selected these five countries because of the availability of quarterly housing price data from 1994. Later, we added Indonesia, Brazil, Mexico, the Czech Republic, and Poland for analysis. We selected these five additional countries because of the availability of quarterly housing price data since 2002. Table 1 and Table 3 show sample countries and period, respectively. Table 2 shows data sources.

Table 1: List of sample countries

Table 2: Data

Table 3: Sample period

4. Results

4-1. Global financial and macroeconomic factors

First, we consider whether global factors are common between financial and macroeconomic variables. We estimate dynamic factor models that assume there are common global factors between them using the maximum likelihood method; however, the ML method does not converge. Therefore, we consider that no significant global factor is common to the macroeconomic variables and financial variables (as Ha et al., 2020), and we estimate dynamic factor models for global financial factors and global macro factors separately.

Second, this study focuses on variable-specific global factors for global financial factors. As our financial data contains three dimensions (world, country, financial variable), there can be the following global financial factors: (i) a global financial factor common to all financial variables and all countries; (ii) a global factor common to each financial variable (variable-specific global factor); (iii) a country financial factor common to all financial variables in each country, and an idiosyncratic component for each series. We estimate the models that assume both global financial factors ((i) type factors) and variable-specific global factors ((ii) type factors); however, the ML method does not converge. Therefore, we believe that our data contain only variable-specific global factors.

Panel A of Table 4 shows the results of estimating dynamic factor models with two lag structures in error terms (in Eqs (2)) and factors (in Eqs (3)) for housing price-specific global factors. The housing price-specific global factor (**fhg7_1**) we identified is significantly correlated with housing prices in Canada, France, the United Kingdom, and the United States, but not with housing prices in Germany, Italy, and Japan. The factor is significantly correlated with both its 1st and 2nd lags. Panel B of Table 4 shows the results for a stock price-specified global factor³. The stock price-specific global factor

³ Regarding stock price data, this study uses the stock price return (log difference), which is standardized by the GARCH residual. We believe that this will avoid the problems caused by the

(**fsg7_2_ga**) correlates with all stock prices in all G-7 countries. However, the factor is not significantly correlated with both its 1st and 2nd lags. So, we use the first principal component of the stock prices of G-7 countries that do not allow for dynamics in the factor (**fsg7_1_f1**). Panel C, and D of Table 4 show the results for a short-term interest rate-specified global factor and a global macroeconomic factor, respectively⁴. Both factors we identified (**frg7_1**, and **mgdp7_1**) are correlated with variables in all G-7 countries and with their two lags significantly.

Table 4: Estimation results for dynamic factor models

Figure 5 shows four variable-specified global financial and macroeconomic factors we identified: a housing price-specified global financial factor (**fhg7_1**); a stock price-specified global financial factor (**fsg7_1_f1**); a short-term interest rate-specified global financial factor (**frg7_1**); a global macroeconomic factor (**mgdp7_1**).

Figure 5: Estimated global factors

4-2. Variance decompositions

Table 5 shows the results of variance decompositions of real GDP fluctuations for each of the 10 emerging countries. The analysis of variance decomposition of GDP fluctuations for each country shows the relative importance of each shock identified by the Cholesky decomposition based on the results of the VAR model estimated for each country. The order of each variable in the VAR model is housing price-specific global financial factor, stock price-specific global financial factor, short-term

heteroscedasticity of stock price returns.

⁴ This study does not include a constant term in Eqs (1) for a short-term specified global factor to converge the calculation.

interest rate-specific global financial factor, global macroeconomic factor, each country's housing price, stock price, short-term interest rate, real effective exchange rate, and real GDP. For the five countries of South Korea, Malaysia, Thailand, Colombia, and Hungary, the results are those of the analyses over the period after 1994, and over the period after 2002 for Indonesia and Brazil, and over the period after 2005 for Mexico and Czech Republic, and over the period after 2007 for Poland.

The results of the five countries for the period after 1994 are as follows. For Korea, domestic shocks explain a relatively large part (86%) of GDP fluctuations. In particular, the importance of the stock price shock is large (24%). For Malaysia and Thailand, like the case of Korea, domestic shocks explain a larger fraction of output variance (74% and 84%, respectively), but for Thailand, domestic GDP-specific shocks are important (59%). For Malaysia, the stock price-specified global factor is important. For Colombia in Latin America, like the economies in Asia, the output variance is also largely affected by domestic shocks (88%). On the other hand, for Hungary in Europe, the impact of domestic shocks is relatively small (63%), and conversely, the impact of global shocks, especially the global shock of house prices, is large (20%).

These features can be summarized as follows. First, domestic shocks explain a large part of the GDP fluctuations for the three countries in East Asia and Colombia. Second, for Hungary in Europe the relative importance of global shocks, especially a housing price-specific global financial shock is large. Third, it has been affected by a domestic stock price shock for Korea and by a global stock price shock for Malaysia.

The results for the remaining five countries after 2000 show a mixture of domestic and global shocks as important shocks. The relative important shocks are domestic shocks for Indonesia and Poland, and global shocks for Brazil, Mexico, and the Czech Republic.

Differences in the period of analysis across countries may make it difficult to interpret the results. Table 6 shows the results after 2006, including the period of the global financial crisis (except for

Poland). Including the period of the global financial crisis, the relative importance of global shocks, especially housing price-specific global shocks, become larger for many countries (Korea (global shock 36%, of which housing price-specific global shock 22%)), Malaysia (33%, 20%), Hungary (41%, 18%), Brazil (35%, 13%), Mexico (42%, 25%), and Czech Republic (53%, 29%).

Table 7 shows the results over the period after the global financial crisis (after 2009). For many countries, the relative importance of the housing price specific-global shocks has decreased, but for some countries the relative importance of global shocks continues to be large (Malaysia (33%), Hungary (38%), Brazil (33%), Mexico (32%), the Czech Republic (48%)). Meanwhile, the relative importance of domestic shocks has increased again for Korea and Thailand in East Asia.

Table 5: Variance decompositions for full sample

Table 6: Variance decompositions for the period includes the GFC

Table 7: Variance decompositions for the period after the GFC

5. Conclusion

The purpose of this study is to examine the global macro-finance relationship in emerging economies. This study first identifies global financial cycles using financial data from G-7 countries. Then, by estimating the vector autoregression (VAR) model, which includes global and domestic financial and macroeconomic factors for each emerging country, this study analyses the extent to which domestic and global financial fluctuations can explain the macroeconomic fluctuations of each country.

The research questions examined in this study are as follows: Which emerging economies are more vulnerable to global fluctuations in which types of financial markets? Have the sensitivities of

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To answer these questions, this study adopts the following approach: First, we identify the common fluctuations in financial asset prices among the G-7 developed countries as global financial fluctuations. We focus on three types of financial markets: housing, stock, and bond markets. We identified variable-specific global factors by estimating the dynamic factor model. We then estimate the VAR model for each country. Based on the estimated parameters, we evaluate the factors that contribute to the fluctuation of real GDP growth in each country by analyzing variance decomposition.

Our Main findings are as follows. First, the shocks that play relatively important roles in explaining GDP fluctuations are domestic shocks for Korea, Malaysia, and Thailand in East Asia. Second, in the period before and after the global financial crisis, global factor shocks, especially, housing price-specific global factor shocks, play relatively important roles in explaining GDP fluctuations for many emerging economies including economies in East Asia. Third, for some countries in Latin America and Europe (except for Colombia and Poland), the role of global factors remains large even after the global financial crisis. Some emerging East Asian economies, such as Korea and Thailand, may have been affected by regional shocks centered on China rather than global shocks. Including China in the analysis and comparing between developed and emerging countries are remaining issues for future research.

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Table 1: List of Sample Counties				
Depveloped/Emerging	G7	Emerging		
Regions		Asia	Latin	Europe
Full periods	Canada (CAN)	Korea (KOR)	Colombia (COL)	Hungary (HUN)
1990Q1-2019Q4	France (FRA)	Malaysia (MYS)		
	Germany (DEU)	Thailand (THA)		
	Italy (ITA)			
	Japan (JPN)			
	United Kingdom (GBR)			
	United States (USA)			
Sub periods				
		Indonesia (IDN)	Brazile (BRA)	Cezch (CZE)
			Mexico (MEX)	Poland (POL)
Source: Author				

Table 2: Data			
Variable	Definition	Source	Transformation
fh	real housing price	BIS: Real property price, Index	log diference
		The Magyar Nemzeti Bank for HUN;	
		Natinal Statistics for BRA, MEX, CZE, POL	
fs	real stock price	OECD, IFS: Total Share Prices for All Shares	log diference
fr	3-month interest rate (tresuary bill or interbank)	OECD, IFS: 3-Month or 90-day Rates and Yields	diference
mgdp	real GDP	OECD, IFS: Gross Domestic Product by Expenditure in Constant Prices	log diference
Notes: Data series cover cover the 1989Q3 - 2019Q4 period. Macroeconomic and financial variables are all seasonally adjusted. Financial variables are deflated by the CPI of each country. We use log differences of all variables (except for interest rates).			

Table 3: Sample period					
	Sample period				
	f-housing	f-stock	f-interest rate	f-reer	m-gdp
G-7 countries	1989Q3-	1989Q3-	1989Q3-		1989Q3-
KOR	1994Q2-	1994Q2-	1994Q2-	1994Q2-	1994Q2-
MYS	1994Q2-	1994Q2-	1994Q2-	1994Q2-	1994Q2-
THA	1994Q2-	1994Q2-	1994Q2-	1994Q2-	1994Q2-
COL	1994Q2-	1994Q2-	1994Q2-	1994Q2-	1994Q2-
HUN	1994Q2-	1994Q2-	1994Q2-	1994Q2-	1994Q2-
IDN	2002Q3-	2002Q3-	2002Q3-	2002Q3-	2002Q3-
BRA	2002Q3-	2002Q3-	2003Q2-	2002Q3-	2002Q3-
MEX	2005Q2-	2002Q3-	2002Q3-	2002Q3-	2002Q3-
CZE	2005Q2-	2002Q3-	2002Q3-	2002Q3-	2002Q3-
POL	2006Q4-	2002Q3-	2002Q3-	2002Q3-	2002Q3-
Source: Author					

Table 4: Results of estimating a dynamic factor model							
A: Results for a housing price-specified global factor							
	can_fh_sa	fra_fh_sa	deu_fh_sa	ita_fh_sa	jpn_fh_sa	gbr_fh_sa	usa_fh_sa
fhg7_1	0.002	0.002	0.000	0.000	0.001	0.003	0.002
	[1.821]*	[3.163]***	[-0.213]	[0.196]	[1.376]	[1.962]**	[1.958]*
_cons	0.007	0.006	0.002	0.003	-0.001	0.005	0.003
	[2.206]**	[1.536]	[0.854]	[0.706]	[-0.288]	[0.957]	[0.645]
fhg7_1							
L.fhg7_1	1.547						
	[7.060]***						
L2.fhg7_1	-0.607						
	[-2.959]***						
B: Results for a stock price-specified global factor							
	can_fs_sa_g a	fra_fs_sa_g a	deu_fs_sa_ ga	ita_fs_sa_ga	jpn_fs_sa_g a	gbr_fs_sa_g a	usa_fs_sa_g a
fsg7_2_ga	0.811	0.944	0.886	0.856	0.579	0.884	0.787
	[10.800]***	[14.033]***	[13.199]***	[11.619]***	[6.558]***	[12.089]***	[10.893]***
_cons	0.002	0.002	0.000	0.000	0.002	0.001	0.002
	[0.024]	[0.021]	[0.005]	[-0.003]	[0.018]	[0.009]	[0.019]
fsg7_2_ga							
L.fsg7_2_ga	0.076						
	[0.787]						
L2.fsg7_2_ga	0.008						
	[0.079]						
C: Results for a short-term interest rate-specified global factor							
	can_fr_sa	fra_fr_sa	deu_fr_sa	ita_fr_sa	jpn_fr_sa	gbr_fr_sa	usa_fr_sa
frg7_1	1.257	0.93	1.008	0.674	0.515	0.619	1.499
	[6.839]***	[9.261]***	[7.694]***	[6.630]***	[2.995]***	[5.698]***	[8.552]***
_cons							
frg7_1							
L.frg7_1	-0.413						
	[-3.830]***						
L2.frg7_1	-0.278						
	[-2.725]***						
D: Results for a global macroeconomic factor							
	can_mgdp_ sa	fra_mgdp_s a	deu_mgdp_ sa	ita_mgdp_s a	jpn_mgdp_s a	gbr_mgdp_s a	usa_mgdp_ sa
mgdpg7_1	0.002	0.002	0.003	0.003	0.003	0.002	0.002
	[4.751]***	[7.251]***	[5.546]***	[6.896]***	[4.544]***	[4.570]***	[5.040]***
_cons	0.005	0.004	0.004	0.002	0.003	0.005	0.006
	[5.274]***	[5.333]***	[3.223]***	[1.867]*	[2.431]**	[4.604]***	[7.406]***
mgdpg7_1							
L.mgdpg7_1	1.083						
	[7.299]***						
L2.mgdpg7_1	-0.372						
	[-2.665]***						

Table 5: Variance decomposition of GDP

Variance Decomposition of GDP using Cholesky Factors (at a horizon of 30 quarters)

	KOR	MYS	THA	COL	HUN	IDN	BRA	MEX	CZE	POL
	1994-					2002-	2002-	2005-	2005-	2007-
FHG7_1	1.4	3.8	5	2.2	20	10.8	9.1	25.2	27.3	3.9
FSG7_GA_F1	7.8	12.9	3.5	3.7	8.1	3.4	9	4.6	15.8	1.8
FRG7_1	1.3	1.9	1.6	1.8	3.7	1.6	4.3	5.3	8.1	2.5
MGDPG7_1	3.7	6.9	6.1	3.7	5	4.1	12.5	7.5	2.1	4.8
global	14.2	25.6	16.1	11.5	36.8	19.9	34.9	42.6	53.4	13.1
FH_	8.6	20.5	4.9	10.2	5.26	1.3	13.4	10.7	2.5	13
FS_GA	23.8	8.4	8	2.8	1.2	10.7	7.2	2	2.9	10.6
FR	1.1	3.4	2.7	10.6	0.2	2.9	10.9	1.8	5.9	10.6
REER	14.1	5.4	9.3	0.6	2.4	1.9	7.1	11.1	15.8	8.3
MGDP	38.2	36.7	59.1	64.3	54.2	63.3	26.6	31.8	19.6	44.4
domestic	85.8	74.4	83.9	88.5	63.2	80.1	65.1	57.4	46.6	86.9
total	100	100	100	100	100	100	100	100	100	100

Source: Author's calculation

Table 6: Variance decomposition of GDP: After 2006

Variance Decomposition of GDP using Cholesky Factors (at a horizon of 30 quarters)

2006q1-

	KOR	MYS	THA	COL	HUN	IDN	BRA	MEX	CZE	POL
	2006-	2006-	2006-	2006-	2006-	2006-	2006-	2006-	2006-	2007-
FHG7_1	21.7	19.9	5	7.5	18.2	4.8	12.7	24.5	28.8	3.9
FSG7_GA_F1	9.4	4.7	6.7	7.3	5.8	2.6	8.3	4.2	13.3	1.8
FRG7_1	1.6	5.4	1.2	3.2	11.8	4.4	4.3	4.9	8	2.5
MGDPG7_1	3	2.7	4.9	5.2	5.1	5.7	10.1	8	3	4.8
global	35.7	32.7	17.8	23.2	40.9	17.6	35.4	41.7	53	13.1
FH_	1.5	6.6	11.1	11.7	11.21	4.4	17.5	11.4	2.4	13
FS__GA	16.1	12.1	6.5	2.6	1.3	11.1	7.4	1.9	3.2	10.6
FR	7.5	10.6	2.4	2.1	6.4	2.2	10.7	2	6.8	10.6
REER	3.9	3.1	4.5	2	7	5.8	5.4	11.1	16	8.3
MGDP	35.3	34.8	57.7	58.5	33.1	58.8	23.6	32	18.6	44.4
domestic	64.3	67.3	82.2	76.8	59.1	82.4	64.6	58.3	47	86.9
total	100	100	100	100	100	100	100	100	100	100

Source: Author's calculation

Table 7: Variance decomposition of GDP: After the global financial crisis

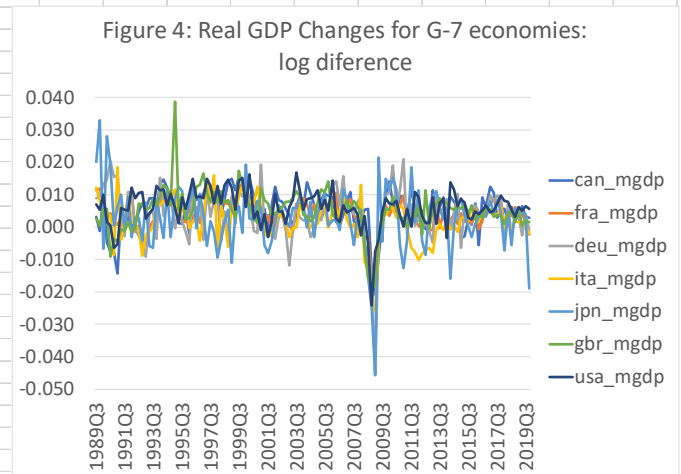
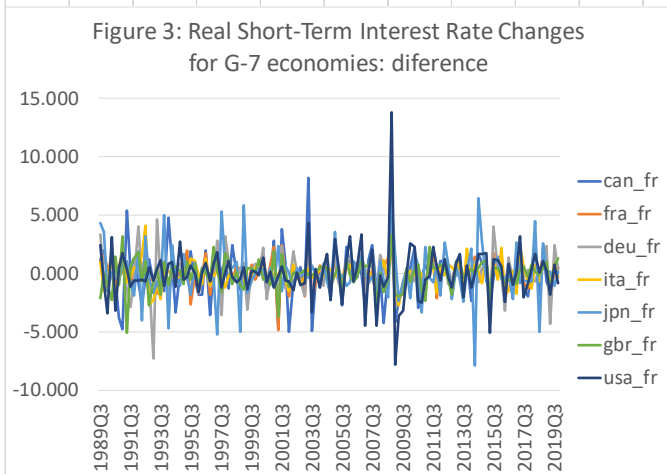
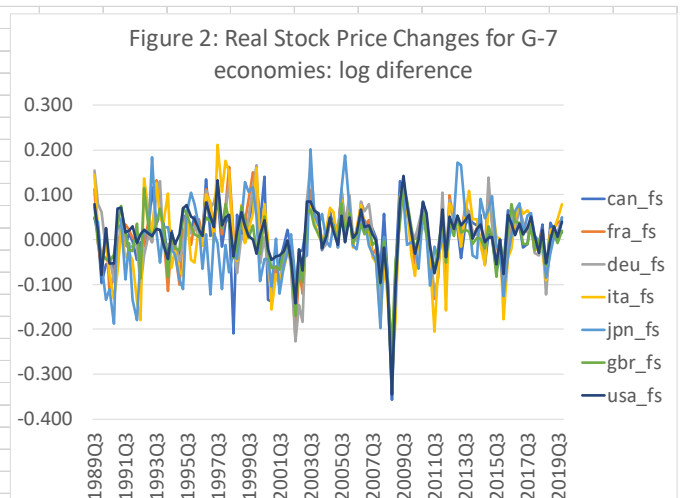
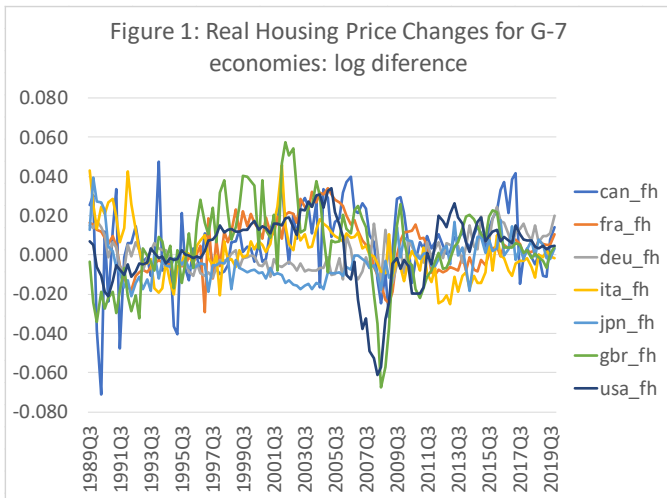
Variance Decomposition of GDP using Cholesky Factors (at a horizon of 30 quarters)

2009q1

-2019q4

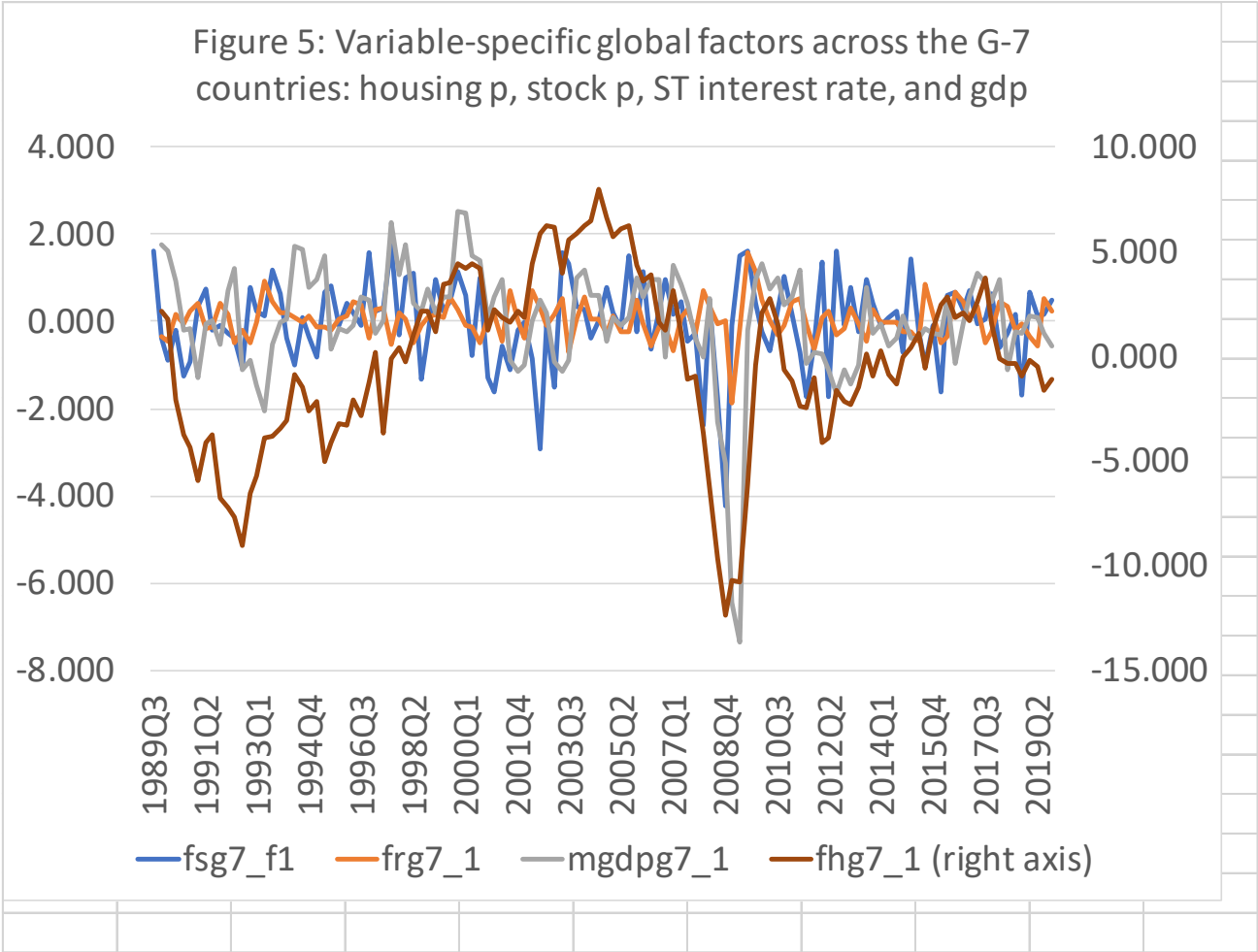
	KOR	MYS	THA	COL	HUN	IDN	BRA	MEX	CZE	POL
	2009-	2009-	2009-	2009-	2009-	2009-	2009-	2009-	2009-	2009-
FHG7_1	2.3	10.3	5.3	7.1	3.2	17.7	10.1	8.9	12.6	6.3
FSG7_GA_F1	1.6	7.5	9.5	8.1	7.4	4.2	7.1	6.1	14.5	0.6
FRG7_1	10.7	6	3.4	3.5	15.7	3.6	7.2	7.5	17.1	4.4
MGDPG7_1	2.7	8.9	4.8	1.4	12.2	9.2	8.5	9.8	3.3	10.1
global	17.2	32.7	23	20.1	38.4	34.7	32.9	32.3	47.5	21.4
FH_	5.4	5.5	6.8	12.8	9.6	11.1	22.2	7.3	10.5	7.7
FS_GA	8.9	9.5	9.3	8.6	2.7	2.1	6.6	3.4	4.6	13.4
FR	29.8	4.2	4.5	10.6	4.4	9.5	11.6	3.3	5.8	5
REER	1.5	2.9	4	6.1	12.7	2.5	5.4	12.1	7.3	7.8
MGDP	37.1	45.1	52.5	41.8	32.2	40.1	21.2	41.7	24.3	44.6
domestic	82.8	67.3	77	79.9	61.6	65.3	67.1	67.7	52.5	78.6
total	100	100	100	100	100	100	100	100	100	100

Source: Author's calculation



Notes: Macroeconomic and financial variables are all seasonally adjusted. Financial variables are deflated by the CPI of each country. We use log differences of all variables (except for interest rates).

Source: BIS, OECD, IFS, National statistics



Notes: **fhg7_1** is a housing price-specific global financial factor, **fsg7_f1** is a stock price-specific global financial factor (the first component), **fhr7_1** is a short-term interest rate-specific global financial factor, and **mgdp7_1** is a global macroeconomic factor.

Source: Author's calculation