Credit Market Condition on Private Equity Market Performance*

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Abstract

This paper employs a structural vector autoregressions (SVAR) to quantify the impact of credit market conditions on private equity (PE) firms' performance in the United States. The key fact that links credit market with PE market is the highly leveraged debt positions in buyout cases. Data on Real GDP, 10-year Treasury yield, credit spread, Tobin's Q, and the internal rate of return (IRR) of PE funds from 1986Q1 to 2025Q1 are used to capture the dynamics of credit and PE markets. We impose a short-run recursive identification scheme to identify the total factor productivity (TFP), credit, risk premium, price of capital, and PE shocks. We find that first, PE market is sensitive to disturbances from the credit and real sector. The IRR of PE funds largely fluctuates in response to TFP, risk premium, price of capital, and PE shocks. Second, the PE market does not cause large swings to the real economy. The PE shock does not create significant movements in real GDP, 10-year Treasury yield, credit spread and Tobin's Q. This finding counters what many market speculators' worry that PE market is a potential source to cause large fluctuations of the U.S. economy.

JEL Classification: E44, G12, G23
Keywords: Private Equity, Credit Market, Vector Autoregressions

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1 Introduction

Private equity (PE) market is where investors purchase ownership stakes of the companies at full amount and gain complete control. In this market, equity is traded as an asset, including shares of privately held firms and formerly public companies. PE firms borrow debt from credit market to finance buyouts of companies.[1] These buyouts are highly leveraged with 60 to 90% debt financing (Kaplan and Stromberg 2009; Axelson et al. 2013). By leveraging the buyouts, PE firms take advantage of tax benefits (Kaplan and Stromberg 2009), increase the productivity of target company through resource reallocation and fat trim on operation (Davis et al. 2014), and reach economies of scale by integrating the bought out company with other companies in the same industry. PE firms usually hold the purchased companies for about 10 years, then sell the complete ownership of companies to new buyers (see Ljungqvist 2024; Gompers et al. 2016). Persistent and strong performance of buyout deals hinge on borrowing debt cheaply and then arbitrage on the difference with the PE market at the time of resale (see Axelson et al. 2013; Harris et al. 2014; Harris et al. 2023). Buying and selling of one private company transacted through a PE fund managed by PE firms.

A quantitative estimation of the impact of credit market condition onto the PE market, as well as the latter's feedback to the economy is absence in the literature. The literature on PE points out variations in buyout leverage are primarily driven by time-series factors.[2] What is the effect of a 2% increase in the credit spread of bank loans on the internal rate of return (IRR) of PE funds? How big is the influence of turbulence in PE market to aggregate output? These questions are of interests to investors and academics, and our paper addresses them.

We contribute to the private equity literature by using a structural vector autoregressions (SVAR) estimated on the United States data. Our sample runs from 1986Q1 to 2025Q1 and consists of Real GDP, 10 year Treasury yield, credit spread, Tobin's Q, and the IRR of PE funds. The choice of these variables is based on two reasons. First, the PE and macroeconomic literature shows that

[1] For example, Blackstone, Carlyle, Kohlberg Kravis Roberts (KKR), and Apollo Asset Management are famous PE firms.

[2] Axelson et al. (2013) concluded that borrowed credits in PE leveraged buyouts are procyclical, and high risk premium of interest rate lowers the leverage used in buyout transactions.

the dynamic of supply and demand in private equity market is captured by the movements of the five variables. Second, these variables help identify the shocks stem from aggregate economy, credit market, and the PE market. Real GDP, 10 year Treasury yield, credit spread, Tobin's Q, and IRR of PE funds correspond to total factor productivity (TFP), credit, risk premium, price of capital, and private equity shocks, respectively.

A short-run recursive identification scheme is applied to identify these shocks. Our identification strategy is guided by a summary of PE and macroeconomics literature. The overall macroeconomic condition, reflected in real GDP, is crucial for PE funds performance and profit margin. The 10 year Treasury yield is an opportunity cost of PE for investors who supply money to PE funds. The risk premium reflects the 'tightness' of credit market. Tobin's Q entails the profitability of investment, and the IRR of PE funds is our measure of the overall performance of PE market.

We report impulse response functions (IRFs) and forecast error variance decompositions (FEVDs) as results. IRFs examine the co-movements of variables, can serve to test the hypothesis and findings established in the literature. FEVDs quantify the impact of shocks to aggregate variable fluctuations. First, we find that the PE market is sensitive to the impulses from the production and investment sectors as well as the credit market. The IRFs of IRR of PE funds showcase statistically significant movements with respect to TFP, risk premium, and price of capital shocks. One standard deviation increases in real GDP growth rate, credit spread, and Tobin's Q growth rate cause a 1% increase, 2% drop, and 2% raise in IRR of PE funds, respectively. The PE market is largely dependent on the production and investment sectors, reflected real GDP and Tobin's Q, and the credit market conditions, captured by the credit spread. Furthermore, the FEVD shows that 30% and 17% of movements in IRR of PE funds are driven by risk premium and price of capital at 4 years horizon, respectively.

Second, disturbance from the PE market does not matter to the U.S. economy. The IRFs of real GDP, 10-year Treasury yield, risk premium, and Tobin's Q with respect to the PE shock do not display statistically significant movements. The confidence bands on these IRFs are wide and surround zero. The FEVDs of real GDP, 10-year Treasury yield, risk premium, and Tobin's Q show that the PE shock does not contribute much, if any at all, to their aggregate movements. This

result addresses the concern from market speculators and academics that turmoil in the PE market can cause damage to the U.S. economy, we think otherwise.

The remaining of this paper is the following, section 2 briefly reviews the PE history and describes data. Section 3 builds our SVAR with a discussion of identification. Results are shown in section 4, and section 5 concludes.

2 Private Equity and Data Description

This section gives a brief review of private equity history since 1980s, then describes the data in details.

2.1. Private Equity Overview

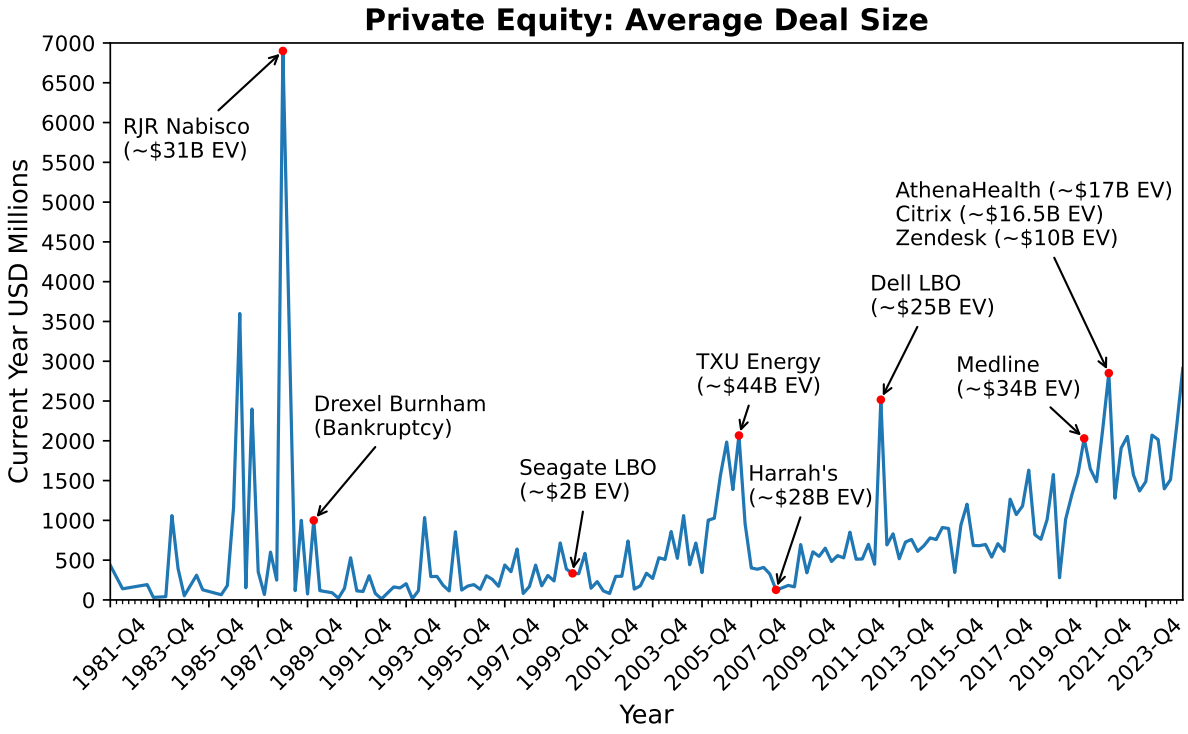
The private equity market boomed during 1982-83, it was caused by a surge in leveraged buyout activities financed by junk bonds. This period was coined by the Junk Bond Era. The most famous leveraged buyout case was the Kohlberg Kravis Roberts (KKR) acquisition of RJR Nabisco in 1987. This deal size was 31 billion dollars, with 6 billion initial equity and 25 billion debt in 1987 dollars. This Junk Bond Era ended with the bankruptcy of Drexel Burnham Lambert Inc in 1990.[3] Its head of high-yield securities, Michael Milken, was indicted of 98 counts of racketeering, mail fraud, and securities fraud and was sentenced 10 years imprisonment. The investment bank agreed not to contest six federal felony charges, paid a record fine of $650 million, and filed for Chapter 11 bankruptcy protection (Ljungqvist 2024).

Private equity firms experienced increased regulation and tightened credit conditions during 1990-2000s after the junk bond market collapse. Buyout activities were few but stable. The second boom in leveraged buyouts in private equity market appeared in mid 2000s, fueled by cheap credit and grown "shadow banks". Syndicated and leveraged loans were widely used to finance private equity leveraged buyouts, as opposed to previous junk bonds. The notable buyout deal was the KKR and TPG Capital acquisition of TXU Energy in 2007. This deal size was 44 billion dollars,

[3]Drexel Burnham Lambert Inc was an investment bank specialized in underwriting junk bonds and finance leveraged buyouts of private equity firms.

with 8 billion initial equity and 36 billion debt in 2007 dollars. The following 2008 financial crisis resulted credit crunch that negatively impacted private equity market. Many buyout deals were canceled, postponed, or restructured.

In 2008, credit market crashed, resulting reductions in leveraged buyout activity, and the beginning of a slow recovery under tight credit conditions facing renewed regulatory scrutiny, and new policies focused on financial restraint. Private equity market began to recover post 2010. Notable case in 2013? Covid imposed a temporary hiccup in private equity market in 2020. Credit became cheap post Covid in 2021, which fueled the market. The subsequent monetary contraction efforts of the Federal Reserve slowed down buyouts but it was on the rise again lately.[4]



Notes: The blue line traces the quarterly average buyout deal sizes measured in current year US dollars. Data source: Preqin.

[4]Refer to Ljungqvist (2024) for a brief overview of private equity market from 1980s to 2024.

2.2. Data Description

Data are quarterly and run from 1986Q1 to 2025Q1. Our sample consists of real GDP, 10-year Treasury yield, credit spread, Tobin's Q, and the IRR of PE funds. Credit spread is constructed as the Moody's Baa corporate bond yield minus the 10-year Treasury yield. We follow Gallegati and Ramsey (2013) and Mendieta-Munoz (2024) for Tobin's Q construction, i.e. the ratio of the market value of equities to net worth of non-financial firms.[5] FRED database is the source for real GDP, 10-year Treasury yield, Moody's Baa corporate bond yield, nonfinancial corporate equities, and nonfinancial corporate net worth.

The IRR of PE funds is obtained from the Cambridge Associates database. This rate is the average IRR of private to private, public to private, and secondary buyout deals from 1986Q1 to 2025Q1. Gompers et al. (2016) documented that private equity fund managers most often use IRR to evaluate fund performances.

3 Structural Vector Autoregressions

This section presents reduced-form and structural VARs. Next, the identification is discussed.

3.1. Reduced-Form and Structural VARs

The covariance-stationary vector of endogenous variables is

$$\boldsymbol{y_t} = \begin{bmatrix} \Delta lnY_t & \Delta lnR_t & SP_t & \Delta lnQ_t & IRR_t \end{bmatrix}',$$

where ΔlnY_t is real GDP growth, ΔlnR_t is the first difference of log 10 year Treasury bill rate, SP_t is the credit spread, ΔlnQ_t is the first difference of log Tobin's Q, and IRR_t is the IRR. Consider a reduced-form VAR to be estimated on $\boldsymbol{y_t}$,

$$\boldsymbol{y_t} = v + C(L)\boldsymbol{y_{t-1}} + \boldsymbol{u_t},\ \boldsymbol{u_t} \sim N(0, \Sigma_u), \tag{1}$$

[5]Net worth is given by total assets minus liabilities.

where v is a 5×1 vector of intercepts, L is the lag operator defined such that $L\boldsymbol{y_t} = \boldsymbol{y_{t-1}}$, $C(L) = \sum_{i=1}^{p} C_i L^{i-1}$ are the 5×5 slope coefficient matrices associated with lags of the reduced-form VAR, p is the lag length, and Σ_u is the covariance matrix of the reduced-form errors, $\boldsymbol{u_t}$.

Build on the reduced-form VAR in equation (1) to construct a SVAR as

$$\boldsymbol{y_t} = v + C(L)\boldsymbol{y_{t-1}} + D\boldsymbol{\varepsilon_t},\ \boldsymbol{\varepsilon_t} \sim N(0, I), \tag{2}$$

by mapping the reduced-form errors into the structural shocks with

$$\boldsymbol{u_t} = D\boldsymbol{\varepsilon_t},$$

where D is the 5×5 nonsingular structural matrix, and $\boldsymbol{\varepsilon_t} = [\varepsilon_{y,t}, \varepsilon_{r,t}, \varepsilon_{sp,t}, \varepsilon_{p,t}, \varepsilon_{pe,t}]'$ is the vector of orthogonalized unit variance structural shocks.

The identifications of structural shocks rest on imposing restrictions on the structural matrix, D. Lag length is two, $p = 2$.

3.2. Identification

Recursive short-run zero restrictions are imposed on the short-run structural matrix, D, to identify TFP, credit, risk premium, price of capital, and private equity shocks by the ordering of $\boldsymbol{y_t}$ shown above.

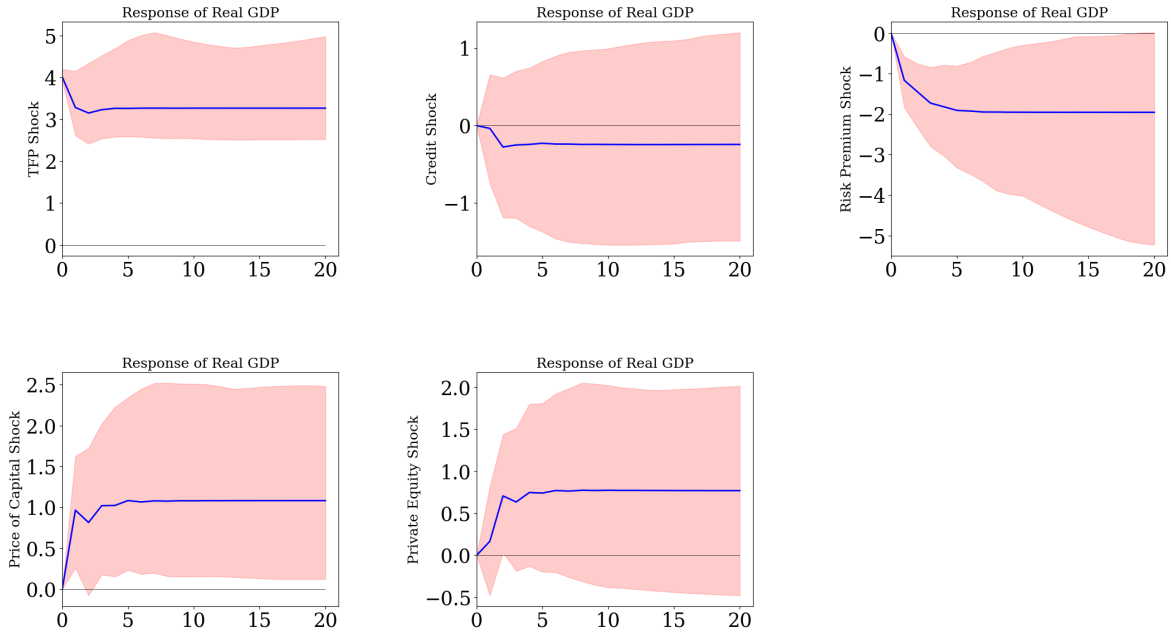
4 Results

This section presents IRFs and FEVDs as results.

4.1. IRFs

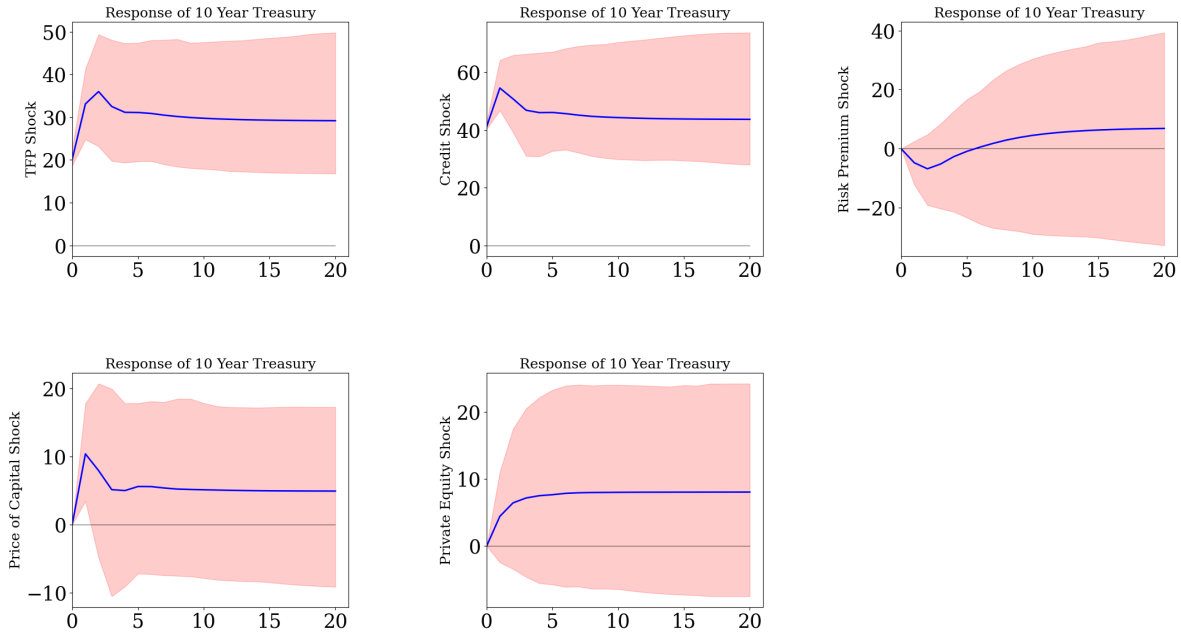
TFP, price of capital, and risk premium shocks generate interesting results. Response of IRR is also very interesting.

Impulse Response Functions



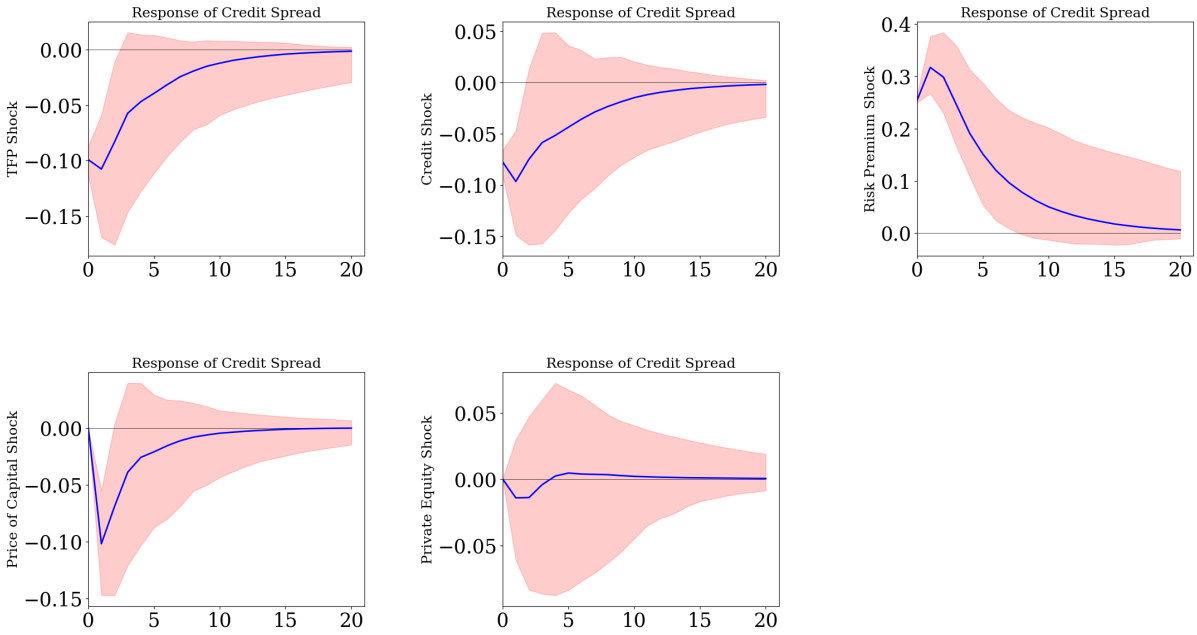
Notes: The blue line traces the quarterly average buyout deal sizes measured in current year US dollars. Data source: Preqin.

Impulse Response Functions



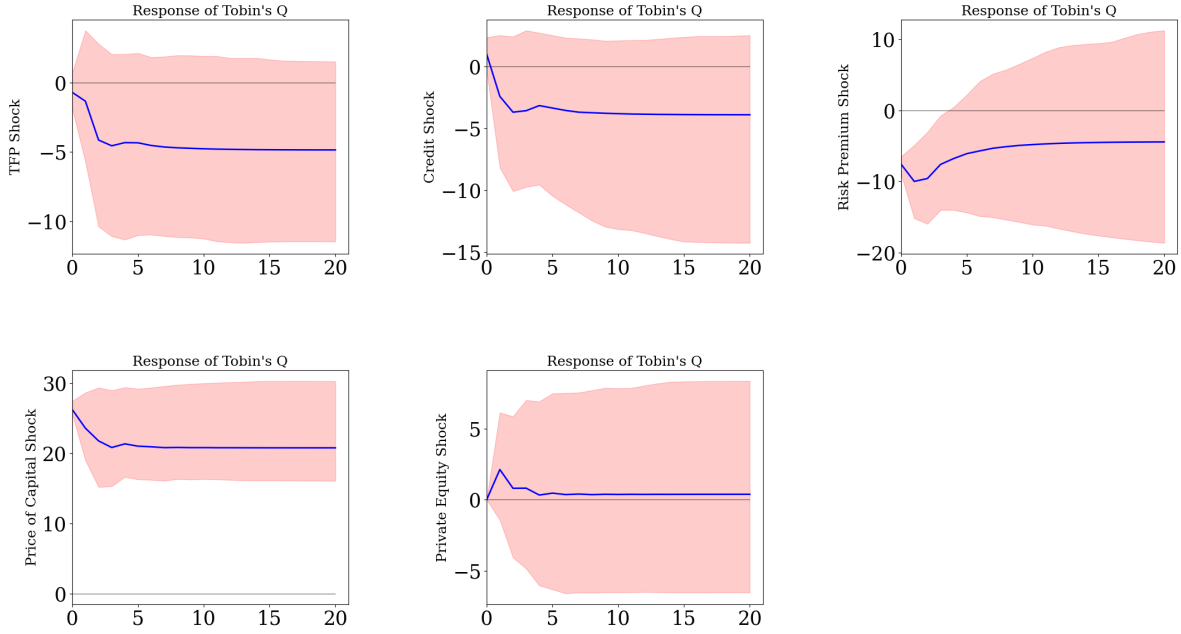
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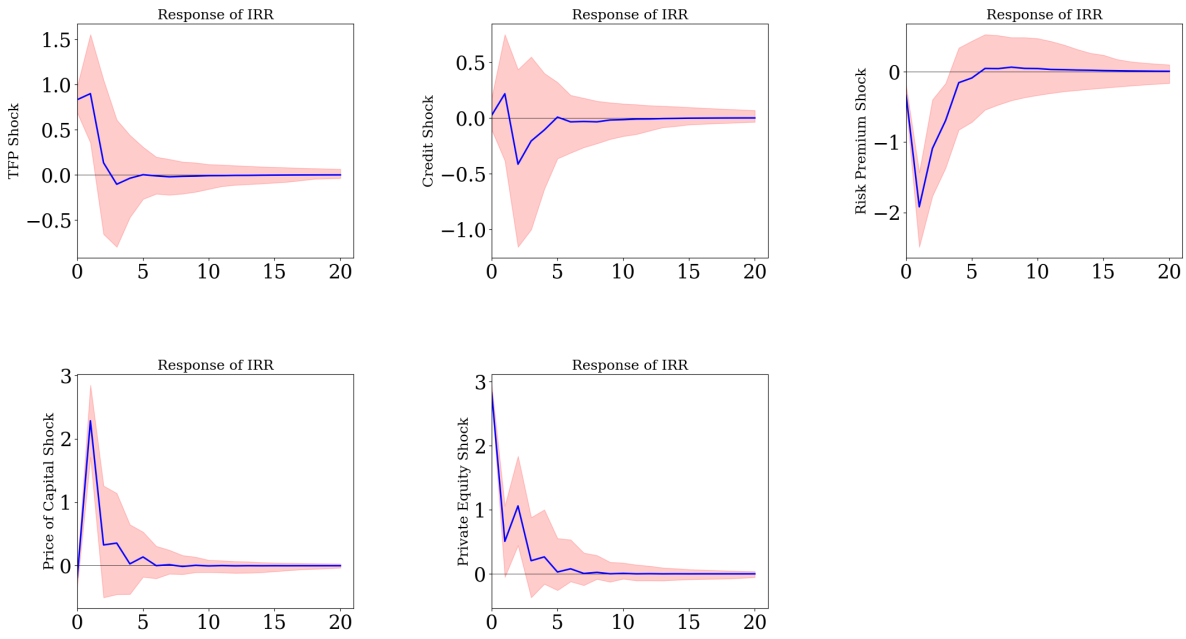


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4.2. FEVDs

TFP and risk premium shocks are important. Private equity shock does not cause large swings in U.S. economy.

Table 1: FEVDs

Variable	Shocks \ Horizons	Q1	Q2	Q4	Q8	Q16	Q20
Y_t	TFP	0.92	0.87	0.79	0.73	0.69	0.69
	Credit	0.00	0.00	0.00	0.00	0.00	0.00
	Risk Premium	0.05	0.08	0.14	0.18	0.20	0.21
	Price of Captial	0.03	0.04	0.05	0.06	0.07	0.07
	Private Equity	0.00	0.01	0.02	0.03	0.03	0.03
R_t	TFP	0.24	0.27	0.28	0.29	0.29	0.29
	Credit	0.74	0.70	0.69	0.68	0.67	0.67
	Risk Premium	0.00	0.01	0.01	0.00	0.01	0.01
	Price of Captial	0.02	0.02	0.01	0.01	0.01	0.01
	Private Equity	0.00	0.01	0.01	0.02	0.02	0.02
SP_t	TFP	0.11	0.10	0.08	0.08	0.07	0.07
	Credit	0.07	0.07	0.06	0.06	0.06	0.06
	Risk Premium	0.80	0.81	0.82	0.84	0.84	0.84
	Price of Captial	0.02	0.03	0.03	0.03	0.02	0.02
	Private Equity	0.00	0.00	0.00	0.00	0.00	0.00
Q_t	TFP	0.00	0.01	0.02	0.03	0.04	0.04
	Credit	0.00	0.01	0.01	0.02	0.02	0.02
	Risk Premium	0.11	0.12	0.11	0.09	0.07	0.07
	Price of Captial	0.88	0.85	0.85	0.86	0.87	0.87
	Private Equity	0.00	0.00	0.00	0.00	0.00	0.00
IRR_t	TFP	0.11	0.10	0.07	0.06	0.05	0.05
	Credit	0.00	0.00	0.00	0.00	0.01	0.01
	Risk Premium	0.17	0.23	0.30	0.31	0.31	0.30
	Price of Captial	0.13	0.14	0.15	0.16	0.16	0.17
	Private Equity	0.58	0.52	0.48	0.46	0.47	0.47

Notes: The table summarizes the contributions of TFP, risk premium, price of capital, and collateral constraint shocks to the fluctuations of real GDP, Y_t, the world real interest rate, R_t, Tobin's Q, Q_t, and the trade balance, TB_t. The parentheses contain 90% bootstrap sup-t confidence bands.

5 Conclusion

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