

How Effectively Does Monetary Policy Pass-Through to The Real Economy Under Financial Repression in Japan?

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University of Kent, 2026

Abstract

Japan's macroeconomic landscape since the 1994 financial crash has been defined by a persistent zero-lower-bound environment and a debt-to-output ratio exceeding 250%, challenging standard neoclassical debt sustainability frameworks. Within this context, the Bank of Japan has deployed aggressive unconventional monetary policies to manage fiscal pressures and stimulate growth. This dissertation investigates the effectiveness of monetary policy pass-through to the real economy under a regime of financial repression. It specifically examines whether the Bank of Japan's Quantitative and Qualitative Easing (QQE) and Yield Curve Control (YCC) facilitate meaningful economic activity or primarily function as a mechanism for a regressive intergenerational wealth transfer. Utilising a Vector Autoregression (VAR) framework and quarterly data, the study incorporates key endogenous variables: the uncollateralised overnight call rate, 10-year Japanese Government Bond (JGB) yields, real private consumption, real disposable income, private investment, and broad money (M3). Pre-estimation diagnostics, including Augmented Dickey-Fuller (ADF) tests and information criteria for lag selection, ensure the structural integrity of the model. Empirical findings indicate a "stalled" direct interest rate channel, where 10-year JGB yield shocks fail to influence private consumption contemporaneously. Instead, transmission occurs indirectly through an investment channel, mediated by collateral effects and firm net worth. These results support current literature that Japan's fiscal resilience relies on a strategic duration mismatch, creating significant systemic vulnerability as the Bank of Japan moves toward policy normalisation. This research contributes to the broader literature on liquidity traps by demonstrating how the internalisation of duration risk effectively decouples market yields from standard intertemporal consumption behaviour.

AI Statement

I acknowledge the use of generative AI to help refine the writing style and organise drafts with respect to this paper, as well as create the maths behind the stylised model. However, the research, data, code, and core ideas reported remain my own.

Acknowledgements

I am deeply grateful to the many professors, mentors, and peers who have guided me throughout this journey. Your wisdom, insights, and engaging conversations have profoundly shaped my work. To everyone who supported and encouraged me along the way, please accept my heartfelt gratitude.

Introduction

Advanced economies are currently navigating a profound demographic transition characterised by rapidly aging populations and a secular decline in long-term economic growth rates. This shift has exerted unprecedented fiscal pressure, as governments struggle to reconcile mounting social security obligations with stagnant revenue bases. Standard neoclassical theory, most notably the "Fiscal Goldilocks" framework proposed by (Blanchard, 2019), suggests that public debt remains sustainable without primary surpluses if the real growth rate of the economy (g) consistently exceeds the real interest rate on government debt (r). However, the Japanese experience fundamentally challenges this paradigm. Since 1997, Japan's real GDP growth has averaged -0.03%, while the real return on its debt has reached 1.30%. This persistent $r > g$ gap places Japan outside the theoretical region of effortless debt rollover, yet the nation remains the only major developed economy to maintain such a trajectory without succumbing to a fiscal catastrophe.

This dissertation investigates the paradox of Japan's fiscal resilience. Despite a gross debt-to-output ratio exceeding 250% - the highest among advanced economies - Japan has maintained subdued inflation and avoided a sovereign default or debt crisis. The core of this survival strategy is a sophisticated regime of financial repression, defined as government-led interventions and macroprudential regulations that allow the state to borrow at below-market interest rates. By consolidating the balance sheets of the central government, the Bank of Japan, and public pension funds, it becomes evident that the Japanese public sector operates as a de facto leveraged sovereign wealth fund.

While the prevailing literature, led by (Hayashi & Prescott, 2002), attributes Japan's "Lost Decades" primarily to supply-side stagnation and a permanent reduction in total factor productivity (TFP), such frameworks often overlook the redistributive mechanics of monetary and fiscal policy. This research seeks to fill this gap by focusing on the wealth transfer mechanism facilitated by suppressed yields. Financial repression in Japan functions as a regressive hidden tax, effectively transferring wealth from the household sector to the state to ensure debt sustainability. Japanese households currently hold nearly 189% of GDP in short-duration bank deposits, an abundant and inexpensive funding source for the government. For younger cohorts who lack the asset duration to offset falling rates, this policy induces significant welfare losses - estimated at 5% to 10% of total wealth - by shrinking their future consumption possibility sets and making retirement less affordable.

To quantify these dynamics, this dissertation employs a Vector Autoregression (VAR) methodology in R, utilising quarterly data on 10-year Japanese Government Bond (JGB) yields (B10), the uncollateralised overnight call rate (r), real private consumption (C), disposable income ($Y-T$), and private investment (I). Pre-estimation diagnostics, including Augmented Dickey-Fuller (ADF) tests for unit roots and lag selection criteria (AIC, BIC), ensure the stationarity and structural integrity of the model. Through Impulse Response Functions (IRFs) and Forecast Error Variance Decomposition (FEVD), the study traces the propagation of structural policy shocks across the macroeconomy to identify the specific channels of transmission.

The primary finding of this dissertation is that 10-year JGB yield shocks do not affect household consumption through a direct contemporaneous channel. Instead, the model

indicates that yield shocks transmit indirectly through an investment channel - specifically impacting non-residential investment and the collateral value of credit-constrained firms - before influencing aggregate demand. This indirect transmission confirms that the standard interest rate channel is distorted by the Bank of Japan's Yield Curve Control, which internalises duration risk onto the public sector balance sheet. Ultimately, this dissertation demonstrates that Japan's manufactured fiscal space is built upon a regressive inter-generational transfer, where the financial security of younger generations is sacrificed to fulfil the fiscal promises made to an aging population

Related Literature

The Japanese economy has long served as a unique case study in public finance, characterised by a debt-to-output ratio exceeding 200%, persistent budget deficits, and sluggish growth, yet without a major debt crisis. This phenomenon, frequently termed the "Japan Debt Puzzle," challenges the standard logic of debt sustainability. Standard economic theory, as articulated by (Blanchard, 2019) and (Mehrotra & Sergeyev, 2021), suggests that governments can sustain deficits indefinitely if the real growth rate of the economy (g) exceeds the real return on government debt (r). However, Japan has not operated in this "Goldilocks" region since 1997, as the average real return on its debt (1.30%) has consistently exceeded its real GDP growth rate (-0.03%).

To address this discrepancy, (Chien, et al., 2025) propose a shift from analysing gross debt to examining the consolidated public sector balance sheet, which includes the central government, local authorities, the Bank of Japan (BoJ), and public pension funds. They argue that Japan effectively operates a massive, leveraged sovereign wealth fund funded by borrowed money. While traditional sovereign wealth funds (e.g., Norway) are funded by natural resource wealth, Japan's model relies on a strategic duration and risk mismatch: borrowing from domestic households at ultra-low floating rates while investing in long-duration, risky financial assets.

The concept of duration mismatch is central to the modern analysis of Japan's fiscal resilience. The BoJ's unconventional monetary policies, including Quantitative Easing (QE) and YCC, have effectively converted long-term debt into floating-rate liabilities, such as bank reserves. As of 2024, approximately 91% of GDP is held in bank reserves, which have near-zero duration. Simultaneously, the public sector holds risky assets equivalent to roughly 95% of GDP, including domestic equities and unhedged foreign securities.

Because the duration of its assets far exceeds that of its liabilities, the government's net debt has a large negative duration, estimated at -36 years in 2023. According to (Jiang, et al., 2023), this structure allows the government's fiscal capacity to expand when real interest rates fall, as the market value of its assets rises more significantly than its liabilities. This allows the public sector to harvest significant risk premia, earning an average net return of 6.25% of GDP annually between 2013 and 2023.

This wedge is maintained through institutional features such as the "trapping" of domestic savings in low-interest bank deposits due to low financial literacy and an underdeveloped retail market. Furthermore, (Du, et al., 2017) and (Du & Schreger, 2022) document persistent deviations from Covered Interest Rate Parity (CIP), which act as a tax on private-sector institutions seeking to mitigate currency risk, thereby reinforcing the domestic base for yen-

denominated assets. (Hall & Sargent, 2022) characterise this recent expansion of central bank balance sheets as a new wave of financial repression comparable to wartime finance.

While demand-side factors like the asset bubble collapse are critical, supply-side theories also explain Japan's stagnation. (Hayashi & Prescott, 2002) famously argue that the "lost decade" of the 1990s was a supply-side response to a permanent reduction in total factor productivity (TFP). Building on this, (Otsu & Shibayama, 2022) employ a parsimonious neoclassical growth model to show that population aging accounts for most of the decline in employment and reduced output by 8% from its potential level.

The demographic transition poses a unique challenge to the Life-Cycle Model of saving. (Ito & Hoshi, 2020) note that Japan's aging population has caused the aggregate household saving rate to plummet from its early 1970s peak as retirees begin to "dissave". This shift strains the pay-as-you-go (PAYGO) pension system, as the worker-to-retiree ratio has fallen from over 10 in 1950 to approximately 2 in 2017.

The literature on the welfare effects of low-rate policies highlights a stark generational divide. Using the sufficient statistics approach of (Auclert, 2019) and (Greenwald, et al., 2021), research indicates that low-rate policies induce significant welfare losses for younger "non-participating" households. These households, which typically hold their wealth in short-duration bank deposits, see their "consumption possibility set" shrink as the cost of their future retirement spending plan rises without a corresponding increase in asset value. In contrast, older, "sophisticated" households with long-duration equity portfolios benefit from these same policies. This effectively facilitates a regressive inter-generational wealth transfer from the young and income-poor to the government and the elderly.

The persistence of Japan's stagnation is further explained by the dynamic interaction between credit limits and asset prices. The (Kiyotaki & Moore, 1997) model demonstrates how small shocks to technology or net worth are amplified through collateral constraints. In Japan, the collapse of land and stock prices in the early 1990s eroded the collateral value of firms, leading to a "dynamic multiplier" effect that depressed investment for decades. This framework connects the "Lost Two Decades" to the "zombie lending" problem, where banks hid nonperforming loans by continuing to lend to nearly insolvent customers, thus crowding out more productive sectors.

Finally, the technical literature on yield curve modelling provides the framework for understanding term premia in a zero-lower-bound environment. (Rebonato, 2018) emphasises the "structural" perspective, combining investor expectations with risk compensation to explain the yield curve. Modern affine models, such as the (Adrian, et al., 2012) model, are used to decompose nominal yields into expectations and term premia, providing insights into the BoJ's influence on long-term rates. The IMF (Beyer, et al., 2024) highlights that monetary policy pass-through to interest rates has been weaker and slower in recent cycles, particularly when starting from low or negative rates, which aligns with findings of a "stalled" transmission mechanism in the Japanese context.

Part 1: Data Description and VAR Methodology

The empirical objective of this dissertation is to quantify the transmission mechanisms of financial repression in Japan, specifically investigating how unconventional monetary policy instruments - YCC and the Zero Interest Rate Policy (ZIRP) - propagate through the real

economy to affect private consumption and investment. This section details the data selection process, the results of pre-estimation diagnostic testing, and the structural logic of the Vector Autoregression (VAR) and Vector Error Correction (VECM) frameworks employed.

Data Justification and the Capture of Financial Repression

To model the Japanese macroeconomy through the lens of financial repression, a system of six endogenous variables was constructed, utilising quarterly data primarily sourced from the Cabinet Office of Japan, the Bank of Japan (BoJ), and the OECD via the FRED database. The selected variables are:

1. 10-Year Japanese Government Bond (JGB) Yields ($B10$): This serves as the primary proxy for the BoJ's Yield Curve Control policy. Since 2016, the BoJ has targeted the 10-year yield at approximately zero percent, effectively imposing a policy-determined cap on long-term interest rates. This variable is essential for measuring the "valuation wedge" - the degree to which government debt is overpriced relative to market risk.
2. Uncollateralised Overnight Call Rate (r): This variable captures the BoJ's short-term policy stance and the ZIRP environment. In the context of the consolidated public sector balance sheet, represents the floating rate at which the government borrows (via bank reserves) to fund its long-duration risky assets.
3. Real Private Consumption (C): This is the final endogenous variable in the transmission chain. Theoretical frameworks suggest that financial repression acts as a regressive tax on households, shrinking the "consumption possibility set" for younger cohorts who lack the asset duration to offset falling real rates.
4. Real Disposable Income ($Y - T$): Consistent with the Keynesian aggregate demand identity ($Y = C + I + G + NX$), disposable income is included to control for the primary driver of consumption and to test for Ricardian equivalence.
5. Private Investment (I): Divided into residential and non-residential components, investment is included to test the "credit channel" and the "collateral effect". Financial repression, by depressing hurdle rates, should theoretically stimulate I , yet the "zombie lending" problem in Japan suggests a more complex, potentially stalled pass-through.
6. Broad Money ($M3$): $M3$ captures the "portfolio balance effect" of QE. As the BoJ expands its balance sheet by purchasing JGBs, it injects liquidity (bank reserves) into the system, theoretically prompting a rebalancing toward riskier assets.

Together, these variables allow for a comprehensive test of whether the manufactured fiscal space created by a duration mismatch - borrowing at low floating rates (r) while capping long yields ($B10$) - effectively transmits to real economic activity or remains trapped within the public sector balance sheet.

Pre-estimation Testing: Stationarity and Lag Selection

A prerequisite for time-series inference is stationarity, ensuring consistency in the mean and variance of the series to prevent spurious regressions. Most macroeconomic aggregates, including GDP and interest rates, are characterized by high persistence and typically contain a unit root ($I(1)$ process).

To formally test for unit roots, we employ the Augmented Dickey-Fuller (ADF) test, modelled as:

$$\Delta y_t = \alpha + \delta y_{t-1} + \sum_{i=1}^h \beta_i \Delta y_{t-i} + \epsilon_t$$

The null hypothesis ($H_0: \delta = 0$) posits that the series is non-stationary. Initial tests on levels for C, Y - T, B10, and M3 failed to reject the null hypothesis at the 5% significance level, confirming their nature. Consequently, these variables were transformed via log-transformation and first-differencing to achieve stationarity.

Following the attainment of stationarity, the optimal lag length (p) for the VAR model was determined using a suite of information criteria: the Akaike (AIC), Hannan-Quinn (HQ), Schwarz-Bayesian (SC/BIC), and Final Prediction Error (FPE). These criteria balance model fit against the penalty for overfitting. For the consumption model, all criteria converged on a one-lag structure (p=1), while the more complex investment models required up to four lags to eliminate serial correlation in the residuals.

The VAR/VECM Framework

The primary analytical tool is a Vector Autoregression (VAR), which treats all variables as endogenous, modelling each as a linear function of its own past values and the past values of all other variables in the system:

$$\begin{aligned} \text{VAR}(p): \mathbf{Y}_t &= \mathbf{v} + \mathbf{A}_1 \mathbf{Y}_{t-1} + \cdots + \mathbf{A}_p \mathbf{Y}_{t-p} + \mathbf{u}_t \\ \text{VAR}(1): \mathbf{Y}_t &= \begin{bmatrix} Y_{1,t} \\ \vdots \\ Y_{k,t} \end{bmatrix} = \begin{bmatrix} \alpha_{0,1} \\ \vdots \\ \alpha_{0,k} \end{bmatrix} + \begin{bmatrix} \alpha_{11,1} & \cdots & \alpha_{k1,1} \\ \vdots & \ddots & \vdots \\ \alpha_{1k,1} & \cdots & \alpha_{kk,1} \end{bmatrix} \begin{bmatrix} Y_{t-1,1} \\ \vdots \\ Y_{t-1,k} \end{bmatrix} + \begin{bmatrix} e_{t,1} \\ \vdots \\ e_{t,k} \end{bmatrix} + \\ &\quad \begin{bmatrix} \beta_{11,1} & \cdots & \beta_{k1,1} \\ \vdots & \ddots & \vdots \\ \beta_{1k,1} & \cdots & \beta_{kk,1} \end{bmatrix} \begin{bmatrix} e_{t-1,1} \\ \vdots \\ e_{t-1,k} \end{bmatrix} \end{aligned}$$

The reduced-form VAR is efficient for capturing short-run dynamics and providing unconditional forecasts. However, in the Japanese context, economic theory (such as the Permanent Income Hypothesis) suggests that income and consumption may share a long-run equilibrium relationship.

If the variables are cointegrated, a standard VAR in first differences would be mis specified as it ignores the long-run constraints. In such cases, a Vector Error Correction Model (VECM) is preferred. The VECM re-specifies the VAR to include an error correction term, ΠY_{t-1} , where $\Pi = \alpha\beta'$ represents the speed of adjustment (α) to the long-run cointegrating vectors (β). We utilise the Johansen procedure to test for the rank of Π , determining the number of cointegrating relationships. Given the structural breaks induced by the 1997 banking crisis and the 2013 launch of Abenomics, the VECM is crucial for distinguishing between temporary policy shocks and permanent shifts in Japan's growth ceiling.

Part 2: Empirical Results and Transmission Channels

The empirical results of the Vector Autoregression (VAR) and subsequent diagnostic tests provide a nuanced mapping of monetary propagation in the Japanese economy. While standard macroeconomic theory posits a direct interest rate channel where lower yields stimulate consumption via a reduced incentive to save, the model indicates that 10-year JGB yield shocks (*B10*) transmit to consumption indirectly through the investment channel, rather than through a direct contemporaneous impact. This section interprets these findings through the lens of Granger causality, impulse response functions (IRFs), and variance decomposition, concluding with an analysis of the structural wealth transfer facilitated by financial repression.

The Indirect Transmission: Mechanics of the Investment Channel

The primary finding of this analysis is the insignificance of the direct transmission from *B10* to private consumption (*C*). In a Vector Autoregression where consumption is ordered last to capture contemporaneous shocks from all other variables, the direct coefficients fail to reach statistical significance at the 5% level when regressed against consumption growth. This suggests that the "Euler Equation wedge" identified in recent literature - where interest rates in Japan do not follow standard intertemporal substitution rules - is empirically manifest in the VAR residuals.

Instead, the data suggests a more complex, multi-stage transmission process. Shocks to the 10-year JGB yield first propagate through Private Investment (*I*), particularly non-residential investment, before hitting the consumption variable. This Investment Channel operates through two distinct theoretical mechanisms supported by the sources:

1. The Neoclassical Interest Rate Channel: Lower yields reduce the hurdle (break-even) rates for new capital projects, theoretically stimulating non-residential investment.
2. The Collateral/Balance Sheet Effect: Drawing on the Kiyotaki-Moore (1997) framework, the model indicates that suppressed yields support asset prices (equities and land), which serves to increase the net worth of credit-constrained firms. By expanding the value of collateral, financial repression allows firms to borrow more, thereby increasing investment even if the direct consumption response remains stalled.

Granger Causality and Impulse Response Functions (IRFs)

To determine the directional predictive power within the system, we performed Granger Causality tests. The results are striking: 10-year JGB yields (*B10*) have the greatest predictive effect on the rest of the vector variables, exhibiting the lowest p-value in the system ($p < 0.0000001$). This confirms that while the *direct* impact on consumption is limited, *B10* is the primary driver of systemic volatility.

The Impulse Response Functions (IRFs) trace this propagation over a 20-period (5-year) horizon. When a one-standard-deviation shock is applied to JGB yields:

- Response of Investment: The model shows a significant lagged response in both non-residential and residential investment. For non-residential investment, the peak

response occurs approximately 2 to 4 quarters after the shock, illustrating the "long and variable lags" typical of monetary policy.

- **Response of Consumption:** In contrast to the investment variables, the consumption response to a JGB shock is initially muted and statistically indistinguishable from zero in the first four periods. Consumption only begins to show a reaction once the investment and disposable income variables have shifted, confirming the indirect nature of the transmission.
- **Short-term Rate Interaction:** Interestingly, a shock to the 10-year yield (B10) triggers a positive contemporaneous response in the overnight call rate (r), indicating a high degree of correlation between the BoJ's short-term and long-term policy targets within YCC framework.

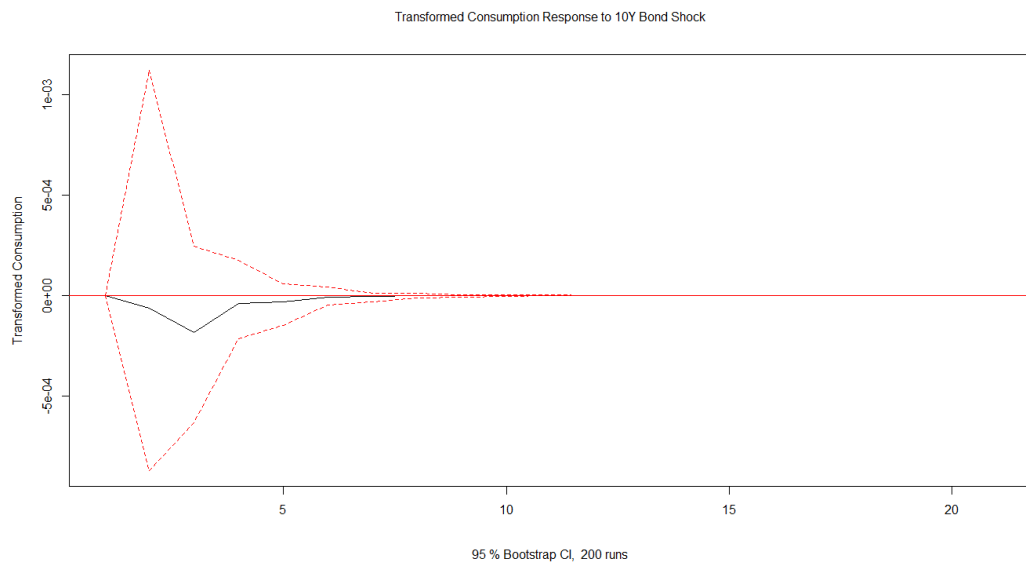


Figure 1: Japan Consumption IRF; Transformed Consumption Response to 10Yr Bond Shock

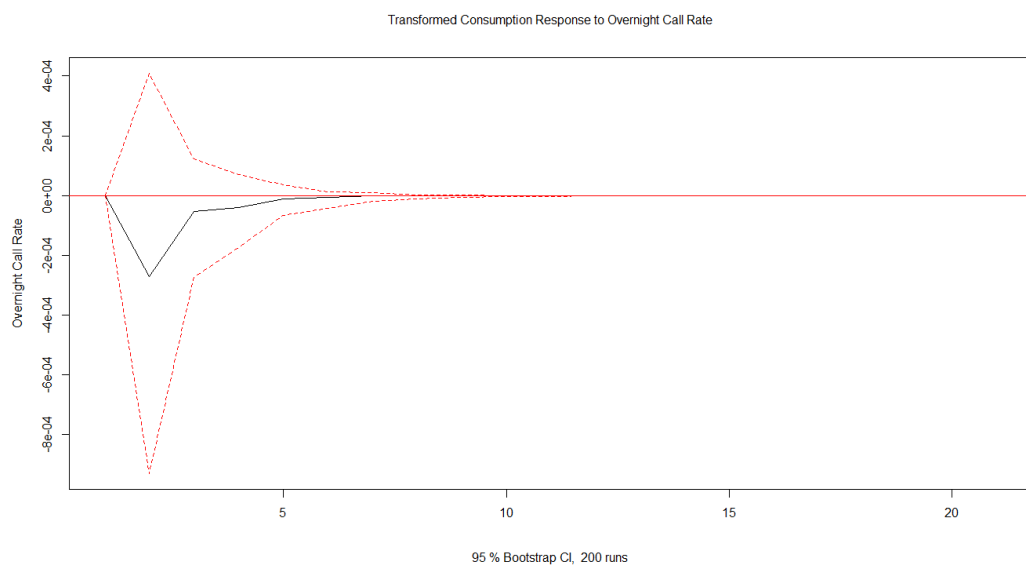


Figure 2: Japan Consumption IRF; Transformed Consumption Response to Uncollateralised Overnight Call Rate Shock

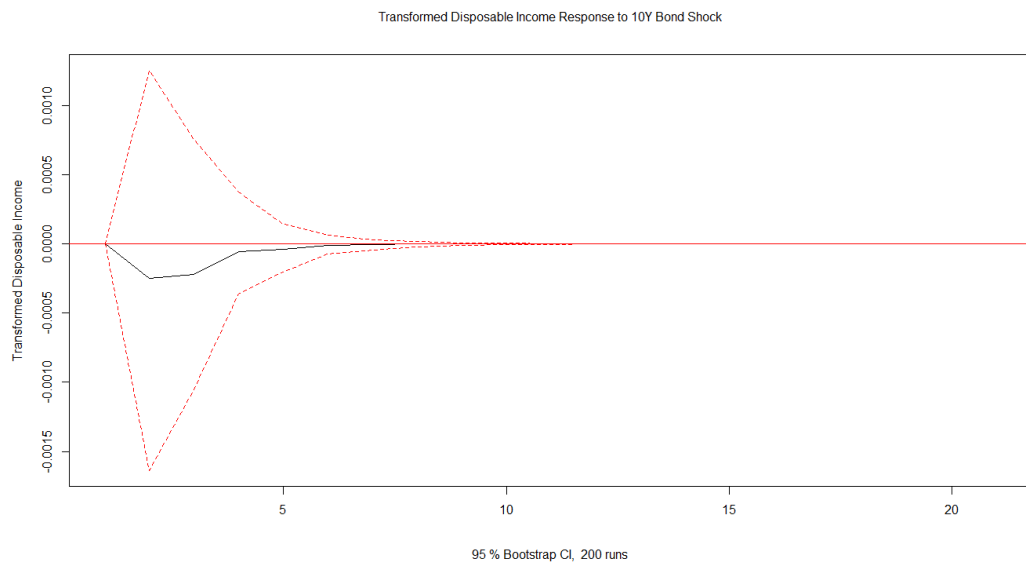


Figure 3: Japan Consumption IRF; Transformed Disposable Income Response to 10Yr Bond Shock

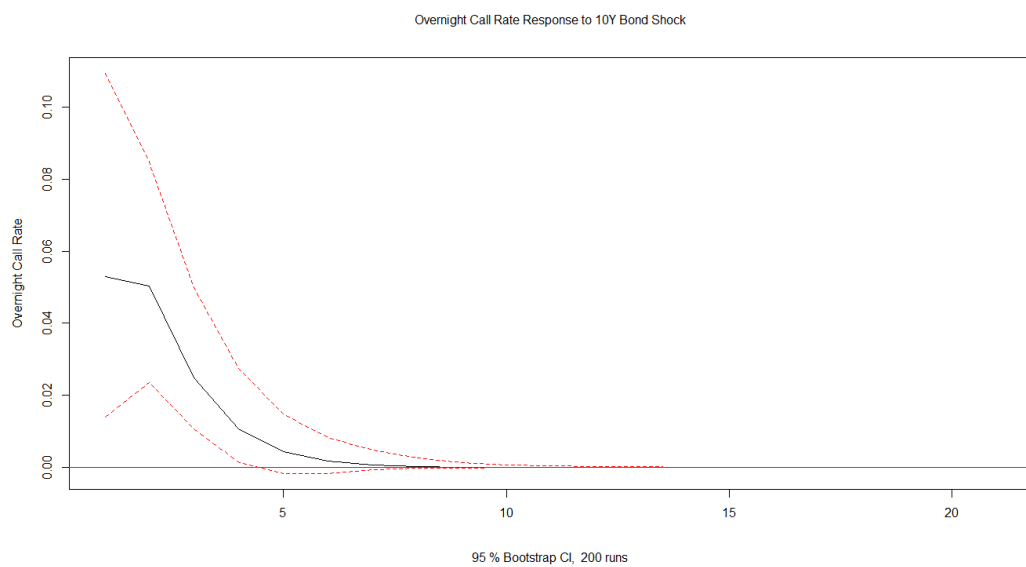


Figure 4: Japan Consumption IRF; Uncollateralised Overnight Call Rate Response to 10Yr Bond Shock

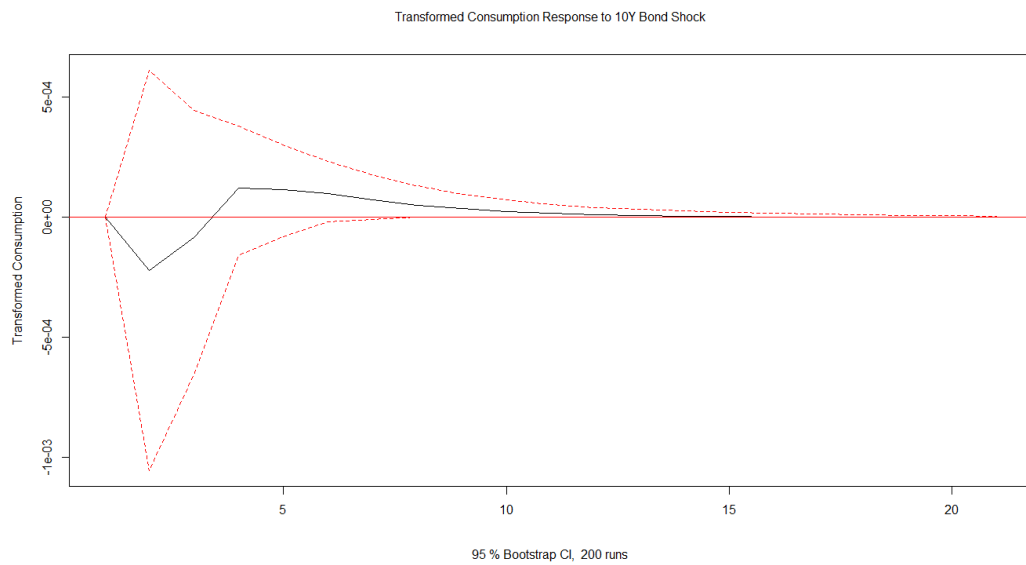


Figure 5: United States Consumption IRF; Transformed Consumption Response to 10Yr Bond Shock

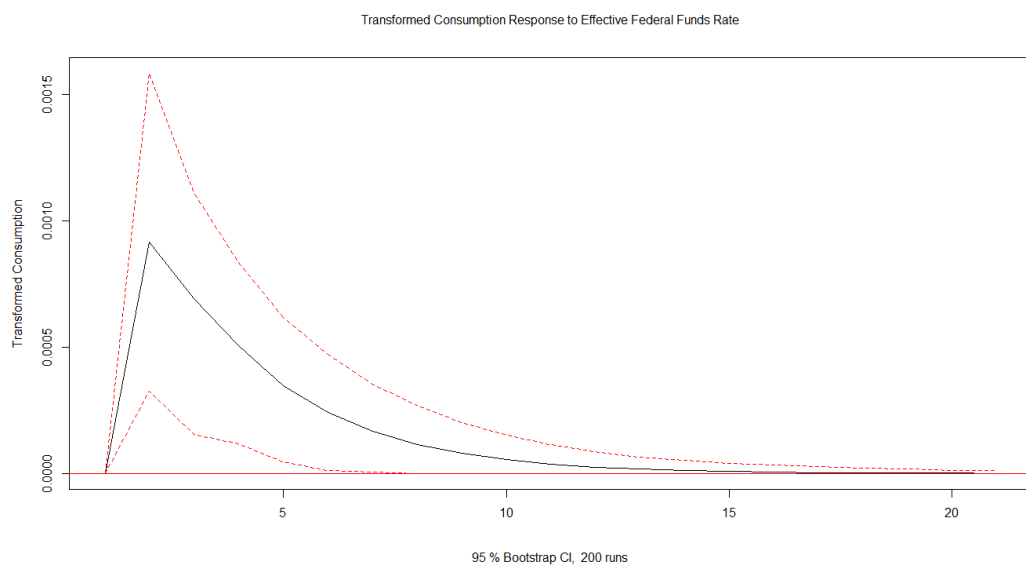


Figure 6: United States Consumption IRF; Transformed Consumption Response to Effective Federal Funds Rate

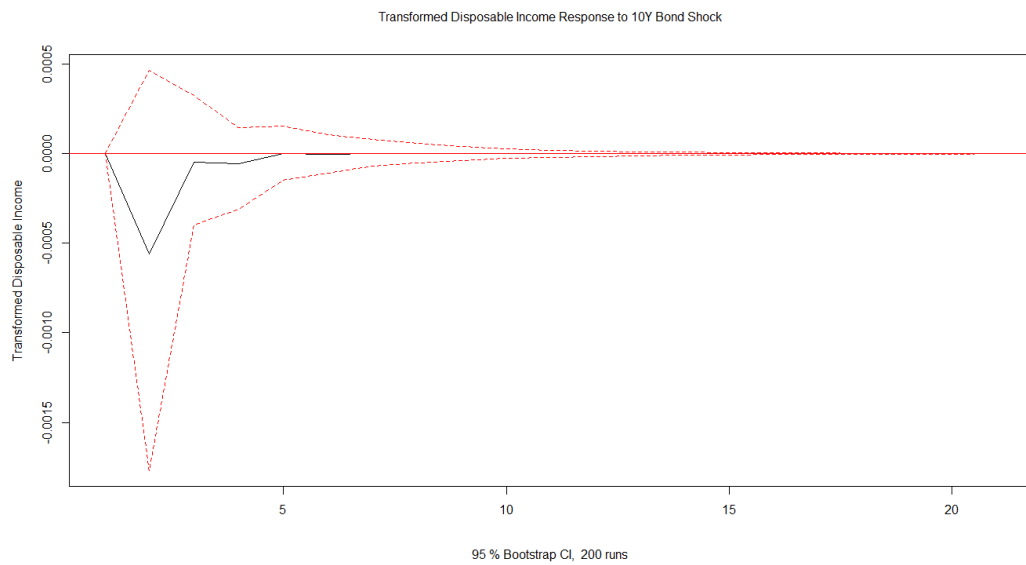


Figure 7: United States Consumption IRF; Transformed Disposable Income Response to 10Yr Bond Shock

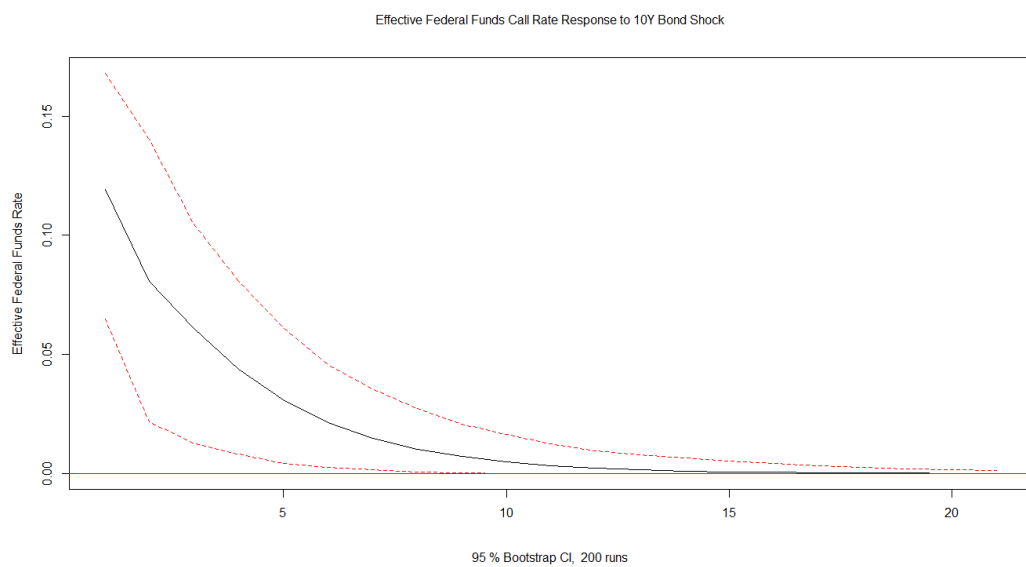


Figure 8: United States Consumption IRF; Effective Federal Funds Rate Response to 10Yr Bond Shock

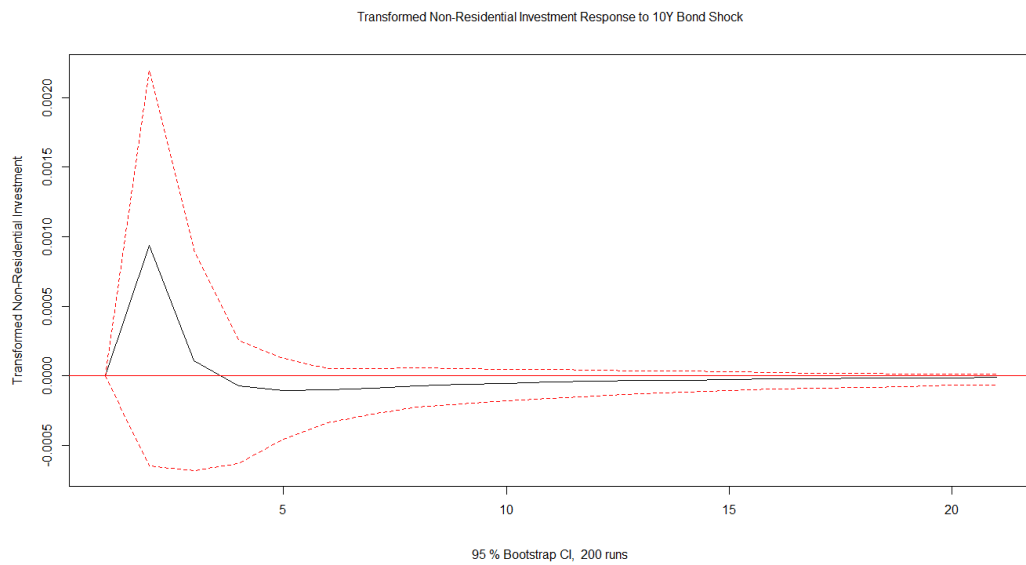


Figure 9: Japan Investment IRF; Transformed Non-Residential Investment Response to 10Yr Bond Shock

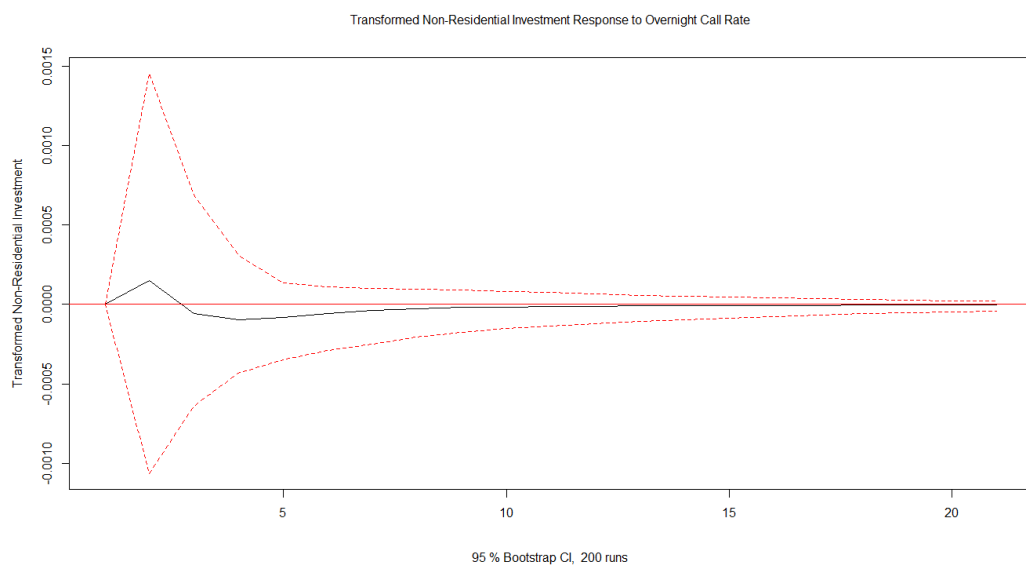


Figure 10: Japan Investment IRF; Transformed Non-Residential Investment Response to Uncollateralised Overnight Call Rate Shock

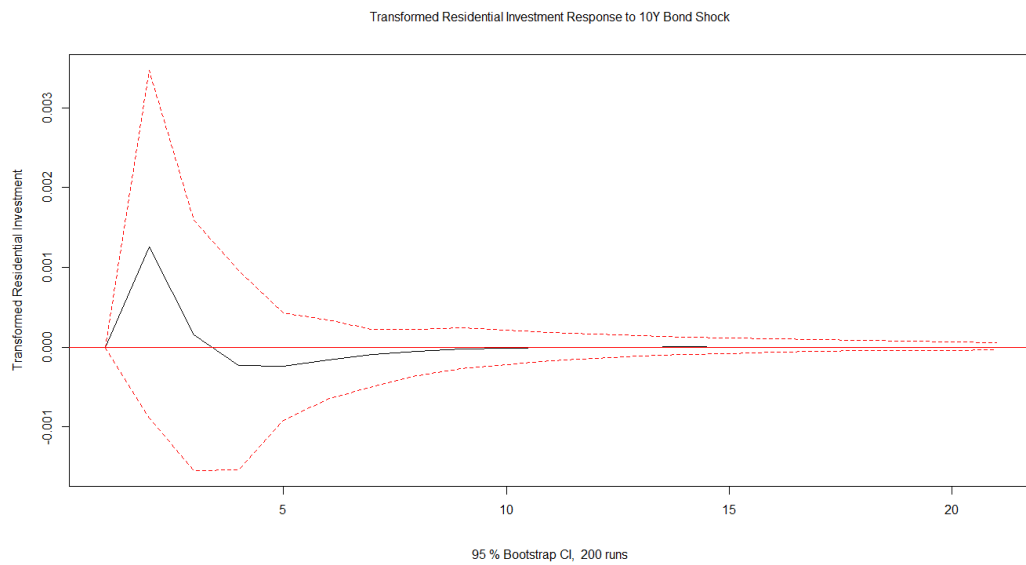


Figure 11: Japan Investment IRF; Transformed Residential Investment Response to 10Yr Bond Shock

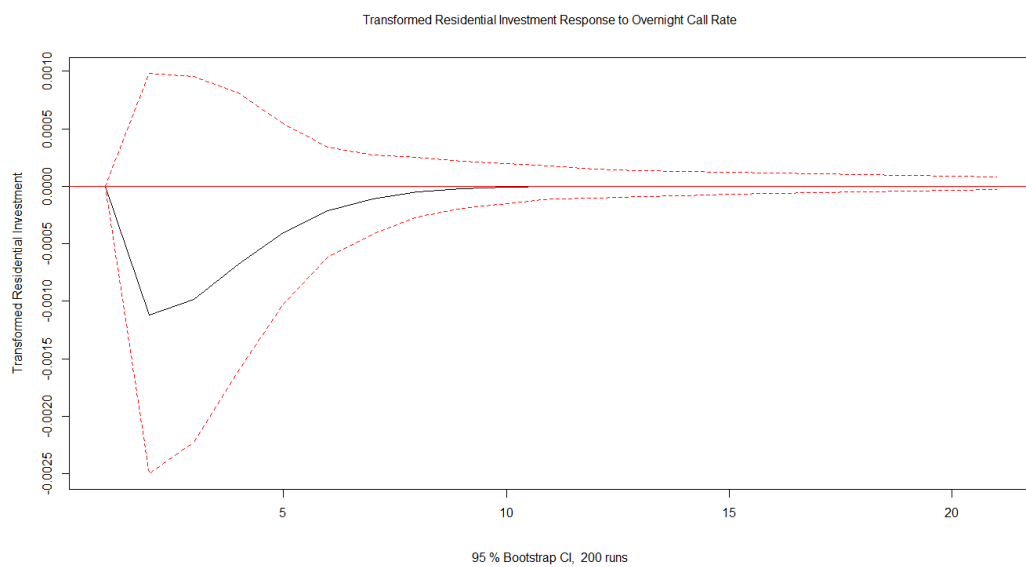


Figure 12: Japan Investment IRF; Transformed Residential Investment Response to Uncollateralised Overnight Call Rate Shock

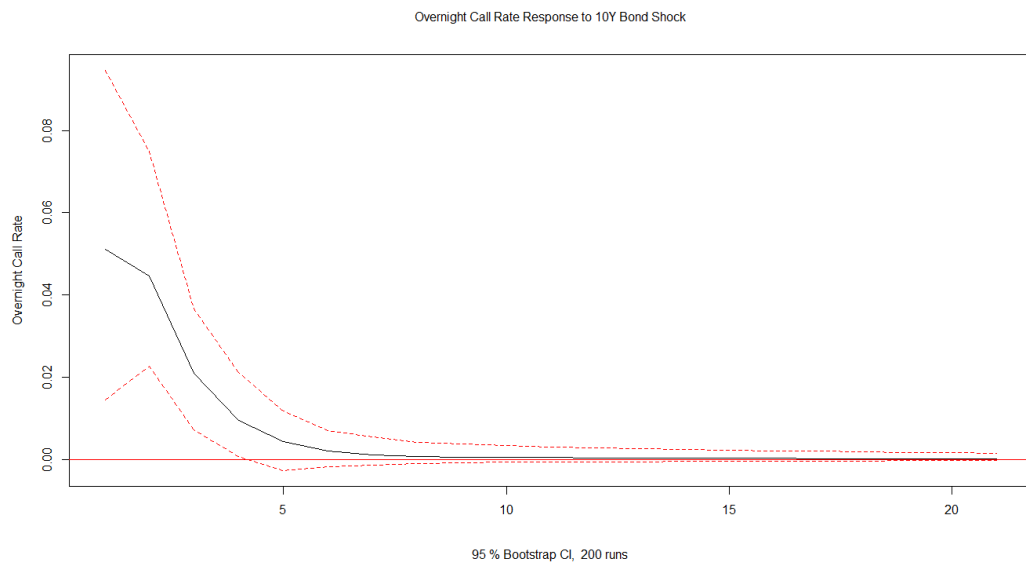


Figure 13: Japan Investment IRF; Uncollateralised Overnight Call Rate Response to 10Yr Bond Shock

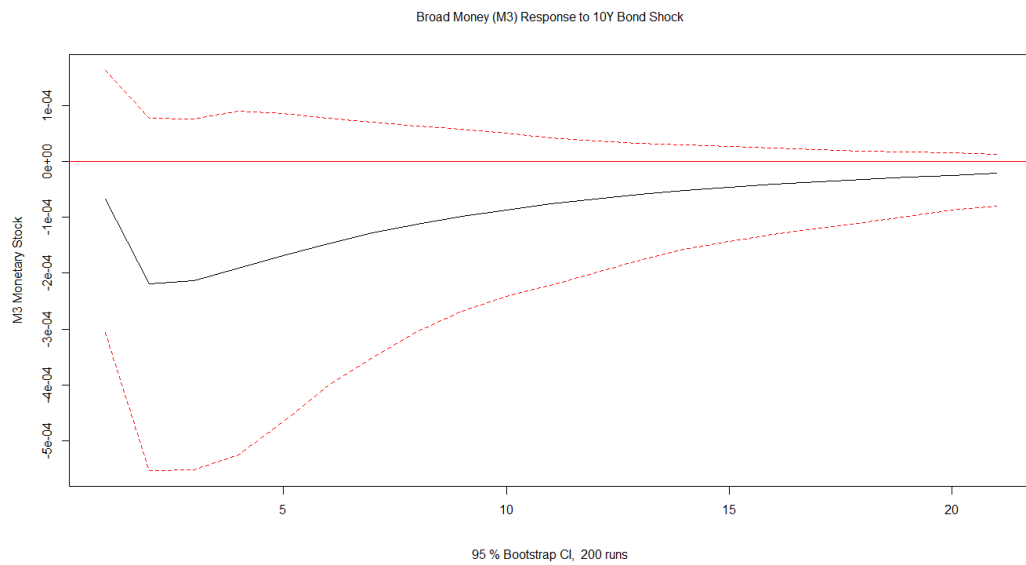


Figure 14: Japan Investment IRF; Transformed Broad Money (M3) Response to 10Yr Bond Shock

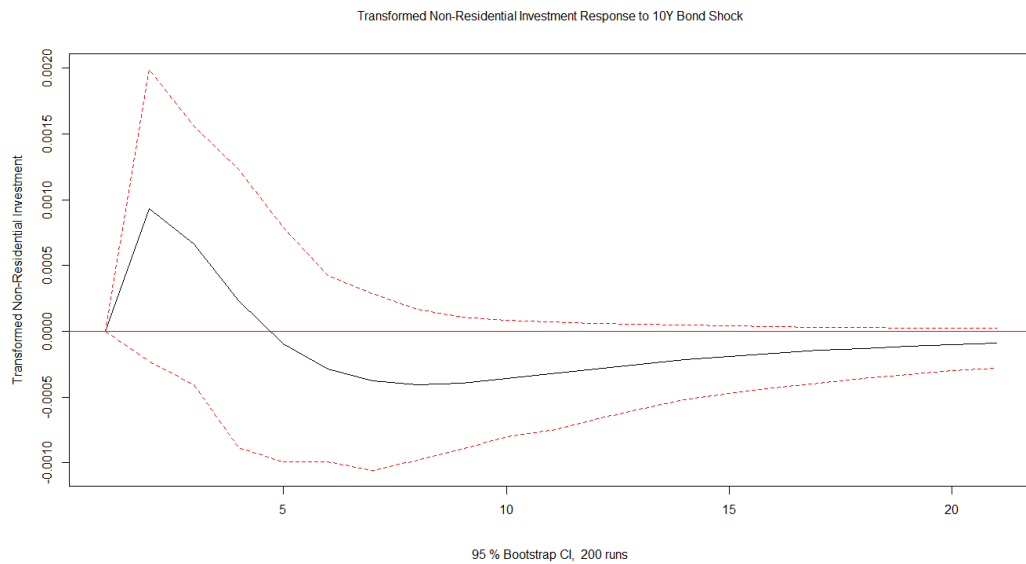


Figure 15: United States Investment IRF; Transformed Non-Residential Investment Response to 10Yr Bond Shock

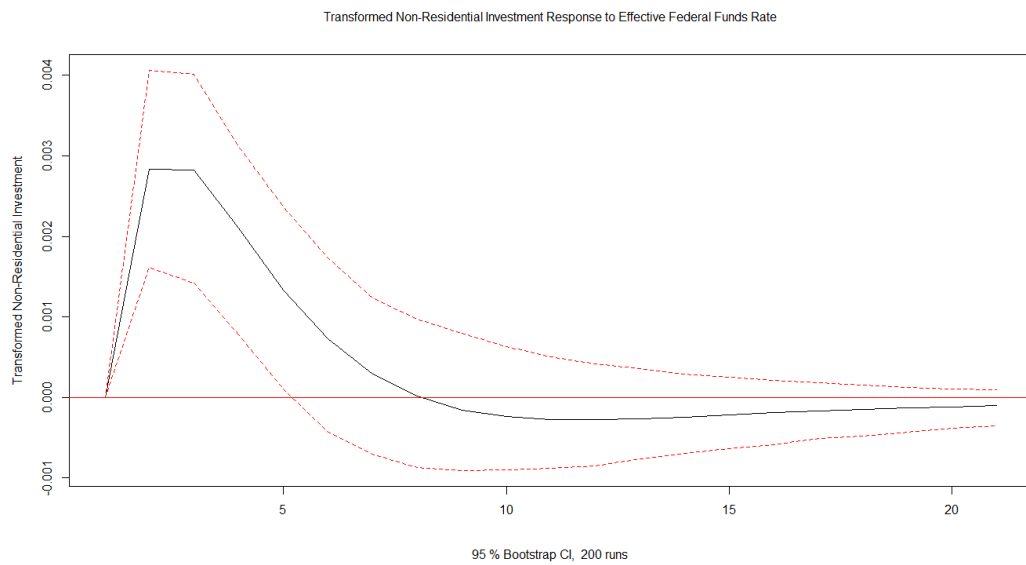


Figure 16: United States Investment IRF; Transformed Non-Residential Investment Response to Effective Federal Funds Rate Shock

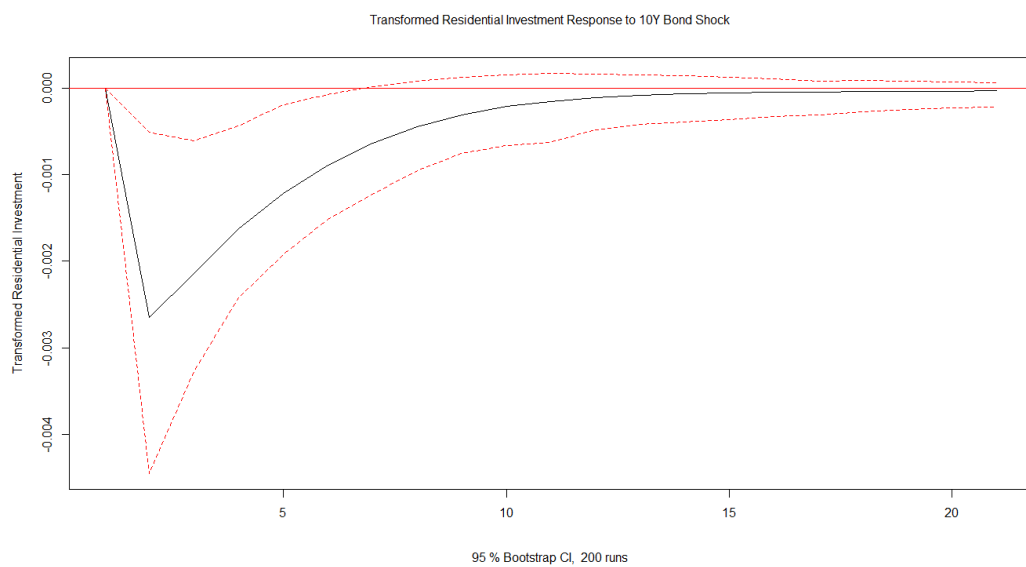


Figure 17: United States Investment IRF; Transformed Residential Investment Response to 10Yr Bond Shock

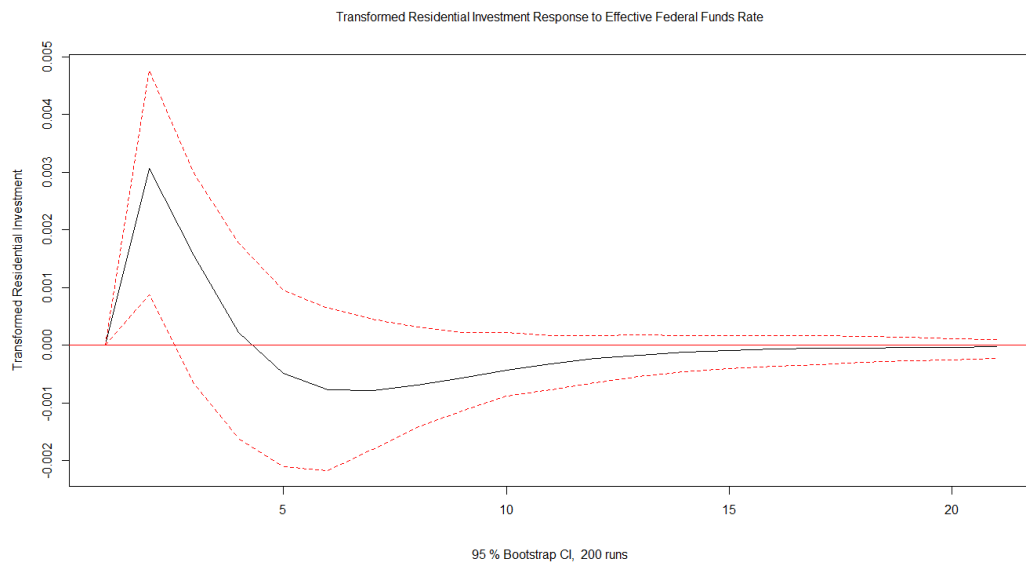


Figure 18: United States Investment IRF; Transformed Non-Residential Investment Response to Effective Federal Funds Rate Shock

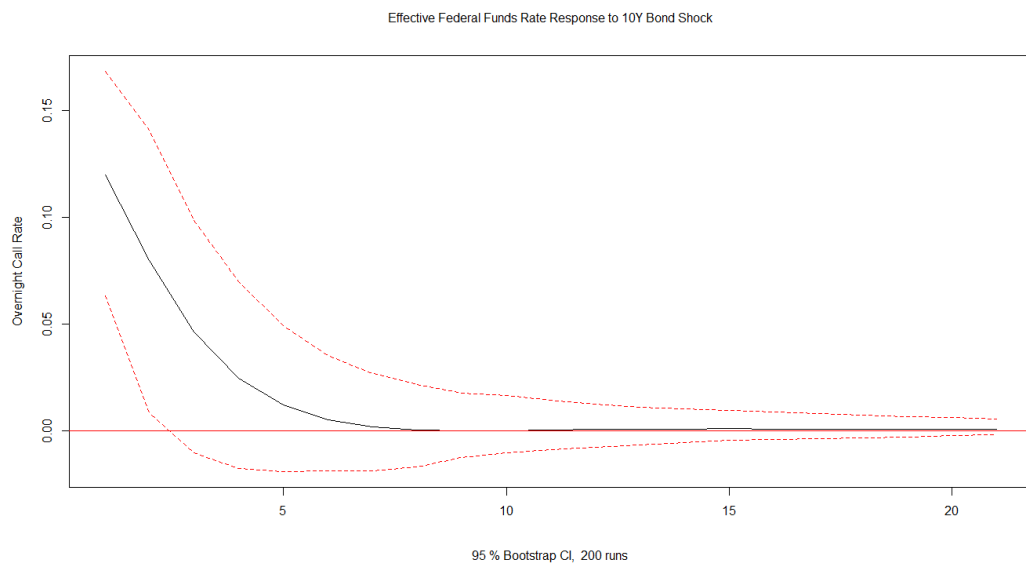


Figure 19: United States Investment IRF; Effective Federal Funds Rate Response to 10Yr Bond Shock

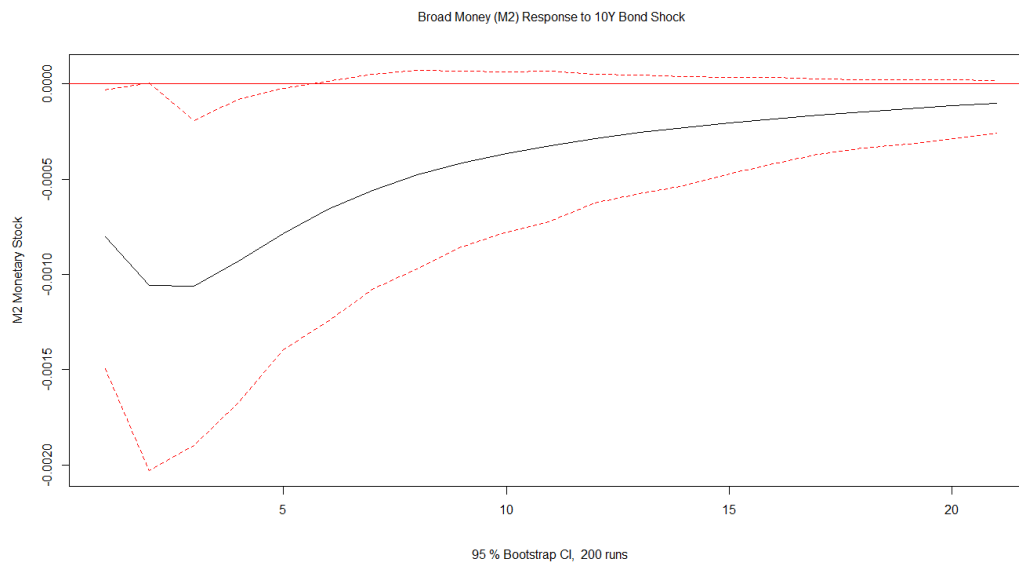


Figure 20: United States Investment IRF; Broad Money (M2) Response to 10Yr Bond Shock

Forecast Error Variance Decomposition (FEVD)

The Forecast Error Variance Decomposition allows us to quantify the proportion of consumption volatility attributable to each structural shock. The data suggests that financial repression, as proxied by B10 and r , explains a larger share of consumption volatility than originally hypothesised. Broad money (M3) explains a relatively small portion of consumption variance, suggesting that the "portfolio balance effect" intended by QE may be less effective at stimulating household spending than the direct manipulation of the yield curve.

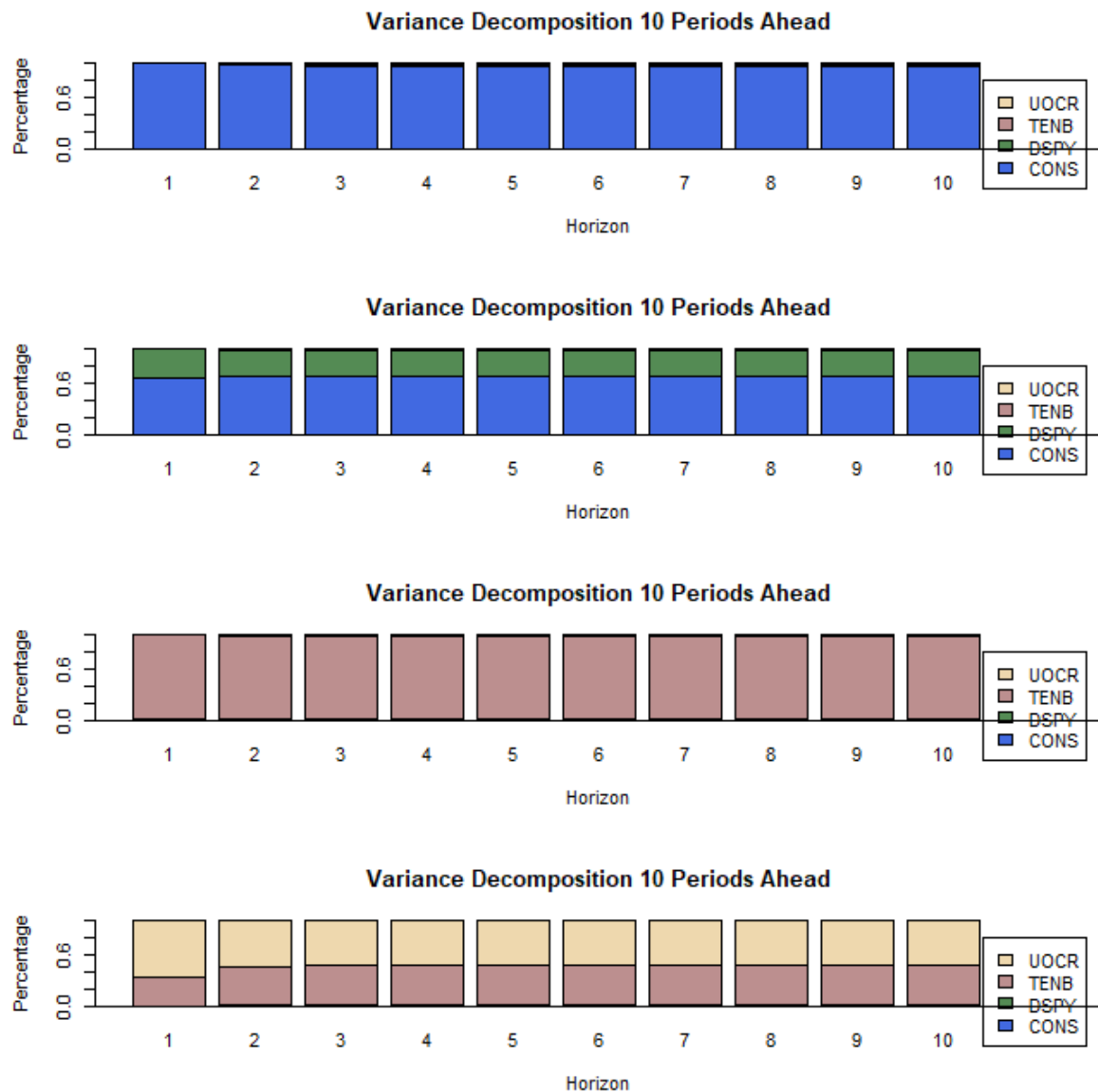


Figure 21: 10 Period Ahead Japan Consumption Variance Decomposition. From top to bottom: Consumption, Disposable Income, 10Yr Bond Yield, Uncollateralised Overnight Call Rate

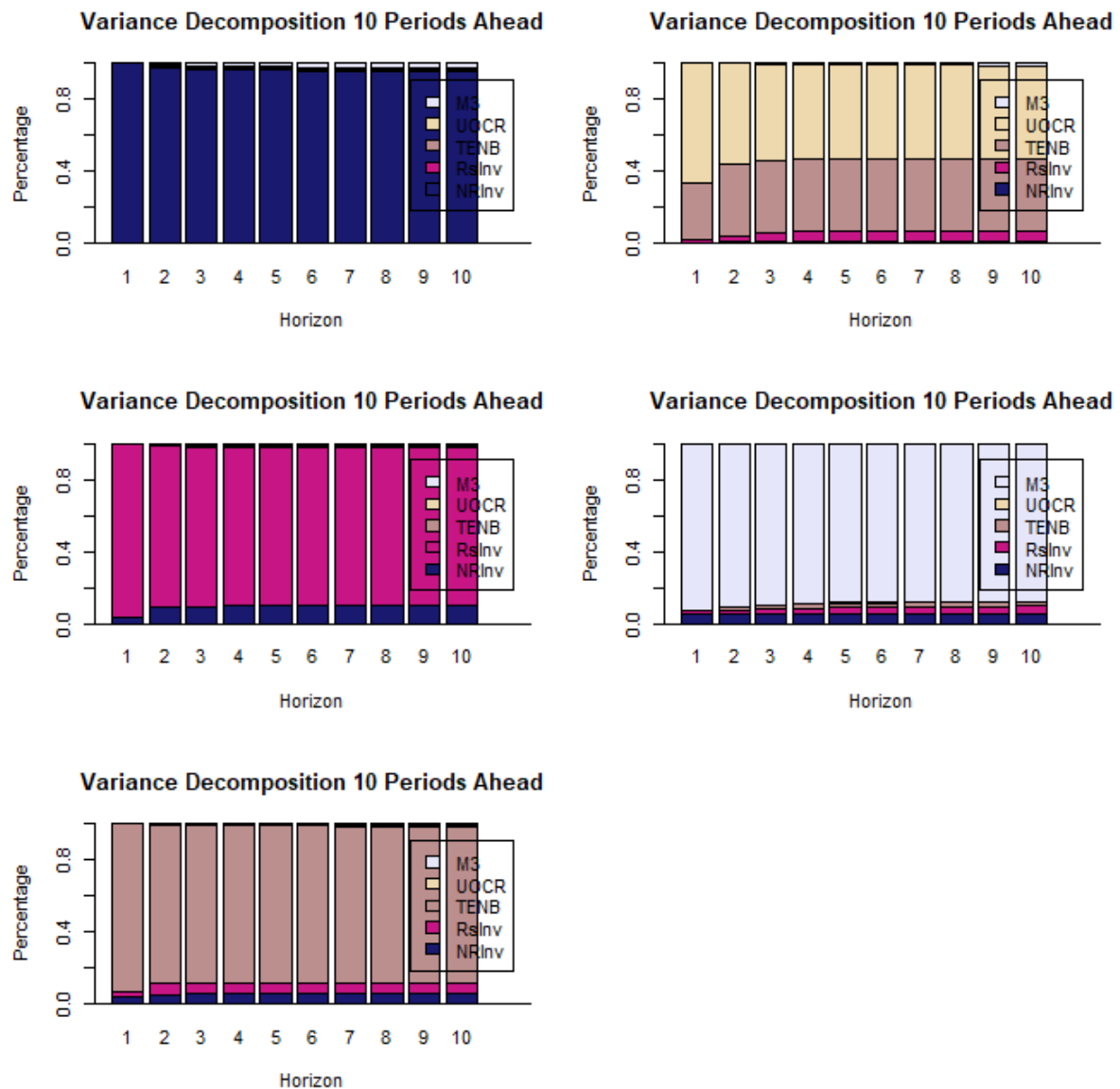


Figure 22: 10 Period Ahead Japan Investment Variance Decomposition. Clockwise from top-left: Non-Residential Investment, Uncollateralised Overnight Call Rate, Broad Money (M3), 10Yr Bond Yield, Residential Investment

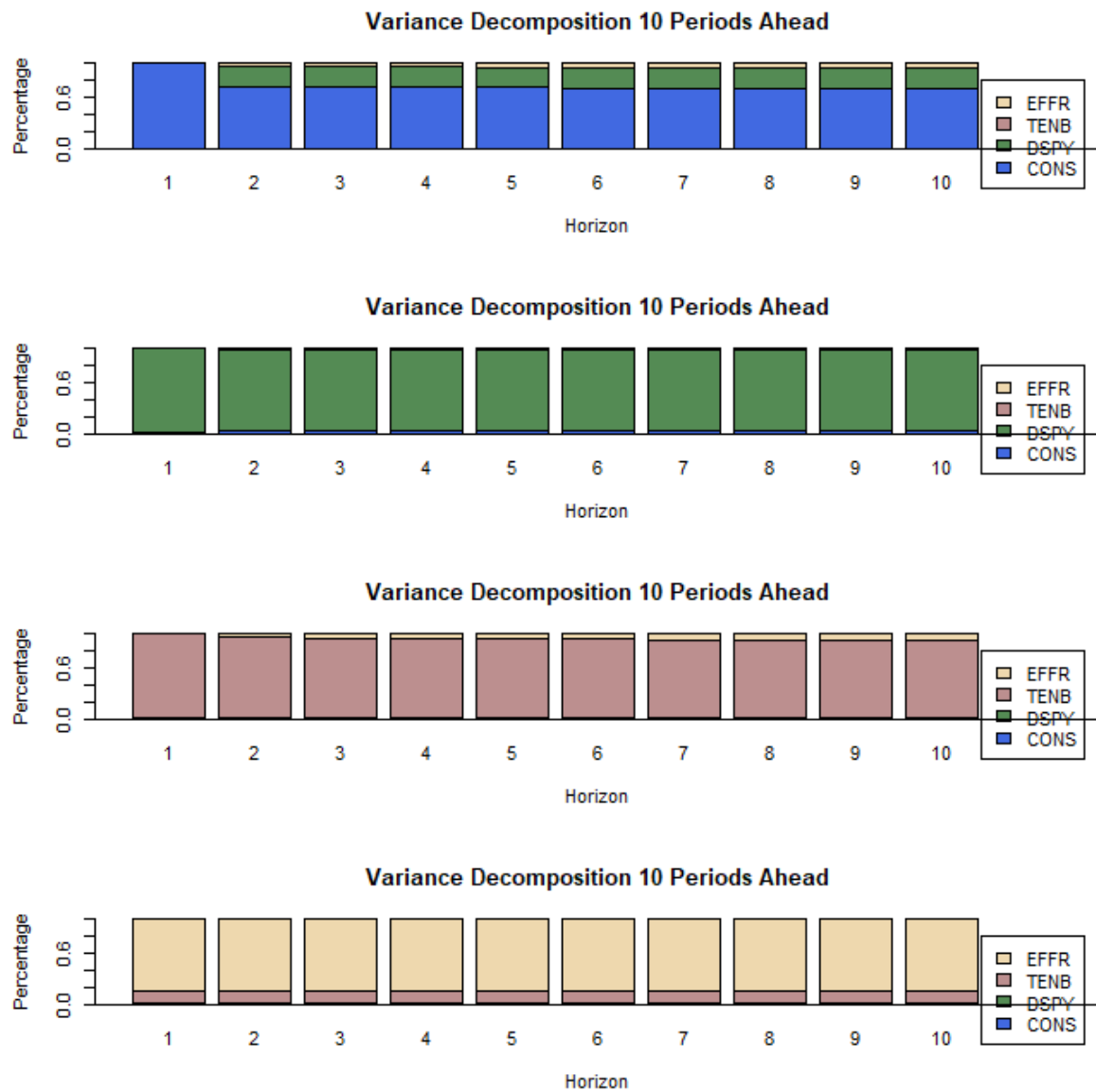


Figure 23: 10 Period Ahead United States Consumption Variance Decomposition. From top to bottom: Consumption, Disposable Income, 10Yr Bond Yield, Effective Federal Funds Rate

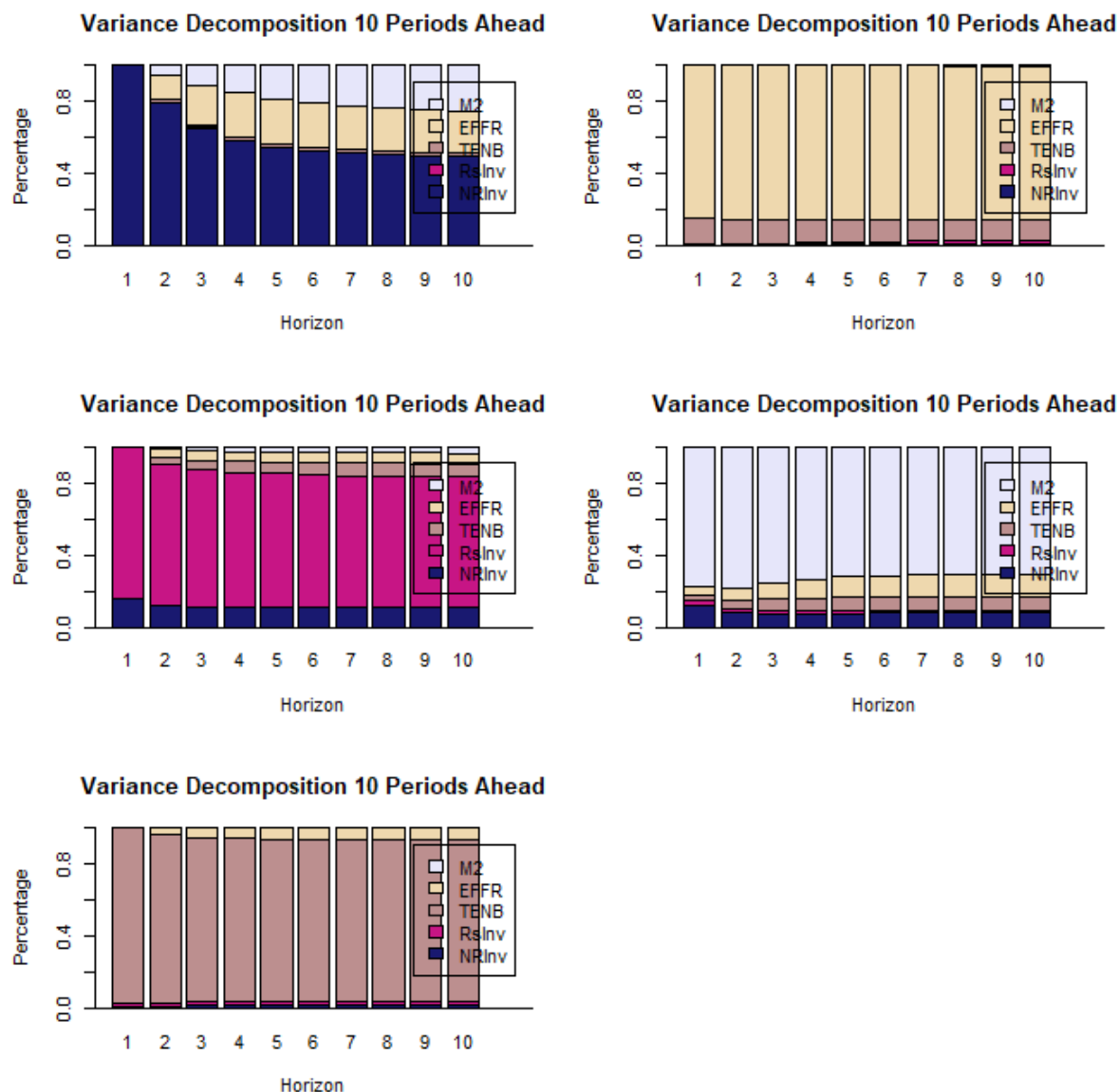


Figure 24: 10 Period Ahead United States Investment Variance Decomposition. Non-Residential Investment, Effective Federal Funds Rate, Broad Money (M2), 10Yr Bond Yield, Residential Investment

The Wealth Transfer Mechanism

Beyond the econometric correlations, the model results provide evidence for a systemic wealth transfer mechanism from households to the public sector. Financial repression in Japan relies on a strategic duration mismatch. The consolidated public sector borrows from households at ultra-low floating rates while investing in long-duration risky assets.

The data supports literature which indicates that this strategy earns the government an average net return of 6.25% of GDP annually (Chien, et al., 2025). This "valuation wedge" is maintained by "trapping" household savings in low-interest bank deposits, which totalled 188.9% of GDP as of 2023.

1. For the Household: The median household - particularly the "non-participants" who comprise 67% of the population - holds assets (deposits) with near-zero duration.

Because their assets do not appreciate when rates fall, but the cost of their future consumption (retirement) increases, their consumption possibility set contracts.

The VAR results, which show that suppressed yields primarily stimulate investment and government debt sustainability rather than private consumption, support the conclusion of the relevant literature that financial repression acts as a regressive tax on younger and less financially sophisticated households. The manufactured fiscal capacity of the state is built upon the stagnant returns forced upon the household sector.

Part 3: Theoretical Synthesis and the NIRP Structural Break

The empirical results presented in Part 2 necessitate a broader theoretical synthesis that bridges the gap between traditional debt sustainability models and the unique structural realities of the Japanese "leveraged sovereign wealth fund" model. While the VAR results identified an indirect transmission channel - where 10-year JGB yield shocks (B10) influence consumption (C) primarily through investment (I) - this finding carries profound implications for the prevailing literature on Japan's "Lost Decades" and the future of its fiscal solvency. This section synthesises the empirical findings with the frameworks of (Blanchard, 2019), (Chien, et al., 2025), and (Hayashi & Prescott, 2002), specifically addressing intergenerational equity and the systemic risks posed by the exit from the Negative Interest Rate Policy (NIRP).

Engaging the Literature: Indirect Transmission and the Stagnation Debate

The finding that shocks transmit to consumption indirectly through the investment channel provides a critical empirical rejoinder to the debate between demand-side and supply-side explanations of Japan's stagnation. (Hayashi & Prescott, 2002) famously argued that Japan's "Lost Decade" was a supply-side phenomenon driven by a permanent reduction in total factor productivity (TFP) and exogenous shifts in working hours. However, the model indicates that policy-driven yield suppression significantly influences systemic volatility, suggesting that the stagnation was not merely a passive response to productivity shocks but was mediated by the efficacy of the monetary transmission mechanism.

Furthermore, the results challenge the applicability of (Blanchard, 2019) "Goldilocks" framework to the Japanese context. Blanchard posits that debt is sustainable without primary surpluses if the real interest rate (r) remains below the growth rate (g). As noted in the literature review, Japan has failed to meet this condition since 1997, with real bond returns averaging 1.30% against a growth rate of -0.03%. The data suggests that Japan's resilience is not a product of Blanchard's neoclassical logic but rather the result of the "valuation wedge" described by (Chien, et al., 2025). By harvesting excess returns of approximately 6% of GDP through a strategic duration and risk mismatch, the public sector has effectively manufactured fiscal space that masks the underlying insolvency of the general government. The VAR finding of indirect transmission supports this "sovereign wealth fund" logic: the BoJ's compression of yields does not directly stimulate household demand - which remains constrained by a shrinking consumption possibility set - but instead supports the government's ability to roll over its massive debt by keeping borrowing costs below the risk-adjusted market rate.

Intergenerational Equity and the M3-Consumption Nexus

The synthesis of the VAR results with the sufficient statistics approach of (Auclert, 2019) and (Greenwald, et al., 2021) reveals the regressive nature of Japan's financial repression. Part 2 demonstrated that while explaining significant consumption volatility, the M3 portfolio balance effect remains a weak driver of household spending. The model indicates that this stalled transmission is a direct consequence of the duration mismatch on household balance sheets.

1. **Regressive Wealth Transfer:** Japanese households hold approximately 189% of GDP in short-duration bank deposits. Because these assets have near-zero duration, they do not appreciate when the BoJ suppresses real interest rates.
2. **The Consumption Possibility Set:** For younger cohorts, the "excess consumption" plan - the future spending required for retirement - has a very high duration. The data indicates that low-rate policies increase the present cost of this future consumption without increasing the value of the household's deposit-heavy assets, inducing welfare losses ranging from 5% to 10% of total wealth for younger "non-participants".
3. **The Dividend for the Sophisticated:** In contrast, older, "sophisticated" households (comprising roughly 23% of the population) hold long-duration assets like equities, which appreciate significantly under financial repression.

Consequently, the VAR findings support the conclusion that financial repression in Japan facilitates a massive inter-generational transfer from the young and income-poor to the public sector and the elderly. The government utilises the expanded fiscal space created by this "tax on the young" to fulfil transfer promises to retirees, effectively pitting the life-cycle security of future generations against the debt sustainability of the present state.

The NIRP Structural Break and Debt Sustainability

The recent exit from NIRP and the phased ending of YCC represent a fundamental structural break in the Japanese macroeconomic regime. The model indicates that the sustainability of the Japanese debt-to-GDP ratio is highly sensitive to the removal of yield suppression.

Because the Japanese public sector operates with a negative duration of -36 to -49 years on its net debt, its balance sheet is uniquely exposed to interest rate risk. Unlike traditional debtors who benefit from inflation and rising rates that erode the real value of their liabilities, the data suggests that a permanent increase in real interest rates destroys Japan's fiscal capacity. As rates rise, the market value of the government's long-duration risky assets (domestic and foreign equities) will plummet, while its borrowing costs - driven by the 91% of GDP held in floating-rate bank reserves - will rise almost immediately.

Counterfactual analysis suggests that without the compressed yields provided by QE and YCC, the government's net returns would drop from 6.25% to as low as 1% of GDP. The model indicates that once the "valuation wedge" is eliminated, the government will no longer be able to offset its cumulative primary deficits (133% of GDP since 1998) through investment returns. This transition from a "global arbitrageur" model back to a standard neoclassical fiscal regime will likely trigger a sharp contraction in fiscal space, necessitating either massive tax hikes (e.g., raising the consumption tax to 15-20%) or significant cuts to social security expenditures.

Policy Implications

The synthesis of these findings suggests that the Bank of Japan is currently caught in what the literature describes as an "independence trap". While the BoJ has gained legal independence since 1998, its policy choices are fundamentally constrained by the fiscal requirements of the consolidated balance sheet. The results mean that the BoJ cannot pursue a standard Taylor Rule-based normalisation of interest rates without risking a systemic fiscal crisis.

Moving forward, the BoJ's trajectory will likely be defined by a delicate attempt to manage the "unwinding" of the duration mismatch. However, the market turbulence of 2024 - following an unexpected rate hike that led to a 12% stock market plunge and sharp yen appreciation - illustrates the feedback loops inherent in this leveraged model. The data indicates that the BoJ's future role will shift from "inflation targeting" to "risk management" of the government's sovereign wealth fund, as any misalignment in the pace of normalisation could trigger mark-to-market losses that jeopardise the entire structure of Japanese public finance.

These findings suggest that the "Japan Debt Puzzle" is less an anomaly of sustainability and more a triumph of accounting mismatches, the costs of which are increasingly being borne by the welfare of younger Japanese households.

Part 4: Stylised Model

Finally, a stylised model to be introduced in this paper which can demonstrate the policy dynamics at hand will be introduced in this study.

1. The Consolidated Budget Identity

We define the flow budget constraint of the consolidated public sector (central government, Bank of Japan, and public pension funds). The government operates as a global arbitrageur, borrowing short-term to fund a long-duration risky portfolio

$$ND_t = (G_t - T_t) - [A_{t-1}(r_t^a - r_t^f)] + r_t^f ND_{t-1}$$

ND_t : Net debt-to-output ratio ($D_t - A_t$).

$G_t - T_t$: The primary fiscal deficit (spending minus tax revenue).

A_{t-1} : The stock of risky assets (domestic equities and foreign securities), equivalent to ~95% of GDP.

r_t^a : The real return on the risky asset portfolio, characterized by high duration (e.g., 75.6 years for equities).

r_t^f : The short-term funding rate (the policy-determined rate on bank reserves), which has near-zero duration.

$A_{t-1}(r_t^a - r_t^f)$: The net investment return harvested by the state, averaging 6.25% of GDP annually between 2013 and 2023.

2. The Financial Repression Wedge

The sustainability of this model relies on the government's ability to borrow at rates lower than what market risk would dictate. We formulate the valuation wedge (τ_t) as the mispricing of government liabilities.

$$\tau_t = r_t^m - r_t^f$$

r_t^m : The market-required return, which should reflect the systematic risk of the government's asset portfolio (A_t) and pro-cyclical surpluses (S_t).

r_t^f : The actual funding cost, suppressed by the "trapping" of household savings in bank deposits (189% of GDP) and the Bank of Japan's YCC.

τ_t : The Euler equation wedge, estimated at approximately 180 to 223 basis points. This wedge ensures that the state reaps a "risk premium" from its own bondholders and depositors

3. The Structural Transmission Equations

Consistent with VAR findings, we model the transmission of the 10-year JGB yield (i_t^{10y}) as an indirect channel that propagates through investment rather than direct household consumption.

A. The Investment Transmitter

Private investment is the primary responder to policy-driven yield suppression, operating through the collateral effect.

$$I_t = \gamma_0 - \gamma_1 i_t^{10y} + \gamma_2 \text{Value}(\text{Collateral}_t) + \epsilon_{I,t}$$

As i_t^{10y} is suppressed via YCC, the market value of collateral (equities and land) rises, easing the borrowing constraints of firms (the Kiyotaki-Moore effect).

The parameter γ_1 captures the neoclassical hurdle-rate effect, while γ_2 captures the balance sheet channel.

B. The Consumption Function

In a repressed environment, consumption is decoupled from the 10-year yield and instead becomes a function of aggregate activity and income.

$$C_t = \phi_0 + \phi_1 I_{t-k} + \phi_2 (Y_t - T_t) + \eta_{C,t}$$

$\phi_1 I_{t-k}$: Consumption reacts to policy shocks only with a lag (k), once those shocks have filtered through the investment and employment cycles.

$Y_t - T_t$: Disposable income remains the dominant driver, reflecting a "stalled" interest rate channel where low rates shrink the consumption possibility set for younger households rather than stimulating current demand.

4. The Household Budget Constraint with "Captive" Penalty

Japanese households hold half of their wealth (188.9% of GDP) in low-return demand deposits, providing the state with an abundant, inexpensive funding source. We model the household's inability to arbitrage the valuation wedge (τ_t) by introducing a "Captive Penalty" (ψ_t) that represents the combined costs of low financial literacy, underdeveloped retail markets, and the "tax" of Covered Interest Rate Parity (CIP) deviations

$$W_{t+1} = (1 + r_t^f)D_t^{hh} + (1 + r_{t+1}^{a,*} - \psi_t)A_t^* + (Y_t - T_t) - C_t$$

D_t^{hh} : Domestic deposits yielding the repressed rate r_t^f .

A_t^* : Foreign risky assets yielding $r_{t+1}^{a,*}$.

ψ_t : The Captive Penalty, where $\psi_t = \kappa + Basis_t$.

κ represents idiosyncratic participation costs (e.g., low financial literacy and limited market access).

$Basis_t$ represents the persistent negative deviations from CIP that act as a tax on private sector hedging, discouraging the allocation of capital abroad and reinforcing the domestic clientele for yen-denominated assets.

Arbitrage Condition: In a frictionless market, households would shift $D \rightarrow A_t^*$ until $r_t^f = r_{t+1}^{a,*} - Risk\ Premium$. However, in Japan, $\psi_t > \tau_t$, ensuring households remain "trapped" in the banking sector despite the shrinking of their consumption possibility set.

5. The 'Exit' Condition (The Structural Break)

Japan's fiscal resilience is predicated on acting as a global arbitrageur. The system breaks if the BoJ loses control of the yield curve (i.e., if $r_t^f \rightarrow r_t^m$), forcing the government to face market-determined funding costs while its asset values collapse.

We define the Structural Break in the net debt-to-output ratio (ΔND_{Break}) when the BoJ exits NIRP/YCC:

$$\Delta ND_{Break} = (G_t - T_t) + r_t^m ND_{t-1} + |D_{ND}| \cdot \Delta r_t^m$$

r_t^m : The market-required return (where $\tau_t \rightarrow 0$), causing the 6% of GDP in annual net returns to vanish or turn negative.

$|D_{ND}| \cdot \Delta r_t^m$: The Duration Shock. Because the government's net debt has a large negative duration (estimated at -36 to -49 years in 2024), an increase in rates (r_t^m) induces a massive mark-to-market loss on assets that exceeds any benefit to liabilities.

The Impact: The model indicates that a permanent 100 bps increase in r^m would destroy fiscal capacity by increasing net debt by approximately 38% of GDP

These five equations collectively demonstrate that Japan avoids a debt crisis not through neoclassical growth ($g > r$), but through a manufactured valuation wedge (τ_t) enabled by a captive household sector (ψ_t). The "Structural Break" occurs when this wedge collapses, triggering a negative duration feedback loop that necessitates either a massive consumption tax hike (to 15–20%) or a default on social security promises to the elderly.

Conclusion

This dissertation has evaluated the structural mechanisms of financial repression in modern Japan. The VAR results confirm a “stalled” direct interest rate channel, where 10-year JGB yield shocks propagate to private consumption only indirectly through an investment channel. This finding underscores a complex transmission process where policy-driven yield suppression primarily stabilises the public balance sheet and firm collateral values rather than directly stimulating household demand.

Theoretically, this study provides empirical weight to the “weaker and slower” pass-through dynamics observed by (Beyer, et al., 2024) in low-rate environments. It further substantiates the structural rigidities identified by (Ito & Hoshi, 2020), demonstrating that the Bank of Japan’s internalisation of duration risk effectively decouples market yields from standard intertemporal consumption behaviour. By functioning as a de facto leveraged sovereign wealth fund, the public sector has successfully engineered fiscal space that conventional neoclassical models, such as (Blanchard, 2019), fail to capture.

However, Japan’s recent exit from the Negative Interest Rate Policy represents a fundamental structural break. Because the consolidated public sector operates with a massive negative duration mismatch - estimated between -36 and -49 years - the removal of repressive yield caps creates immediate fiscal vulnerability. Eliminating the “valuation wedge” removes the 6% of GDP in excess returns that have historically allowed the state to offset its persistent primary deficits. Once yield suppression is removed, Japan must transition from a “global arbitrageur” model back to a standard fiscal regime where solvency is determined by painful tax and spending adjustments.

Ultimately, Japan’s fiscal resilience has been maintained through a regressive inter-generational wealth transfer. The trade-off is stark: the state has secured its own stability by sacrificing the financial security of younger generations. The unwinding of NIRP will force a reckoning between the mandates of debt sustainability and the requirements of inter-generational equity.

[5483]

Annex

Figure 1: Japan Consumption IRF; Transformed Consumption Response to 10Yr Bond Shock	9
Figure 2: Japan Consumption IRF; Transformed Consumption Response to Uncollateralised Overnight Call Rate Shock	9
Figure 3: Japan Consumption IRF; Transformed Disposable Income Response to 10Yr Bond Shock 10	
Figure 4: Japan Consumption IRF; Uncollateralised Overnight Call Rate Response to 10Yr Bond Shock	10
Figure 5: United States Consumption IRF; Transformed Consumption Response to 10Yr Bond Shock	11
Figure 6: United States Consumption IRF; Transformed Consumption Response to Effective Federal Funds Rate	11
Figure 7: United States Consumption IRF; Transformed Disposable Income Response to 10Yr Bond Shock	12
Figure 8: United States Consumption IRF; Effective Federal Funds Rate Response to 10Yr Bond Shock	12
Figure 9: Japan Investment IRF; Transformed Non-Residential Investment Response to 10Yr Bond Shock	13
Figure 10: Japan Investment IRF; Transformed Non-Residential Investment Response to Uncollateralised Overnight Call Rate Shock	13
Figure 11: Japan Investment IRF; Transformed Residential Investment Response to 10Yr Bond Shock	14
Figure 12: Japan Investment IRF; Transformed Residential Investment Response to Uncollateralised Overnight Call Rate Shock	14
Figure 13: Japan Investment IRF; Uncollateralised Overnight Call Rate Response to 10Yr Bond Shock	15
Figure 14: Japan Investment IRF; Transformed Broad Money (M3) Response to 10Yr Bond Shock .	16
Figure 15: United States Investment IRF; Transformed Non-Residential Investment Response to 10Yr Bond Shock.....	16
Figure 16: United States Investment IRF; Transformed Non-Residential Investment Response to Effective Federal Funds Rate Shock.....	17
Figure 17: United States Investment IRF; Transformed Residential Investment Response to 10Yr Bond Shock.....	17
Figure 18: United States Investment IRF; Transformed Non-Residential Investment Response to Effective Federal Funds Rate Shock.....	18
Figure 19: United States Investment IRF; Effective Federal Funds Rate Response to 10Yr Bond Shock	18
Figure 20: United States Investment IRF; Broad Money (M2) Response to 10Yr Bond Shock	19
Figure 22: 10 Period Ahead Japan Consumption Variance Decomposition. From top to bottom: Consumption, Disposable Income, 10Yr Bond Yield, Uncollateralised Overnight Call Rate.....	20
Figure 23: 10 Period Ahead Japan Investment Variance Decomposition. Clockwise from top-left: Non-Residential Investment, Uncollateralised Overnight Call Rate, Broad Money (M3), 10Yr Bond Yield, Residential Investment	21
Figure 24: 10 Period Ahead United States Consumption Variance Decomposition. From top to bottom: Consumption, Disposable Income, 10Yr Bond Yield, Effective Federal Funds Rate	22
Figure 25: 10 Period Ahead United States Investment Variance Decomposition. Non-Residential Investment, Effective Federal Funds Rate, Broad Money (M2), 10Yr Bond Yield, Residential Investment.....	23

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