The Impact of Policy Shocks on Financial Structure: Empirical Results from Japan

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Abstract

This study examines the relationship between Japan's financial structure and the country's fiscal/monetary policy. Vector Error Correction models are utilized to investigate the effect of policy shocks on financial structure development during a sample period of 48 years. Our findings reveal signs of an existing long-run relationship between policy variables and financial structure. Policymakers in Japan may have effectively influenced Japan's financial structure development via fiscal and monetary actions. This result strengthens the assumption of a volatile financial structure due to policy interference. This study is the first of its kind and is intended to stimulate further research and debate.

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1. Introduction

For many decades the active debate on whether the financial structure of a country affects economic growth has lead to a vast number of articles (Dolar and Meh (2002) provide an excellent literature survey) and two very contrary points of view. One group of economists argue that financial structure does not affect economic growth, while the second group of economists claims that it does. Mainly World Bank affiliated scholars (e.g. Demirgüç-Kunt and Levine (2001), Levine (2002)) suggest an irrelevant relationship between economic growth and financial structure while, for instance, Arestis et al. (2001), Arestis et al. (2005), Ergungor (2003), Luintel et al. (2008), Hoshi et al. (1991); Mork and Nakkamura (1999), Weinstein and Yafeh (1998); present opposing results. In this regard, both sides have been presenting competing empirical results, based on econometric analysis, in order to support their standpoint. This controversial debate deals with an extremely important economic issue because, as Arestis et al. (2005, p.1) point out, "[…] resolving this issue undoubtedly improves the quality of economic policies".

According to Dolar and Meh (2002), financial structure can be defined as the extent to which the financial system in a country is either market or bank-based. In the context of the ongoing debate, the aim of this present empirical work is to assess whether induced fiscal and monetary policies do indeed affect the degree of market and bank-orientation within a country's financial system.

Interestingly, the question of whether the financial structure of a country may be influenced by imposed fiscal or monetary policies has not been considered so far. Nevertheless, this question breaks new ground, since, if the financial structure is affected by any such policies, the assumption of an independent and thus stable financial structure development would be invalid. Hence, any examination of a possible linkage between economic growth and the financial structure of a country may be misleading, since imposed policy actions would alter the financial structure and thus also affect its impact on economic growth.

This study examines the effect of fiscal and monetary shocks on the financial structure of Japan by means of an unrestricted Vector Autoregression (VAR) model over the period 1960-2008 which, due to cointegrated variables, is expanded to a Vector Error Correction (VEC) model. For this purpose, annual time series data for Japan has been collected from three sources, namely the IMF's online data base, the Tokyo Stock Exchange's website and the World Bank's Financial Structure Database (revised November 2010, available via the World Bank's website; see also Beck et al. (2000)). The benefit of our econometric model is firstly the possibility to account for multi-directional interrelationships between our variables (invalidating the issue of data endogeneity), while we are able to observe both the short-run and long-run interactions. Although Japan's economy has suffered a massive downturn since the 1990s, tragically amplified by the devastating earthquake in 2011, its case represents a very interesting and important example of an open economy contending with monetary and fiscal actions at restoring its growth.

This paper contributes to the existing empirical literature by presenting findings which reveal evidence of a long-run relationship between implemented fiscal and monetary policies and financial structure in Japan. Although the impact of policy shocks is rather weak and ultimately insignificant, our findings do not support the assumption of a policy-independent development of Japan's financial structure during the past few decades. To the best of our knowledge, this is the first study to estimate the long-run relationship between fiscal and monetary policy, respectively, and financial structure. Our objective is to stimulate a new and fruitful debate on the sensitivity of financial system developments to policy shocks.

The remainder of the paper is organized as follows. In the following section below, we discuss several (empirical and theoretical) findings by other scholars who have analyzed the effect of either policy on the market and bank-sector. This approach will enable us to formulate assumptions which can subsequently be compared with our own empirical findings. After specifying our model and data in Section 3, the empirical results, accompanied by the relevant test diagnostics of our models, are presented in Section 4. A discussion of our findings and conclusions can be found in Section 5 and 6, respectively.

2. Related Literature

The effect of fiscal and monetary policy on the stock market and banking sector, respectively, has been examined (mostly separately) in various empirical studies so far. Since the stock market and banking sector are major elements of any financial system, the relative level of bank or capital market orientation is examined through financial-structure indices which are computed in section three of this study. Relevant empirical findings are reported in this section in order to identify possible explanations for our empirical findings. Nevertheless, to the best of our knowledge, an examination of policy impacts on the relative relationship between the capital market and bank sector has not so far been conducted.

Policy impacts on the stock market

Since the late 1960s, economists like Tobin (1969) and Barro (1974), followed by many others, have introduced theoretical assumptions on the reaction of stock markets to shocks induced by monetary and fiscal actions. Laopodis (2009) points out that, while Tobin (1969) assumes a significant impact of both policies on stock markets, Barro's (1974) theory of debt-neutrality, also known as the Ricardian Equivalence proposition, states that current fiscal actions should not affect current stock returns. As noted by Laopodis (2009) there is an extensive empirical literature on monetary policy impacts on the US stock market. In fact, this statement appears to apply to most developed countries. Leelahapan (2009) detects strong and persistent monetary policy effects on Asian stock markets, specifically for Thailand, Malaysia and South Korea. Ioannidis and Kontonikas (2006) analyze thirteen OECD countries and report (also for Japan) a significant and negative relationship between monetary tightening and real expected stock returns. Pennings et al. (2011) provide empirical evidence of a negative impact of tight money on stock markets for a sample of eight small open economies, including larger OECD countries like Canada and the UK. Similar to Pennings et al. (2011), Amador et al. (2011) detect an increase in stock market liquidity due to expansionary monetary policy for the cases of Germany, France and Italy. It is evident that there are more or less interrelated, theoretical models of money and stock prices with the aim of predicting the impact of monetary shocks on stock markets. Sellin (1998) presents four basic models which offer more or less different predictions, as seen in Table 1. Notably, all models predict a negative relationship between monetary shocks and stock returns.

When examining the effects of fiscal policy shock effects on stock markets, it becomes more difficult to find relevant studies conducted in recent years. Fortunately, Laopodis (2009) provides a current analysis of fiscal effects on US stock markets. His findings support the assumption of a negative relationship between budget deficits and stock market returns. This finding indeed contradicts Barro's (1974) Ricardian Equivalence assumption. Afonso and Sousa (2009) also observe a negative effect of government spending on stock prices in Germany, U.K. and the U.S.

Policy impacts on the banking sector

Regrettably, the number of empirical studies on the effect of monetary and fiscal policy on the banking sector activity, specifically the supply of loans to the private sector, is very limited. Hence, few reports of previously detected effects are available. Igan and Aydin (2010) conduct their empirical analysis on the impact of policy innovations on the Turkish loanable funds market. Their analysis reveals a twofold effect of monetary policy. On the one hand, the supply of foreign credit appears to be insensitive to monetary policy shocks, while on the other hand, a significant effect on domestic credits is reported. Furthermore, while short-term domestic loans increase as monetary policy tightens, long-term loans decrease. With regard to fiscal policy effects, Igan and Aydin (2010) observe a negative influence on the supply of short-term loans. The long-term loan supply is revealed to be unaffected by fiscal policy. Blank and Dovern (2009) examine the distress probability of German banks caused by policy innovations. They conclude that monetary shocks have the highest distress impact, while fiscal actions also yield a negative effect. Nevertheless, their findings provide no insight into the credit market, although any distress may be caused by negative effects on the credit market.

As may be apparent so far, it is very difficult to formulate hypotheses on the potential results of our analysis. Furthermore, expectations based on theoretical models and propositions appear to be too vague, given the fact that empirical studies tend to be ambiguous in their overall findings. Therefore, since our aim is to observe whether financial structure is affected by fiscal and monetary innovations, we utilize both empirical and theoretical perspectives to evaluate our findings, which are presented in the following section.

3. Model and Data

In order to assess the financial structure of specific countries, Demirgüç-Kunt and Levine (1999) and Levine (2002) were among the first to introduce three major indices which they utilize to create an overall financial structure index. For our analysis, we compute these widely accepted indices for our examination. An explanation of these indices and their calculation is presented in this section. For interested readers, Levine (2002) provides a very detailed explanation.

We have chosen Japan for our empirical analysis due to following reasons:

1) Data availability; the most complete data was available for Japan's case via the named sources over the longest sample period.

2) Japan represents a G8 country with one of the largest open economies worldwide.

3) Japan's banking and capital markets are among the largest and best capitalized markets worldwide, due to one of the world's highest saving rates.

Three key measures of the financial structure are computed: *Structure-Activity*, *Structure-Size*, and *Structure-Efficiency*. Notably, since Overhead Cost data is not available over the entire sample period, we use the Bank Credit to Bank Deposit ratio as a substitute. When observing the *Structure-Activity*, we calculate the Total Equity Value Traded ratio to GDP, divided by the Bank Credit ratio to GDP. For all measures, we use real GDP with the base year 2000. It is well known that, after taking the log of this index, a bank-dominated financial system yields negative values. The more negative the index value, the more the bank sector dominates the market, while a positive value reflects higher market activity. Therefore, this measure helps us to identify whether the banking sector dominates the market sector or vice versa. In a perfectly balanced situation, the indicator would equal zero or log of one, respectively. However, the closer to zero the index value, the more balanced the financial system in terms of bank and market concentration. In order to compute the *Structure-Size* index, we use the fraction of Market Capitalization ratio to GDP and the Bank Credit ratio to GDP. Bank Credit reflects the value of Private Credit by Deposit Money Banks. This indicator reflects the size of stock markets relative to that of banks. Larger values indicate a more market-based financial system, while lower values reveal the converse. If its log-value is zero, both markets are equal in size and thus balanced. Negative index values indicate a bank-based, rather than a market-based system and vice versa.

We measure *Structure-Efficiency* by computing the efficiency of stock markets relative to that of banks. We thus multiply the ratio of total value of equities traded (hereafter, TVT) to GDP by the ratio of bank credit to bank deposit (hereafter, BB). The larger the log-value of this index, the more efficient markets are relative to banks. According to Levine (2002), negative scores are the result of relatively higher bank efficiency and for this reason, a sign of bank dominance. In a market-based financial system, the positive index value is higher, the more dominant the market. Note that Japan is widely considered as a developed, high-income country with a historically bank-based financial system (see Demirgüç-Kunt and Levine (1999) and Levine (2002)). All three (log-form) indices are presented in Figure 1 below and indicate that there have been changes towards a less bank-based financial system over the total time period examined.

In addition to the three measures computed, we gather data reflecting monetary and fiscal policy impacts, measured through real narrow money (RM1) and real fiscal spending to GDP ratio (G), respectively. Table 2 provides a summary of variable acronyms employed in our econometric model.

We set up three VAR models by incorporating each structure index as a dependent variable on the left side of our equation, while the measures RM1 and G are chosen as our endogenous right-hand-side variables, with the constant term being the only exogenous component. A VAR model can generally be described via the following mathematical representation:[3]

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + Bx_t + \varepsilon_t$$

"where y_t is a k vector of endogenous variables, x_t is a d vector of exogenous variables,

$A_1, \dots, A_P$ and B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated, but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables." For our case, we utilize an unrestricted VAR model with lag length *3* for *SA* and *SS*, respectively. For *SE* our model is estimated with 6 lags. We choose all lag lengths as suggested by the Akaike Criterion. The advantage of a VAR is

[3] Eviews 6 user guide, page 345.

that all variables are treated as jointly endogenous and no restriction is imposed on their structural relationship. The three calculated VAR models have following general form, e.g. for the case of two-year lags:

$$S_t = a_{11}S_{t-1} + a_{12}RM1_{t-1} + a_{13}G_{t-1} + b_{11}S_{t-2} + b_{12}RM1_{t-2} + b_{13}G_{t-2} + c_{11} + \varepsilon_{1t}$$

$$RM1_t = a_{21}S_{t-1} + a_{22}RM1_{t-1} + a_{23}G_{t-1} + b_{21}S_{t-2} + b_{22}RM1_{t-2} + b_{23}G_{t-2} + c_{12} + \varepsilon_{2t}$$

$$G_t = a_{31}S_{t-1} + a_{32}RM1_{t-1} + a_{33}G_{t-1} + b_{31}S_{t-2} + b_{32}RM1_{t-2} + b_{33}G_{t-2} + c_{13} + \varepsilon_{3t}$$

S_t represents the analyzed structure index *SA*, *SS*, and *SE*, respectively. The error term is represented via ε_{ij} assuming $\varepsilon_{it} \sim i.i.d(0, \sigma^2_{\varepsilon i})$ with zero covariance of all error terms. The parameters to be estimated are a_{ij}, b_{ij}, and c_i. The latter represents the only exogenous variable, namely the constant term. Parameter a_{ij} measures the previous year impact of our structure index, real money supply and government spending, respectively. Our second parameter b_{ij} also measures the impact of all variables (with two-year lags) on our left side variable. Any significant value of a variable induces a long-term effect on the left side variable.

Since we find evidence of cointegration among all variables, we can expand the VAR model to a VEC model, which not only accounts for the long-run relationship of all variables, but also incorporates the short-run adjustment parameters. For a theoretical description of a VEC model, see for instance Gujarati (2004).

The following section reports our analysis procedure and findings.

4. Findings

First, we test whether the variables are stationary, employing the Elliott-Rothenberg-Stock DF-GLS and Phillips-Perron (PP) unit-root tests, assuming an intercept only or an intercept and linear trend in our variables. Note that the DF-GLS test result may not be reliable if the sample size is below 50. Given our limited sample size of 50 observations, the DF-GLS test results are treated with caution. On the other hand, an alternative unit-root test like the KPSS test is not reliable either as Jönsson (2011) demonstrates that it also suffers from size distortion when facing small or medium sample sizes. Hence, the PP unit root test is conducted supplementary to the DF-GLS test, shown in Table 3. We stick with the PP test results whenever DF-GLS results are different to what the PP test suggests. With regard to the test results for *SA*, we decide to stick with the PP test results for the intercept-only case since this variable seems not to be trending over the sample period.

Since we can assume that our variables are all integrated of order one (I(1)), the next step in the analysis is to determine whether all variables are cointegrated. If this is the case, we can compute a VEC model, which represents a VAR model, including a cointegration term which is also known as the error correction term. At the same time, the VEC model allows for short-run adjustment parameters in our equation. Our VEC model can be written in following (one-year lag) matrix form:

$$\begin{bmatrix} \Delta S_t \\ \Delta RM1_t \\ \Delta G_t \end{bmatrix} = \begin{bmatrix} \alpha_{11} \\ \alpha_{21} \\ \alpha_{31} \end{bmatrix} \left[\begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} \end{bmatrix} \begin{bmatrix} S_{t-1} \\ RM1_{t-1} \\ G_{t-1} \end{bmatrix} \right] + \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} \end{bmatrix} \begin{bmatrix} \Delta S_{t-1} \\ \Delta RM1_{t-1} \\ \Delta G_{t-1} \end{bmatrix} + \begin{bmatrix} c_{11} \\ c_{12} \\ c_{13} \end{bmatrix} + \begin{bmatrix} \varepsilon_{11} \\ \varepsilon_{21} \\ \varepsilon_{31} \end{bmatrix}$$

The short-run adjustment parameters are denoted by α_{ij} and measure the speed of adjustment towards the long-run equilibrium in case of a deviation. The error correction relationship is represented by the product of the *β*-matrix (β_{ij} coefficients show the long-run equilibrium relationships between levels of variables) and the vector of lagged endogenous variables. For the case of *SA* and *SS* we chose a VEC lag length of two while *SE* is estimated with 5 lags. Short-run changes in the variables are denoted by γ_{ij} coefficients. The last two vectors represent the constant and error terms, respectively.

In accordance to the common procedure to estimate a VEC model, at first we estimate the cointegration vectors. Before doing so we have to check whether cointegration relations among our variables exist. Therefore, the Johansen cointegration test is performed by employing the Trace and Eigenvalue Statistics, respectively, after the optimal VAR lag length is determined by utilizing the Akaike Criterion. Our test results, presented in Table 4, indicate that there is at least one cointegrated vector *r*. Considering cointegration test results, we can progress to compute the VEC model for each structure index. For the case of the relation between *SA, RM1* and *G,* our VEC model is:

$$\Delta S_t = \alpha_{11}(\beta_{11}S_{t-1} + \beta_{12}RM1_{t-1} + \beta_{13}G_{t-1}) + \gamma_{11}\Delta S_{t-1} + \gamma_{12}\Delta S_{t-2} + \gamma_{13}\Delta RM1_{t-1} + \gamma_{14}\Delta RM1_{t-2} + \gamma_{15}\Delta G_{t-1} + \gamma_{16}\Delta G_{t-2} + c_{11} + \varepsilon_{1t}$$

$$\Delta RM1_t = \alpha_{21}(\beta_{11}S_{t-1} + \beta_{12}RM1_{t-1} + \beta_{13}G_{t-1}) + \gamma_{21}\Delta S_{t-1} + \gamma_{12}\Delta S_{t-2} + \gamma_{23}\Delta RM1_{t-1} + \gamma_{24}\Delta RM1_{t-2} + \gamma_{25}\Delta G_{t-1} + \gamma_{26}\Delta G_{t-2} + c_{21} + \varepsilon_{2t}$$

$$\Delta G_t = \alpha_{31}(\beta_{11}S_{t-1} + \beta_{12}RM1_{t-1} + \beta_{13}G_{t-1}) + \gamma_{31}\Delta S_{t-1} + \gamma_{32}\Delta S_{t-2} + \gamma_{33}\Delta RM1_{t-1} + \gamma_{34}\Delta RM1_{t-2} + \gamma_{35}\Delta G_{t-1} + \gamma_{36}\Delta G_{t-2} + c_{31} + \varepsilon_{3t}$$

For the case of *SS, RM1*and *G,* the representation is similar while our third VEC model is estimated with four lags. Table 5 reports (normalized) cointegration vector estimates while adjustment coefficients for each model are presented in Table 6.

From Table 5, our monetary policy parameters are seen to have consistent signs and be highly significant at no less than the 5 percent level. Apparently, the standard error for G in all three equations is much higher than for the other variables. Nevertheless, we observe a highly significant effect on *SE*. The time trend parameter is also highly significant, indicating that over time, *ceteris paribus*, Japan's financial system tends to become more bank-dominated, especially with regard to activity and size.

A one percent increase in the real money supply causes an increase in activity, size and efficiency of the financial system by about 2, 1, and 0.3 percent respectively, *ceteris paribus*. Furthermore, the effect of fiscal policy on SE is almost 16 percent increase, per one percent increase in fiscal consumption, *ceteris paribus*. We cannot identify any significant fiscal effect on other indices. Now that the long-run effects have been observed, the short-run adjustment parameters are examined.

With regards to our estimation results in Table 6, it is evident that not all adjustment parameters are significant. Clearly, only government expenditure exerts an overall significant short-run adjustment effect which, however, entails a very slow speed of adjustment. The money supply yields a higher speed of adjustment, although with no significant effect for the case of *SE*. Overall, the short-run relationship between policy parameters and structure indices appears to be very weak.

The adjustment parameters contain weights *A,* with which an estimated cointegration vector enters the short-run dynamics. With regard to our results, an overall slow speed of short-run adjustment, if significant, can be observed for each vector. In order to check for weak exogeneity among our variables, we impose zero conditions on these coefficients, demonstrated in Table 7. The null assumes weak exogeneity. With regards to the joint zero restriction results, in the last row of Table 7, we can reject the null at the one percent level. Hence, one can conclude that our right-hand-side variables, with respect to each index), are (jointly) not exogenous in the weak form.

In order to obtain a clearer picture of the impact of policy shocks, Generalized Impulse Responses (which do not rely on the VAR ordering) for all three models are estimated and presented in Figures 2, 3, and 4. It may be noted that Generalized Impulse Responses and Variance Decomposition graphs show the system-wide impact of shocks on a given variable. Variance decomposition graphs and tables are available upon request from the authors. They confirm the results from the Impulse Response functions. The impulse responses observed for *SA* indicate a long-lasting and positive effect (more than a decade) of monetary and fiscal innovations. Nevertheless, the impact of both policy measures on financial system activity is quite small. For *SS,* a similar picture emerges, with a small and positive, but long-lasting effect of both policies being apparent. In both cases, none policy effect dies out at all. Interestingly, for *SE*, the impact of fiscal shocks appears to be insignificant, whereas the monetary policy shocks once again yield a positive and long-lasting effect, although with a low response. Both effects die out after a decade. With regard to the composition of our indices, a positive impact on any index implies a movement towards a more market-oriented financial system. Overall, as the Impulse Response figures (which come without confidence bands), we find empirical evidence of a small, but significant long-run policy impact, fiscal and monetary, on Japan’s financial system during the examined period.

In order to confirm the stability of the estimated models and reliability of our findings, the following diagnostic checks are conducted.

Autoregressive Roots Table

If the estimated VEC model is stationary, as assumed, the number of inverse roots of the underlying autoregressive polynomial, which are equal to unity, must equal two for each model. Our test results, presented in Table 8, confirm that all three models yield two unit roots. Hence, this stability condition is fulfilled by all equations.

Autocorrelation

A key assumption for a stable ordinary least squares estimation, as described by Gujarati (2004), which is used for computing our VEC model parameters, is that there is no autocorrelation among the residuals. To test for the validity of this assumption, we employ both the Portmanteau and LM autocorrelation tests. None of the models reveal relevant signs of autocorrelation as presented in Tables 9 and 10.

Zero mean value of disturbances

The validity of this assumption for all models is checked via a normality test for the model residuals. With regard to the small sample size, the Inverse Square Root of Residual Covariance Matrix-test proposed by Lütkepohl (1991) is chosen and confirms a normal distribution of the error terms. Table 11 lists our test results.

Equal variance of disturbances, homoescedasticity

The stability of our VEC models with regard to equal error term variance distribution can also be confirmed through an extended White-test, results are listed in Table 12.

5. Discussion

As observed, Japan's financial system has been more or less affected by the policies applied. The long-run relationship between the financial structure indices and policy variables are not really surprising, since these indices are most likely (at least indirectly) affected by the imposed fiscal and monetary policies. Market Capitalization and Bank Credit Ratio are measures certainly affected by shocks in terms of narrow money. Hence, the fact that monetary policy reveals a more lasting impact on all three measures appears to be justified. Interestingly, this impulse yields an increasing effect after a few years. On the other hand, fiscal policy, measured through fiscal spending, does not yield this kind of overall effect, and for *SE*'s case the shock imposed dies out over the years. Nevertheless, this time span can take more than 10 years, as in the case of *SA* and *SS*, respectively. The high fiscal impact on *SE* implies that stock markets strongly benefit from increasing fiscal consumption, probably due to an increase in TVT. The overall effect on the bank sector is ambiguous. However, even if the effect is positive, it does not exceed the positive effect on the market.

Interestingly, as shown in Figure 5, real narrow money volume has exceeded fiscal spending since 1984, with massive differences in the amount. With respect to this observation, the overall influence of fiscal policy, relatively considered, has been higher than that of its counterpart. Indeed, Guerrero and Parker (2010) observe a positive impact of government spending on real economic growth in Japan. If we assume a positive impact of financial structure on economic growth, as promoted by Arestis et al. (2005), the identified relationship between fiscal policy and financial structure appears to be reasonable. Furthermore, a positive impact of fiscal actions on the development of a country's financial structure is not surprising. Overall, Japan's financial system has been moving towards a less bank-based system, as also observed by Capelle-Blancard et al. (2008). They also point out that the reason for this finding may be the impressive development of Tokyo's financial market, making the city to one of the leading financial centers worldwide.

6. Conclusion

When referring to the previous theoretical and empirical findings presented in Section 2, a positive effect of expansionary monetary policy on financial structure is not surprising, since low interest rates support a higher demand for equities. Furthermore, falling interest rates also support a higher credit demand, while the credit supply decreases at the same time. Hence, the relative advantage for the stock market appears to be justified. Our empirical findings introduced in Section 2 also suggest a negative impact of fiscal spending on stock markets, Japan's case (partly) confirms this assumption, since fiscal spending creates a decrease in the financial system's stock market efficiency. Apparently, monetary innovations yield a positive impact on stock market dominance but it is not clear whether there is a generally negative impact on the banking sector. Furthermore, it is more appropriate to interpret our results as supporting for the assumption of a positive effect on relative market dominance.

Our study fills a gap in the literature which so far has not analyzed the effect of monetary and fiscal policy on financial structure. Nonetheless, our findings do not deliver proof of a strong impact of any of these policies on the development of Japan's financial structure, although there has been a very volatile development towards a less bank-dominated financial system, as shown in Figure 1. Nevertheless, the existence of a long-run relationship appears to be very likely. For Japan's case, this relationship appears to be rather weak, but this may not be the case for other, and especially less financially developed countries. Therefore, if one assumes that there is generally a significant policy impact on financial structure development, this would imply that fiscal and monetary decision makers can influence the development of a country's financial structure (indirectly). In fact, the initial observations show that in some countries financial structure has been changing back and forth, while others reveal a less volatile development.

For the case of Singapore, Figure 6 shows how volatile this development has been through the period 1992 until 2009. Over the same period, the United States reveals a more stable development towards a capital market-dominated financial system, demonstrated in Figure 7. Unsurprisingly, since 2001, a significant downturn in market dominance is evident. Hence, it seems clear that during politically difficult times, capital markets have been suffering to the advantage of their rival sector.

This volatile image (as in Figure 6) may be a reflection of active financial markets and banking sectors and thus a perfect image of a competitive and global market. But what if this is not the case? Perhaps we should rather ask ourselves whether these widely accepted financial system measures are sufficiently reliable, if they do not account for the influence of policy makers, in the sense that they are biased towards other influences, rather than those of the market itself. If we assume a positive impact of financial structure on economic growth, this could also imply collinearity, since market capitalization, TVT and BB are most likely influenced by economic growth. Indeed, Beck et al. (2001) discuss the complexity of quantifying financial structure through appropriate indices, and Capelle-Blancard et al. (2008) highlight this issue by referring to Japan. They point out that quantifying Japan's financial system as bank dominated, appears controversial with regard to the internationally leading role of Japan's capital market.

This study does not claim to be perfect and its main aim is to stimulate further research and discussion of the presented findings at an international level. Shortcomings should be noted with respect to the limited sample size, since it was difficult to calculate more indices, due to the lack of data. We strongly recommend observations for longer sample periods and for other countries. Alternative monetary policy measures, such as inter-bank interest rates, can and should be utilized where appropriate.

Our reported findings suggest the need for a further and more detailed examination of the observed relationships. We hope that an intensive and open debate among scholars and policy makers worldwide will ensue.

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Tables

Table 1: Theoretical Monetary Policy and Stock Return models, based on Sellin (1998)*

Name	First developments by	Overall prediction
Utility Function Models	*LeRoy (1984), Danthine and Donaldson (1986), Stulz (1986), Boyle (1990), Bakshi and Chen (1996)*	• Monetary shocks will have a negative impact on stock returns, unless monetary policy is procyclical, in the sense that the covariance between output growth and money supply exceeds the variance in output growth.
Cash in Advance Models	*Lucas (1982 & 1984), Day (1984), Svensson (1985), Lucas and Stokey (1987), Labadie (1989), Giovanni and Labadie (1991), Boyle and Peterson (1995)*	• If monetary policy is strongly procyclical, a positive relationship exists. • If monetary policy is weakly procyclical or countercyclical, a negative relationship exists.
Transaction Cost Models	*Marshall (1992)*	• Negative relationship between monetary policy and stock returns.
Structural Macroeconomic Models	*Feldstein (1980), Lachler (1983, Groenewold et al. (1997)*	• Negative relationship between monetary policy and stock returns.

* References can be found in Sellin (1998)

Table 2: Variable Acronyms

Variable	Definition
RM1	Real M1 Monetary Aggregate (log-form)
G	Real Government Expenditure divided by real GDP
SA	Structure-Activity (= Total Value Traded/Bank Credit)
SS	Structure-Size (= Market Capitalization/Bank Credit)
SE	Structure-Efficiency (= Total Value Traded * Bank Credit to Bank Deposit ratio)

Table 3: Unit-root test results at 5% significance level

			Intercept		Intercept & Trend	
			DF-GLS	PP	DF-GLS	PP
SA	Level	Test Statistics	-2.733067	-1.866644	-3.383508	-2.412848
		Critical Value	-1.947816	-2.922449	-3.190000	-3.504330
	First Difference	Test Statistics	-2.934743	-3.065049	-3.094390	-2.895435
		Critical Value	-1.947816	-2.923780	-3.190000	-3.506374
			DF-GLS	PP	DF-GLS	PP
SS	Level	Test Statistics	-1.862170	-2.016746	-2.268726	-2.678726
		Critical Value	-1.947816	-2.922449	-3.190000	-3.504330
	First Difference	Test Statistics	-5.976922	-6.124176	-5.925417	-6.081366
		Critical Value	-1.947816	-2.923780	-3.190000	-3.506374
			DF-GLS	PP	DF-GLS	PP
SE	Level	Test Statistics	-3.095207	-2.446481	-3.406519	-2.697724
		Critical Value	-1.947816	-2.922449	-3.190000	-3.504330
	First Difference	Test Statistics	-4.239206	-4.241186	-4.265397	-4.174312
		Critical Value	-1.947816	-2.923780	-3.190000	-3.506374
			DF-GLS	PP	DF-GLS	PP
RM1	Level	Test Statistics	1.452008	-2.103677	-3.097741	-3.329096
		Critical Value	-1.947816	-2.922449	-3.190000	-3.504330
	First Difference	Test Statistics	-6.044374	-9.729477	-6.125275	-10.76761
		Critical Value	-1.947816	-2.923780	-3.190000	-3.506374
			DF-GLS	PP	DF-GLS	PP
	Level	Test Statistics	-1.060992	-2.414029	-1.096859	-2.278941
		Critical Value	-1.947665	-2.922449	-3.190000	-3.504330

G						
		Test Statistics	-4.940952	-5.777500	-6.174363	-6.583126
	First Difference	Critical Value	-1.947816	-2.923780	-3.190000	-3.506374

Table 4: Cointegration Rank Test, Trace

H_0	H_1	Trace Statistic for SA *RM1* G	Trace Statistic for *SS RM1 G*	Trace Statistic for *SE RM1 G*	5% Critical Value	Max-Eigen Statistic for *SA RM1 G*	Max-Eigen Statistic for *SS RM1 G*	Max-Eigen Statistic for *SE RM1 G*	5% Critical Value
r = 0	r>= 1	34.25666	37.64334	49.64899	29.79707	19.92485	24.62384	37.27007	21.13162
r<= 1	**r>= 2**	**14.33181**	**13.01950**	**12.37892**	**15.49471**	**14.20523**	**12.88420**	**11.63845**	**14.26460**
r<= 2	r = 3	0.126579	0.135303	0.740468	3.841466	0.126579	0.135303	0.740468	3.841466

Table 5: Cointegration Vector Estimates[#]

Index SA		**Index SS**		**Index SE**	
SA (-1)	**1.000000**	**SS(-1)**	**1.000000**	**SE(-1)**	**1.000000**
RM1(-1)	-1.846732	**RM1(-1)**	-1.071052	**RM1(-1)**	-0.290536
	(0.42519)		(0.37539)		(0.05954)
	[-4.34333]		[-2.85318]		[-4.87971]
G(-1)	-6.372383	**G(-1)**	0.819136	**G(-1)**	15.76928
	(3.91414)		(3.31113)		(4.53356)
	[-1.62804]		[0.24739]		[3.47834]
Trend	0.149088	**Trend**	0.076818	**Trend**	N/A[!]
	(0.03957)		(0.03466)		
	[3.76750]		[2.21660]		
Constant	47.07058	**Constant**	26.58451	**Constant**	5.176798

[#] Standard errors in ( ) & t-statistics in [ ]

[!] Trend term omitted due to insignificant t-value.

Table 6: Adjustment Parameter Estimates#, in First-Difference Form

Index SA		Index SS		Index SE	
D(SA)	-0.072484	D(SS)	-0.096674	D(SE)	0.063920
	(0.05342)		(0.06564)		(0.09651)
	[-1.35678]		[-1.47269]		[0.66232]
D(RM1)	0.229219	D(RM1)	0.199950	D(RM1)	0.004401
	(0.06520)		(0.09443)		(0.12204)
	[3.51585]		[2.11737]		[0.03606]
D(G)	-0.006061	D(G)	-0.011613	D(G)	-0.019023
	(0.00300)		(0.00424)		(0.00472)
	[-2.01702]		[-2.73826]		[-4.02647]

#Standard errors in ( ) & t-statistics in [ ]

Table 7: Weak Exogeneity Test

Index SA		Index SS		Index SE	
Null Hypothesis	**Probability**	**Null Hypothesis**	**Probability**	**Null Hypothesis**	**Probability**
$A_{D(RM1)}=0$	*0.004756*	$A_{D(RM1)}=0$	*0.141032*	$A_{D(RM1)}=0$	*0.963710*
$A_{D(G)}=0$	*0.067917*	$A_{D(G)}=0$	*0.036297*	$A_{D(G)}=0$	0.000219
$\boldsymbol{A_{D(RM1)}= A_{D(G)}= 0}$	***0.002283***	$\boldsymbol{A_{D(RM1)}= A_{D(G)}= 0}$	***0.005884***	$\boldsymbol{A_{D(RM1)}= A_{D(G)}=0}$	***0.000900***

Table 8: AR Roots Table

SE RM1 G		***SS RM1 G***		***SE RM1 G***	
Root	Modulus	Root	Modulus	Root	Modulus
1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
-0.720386	0.720386	-0.758911	0.758911	0.698962 - 0.573383i	0.904055
0.697857	0.697857	0.748883	0.748883	0.698962 + 0.573383i	0.904055
0.491310 - 0.491968i	0.695283	0.247027 - 0.613076i	0.660972	0.472150 - 0.762448i	0.896801
0.491310 + 0.491968i	0.695283	0.247027 + 0.613076i	0.660972	0.472150 + 0.762448i	0.896801
0.221217 - 0.423306i	0.477625	0.383318	0.383318	0.800188 - 0.203588i	0.825680
0.221217 + 0.423306i	0.477625	-0.062024 - 0.284049i	0.290742	0.800188 + 0.203588i	0.825680
-0.231697	0.231697	-0.062024 + 0.284049i	0.290742	-0.765272 + 0.293848i	0.819748
				-0.765272 - 0.293848i	0.819748
				0.185016 + 0.747655i	0.770207
				0.185016 - 0.747655i	0.770207
				-0.337553 - 0.683677i	0.762467
				-0.337553 + 0.683677i	0.762467
				-0.687599 - 0.217809i	0.721272
				-0.687599 + 0.217809i	0.721272
				0.026807 + 0.398627i	0.399528
				0.026807 - 0.398627i	0.399528

Table 9: VEC Residual Portmanteau-Test Results

	SA RM1 G		*SS RM1 G*		*SE RM1 G*	
Lags	***Adj Q-Stat***	***Prob.***	***Adj Q-Stat***	***Prob.***	***Adj Q-Stat***	***Prob.***
1	2.143021	NA*	1.533656	NA*	1.994289	NA*
2	3.969156	NA*	3.522704	NA*	4.806668	NA*
3	12.32914	0.1954	11.88934	0.2196	11.20278	NA*
4	18.19010	0.4432	14.75836	0.6785	15.08325	NA*
5	26.00622	0.5183	20.28835	0.8184	18.57498	NA*
6	28.42546	0.8117	28.10335	0.8235	26.96102	0.0291
7	34.98103	0.8588	35.76056	0.8360	33.05339	0.1030
8	37.92752	0.9523	39.26054	0.9341	40.89482	0.1625
9	42.71421	0.9766	54.24263	0.7762	49.64303	0.1949
10	44.81750	0.9950	56.66123	0.9075	51.93121	0.4374
11	50.68443	0.9967	62.24224	0.9397	64.51523	0.3218
12	59.63923	0.9943	70.18927	0.9395	71.94157	0.3807

**The test is valid only for lags larger than the VAR lag order.*

Table 10: VEC Residual Serial Correlation LM-Test Results

	SA RM1 G		*SS RM1 G*		*SE RM1 G*	
Lags	***LM-Stat***	***Prob.***	***LM-Stat***	***Prob.***	***LM-Stat***	***Prob.***
1	5.773401	0.7624	9.163336	0.4223	11.37443	0.2509
2	4.848946	0.8473	5.891404	0.7507	6.852804	0.6524
3	10.47155	0.3137	9.896143	0.3590	12.22540	0.2009
4	5.497579	0.7890	2.536193	0.9799	7.729226	0.5616
5	8.362763	0.4980	5.496419	0.7891	6.116630	0.7282
6	2.206882	0.9878	7.630463	0.5718	12.14880	0.2051
7	6.278005	0.7118	9.207733	0.4183	7.197804	0.6165
8	2.586024	0.9785	2.932020	0.9669	7.060983	0.6308
9	4.432041	0.8807	14.38240	0.1094	7.796591	0.5548
10	1.891224	0.9931	2.690286	0.9753	1.877086	0.9933
11	5.009414	0.8335	4.693430	0.8602	9.111714	0.4270
12	7.040226	0.6329	6.774796	0.6606	4.859263	0.8464

Table 11: VEC Residual Normality-Test Results

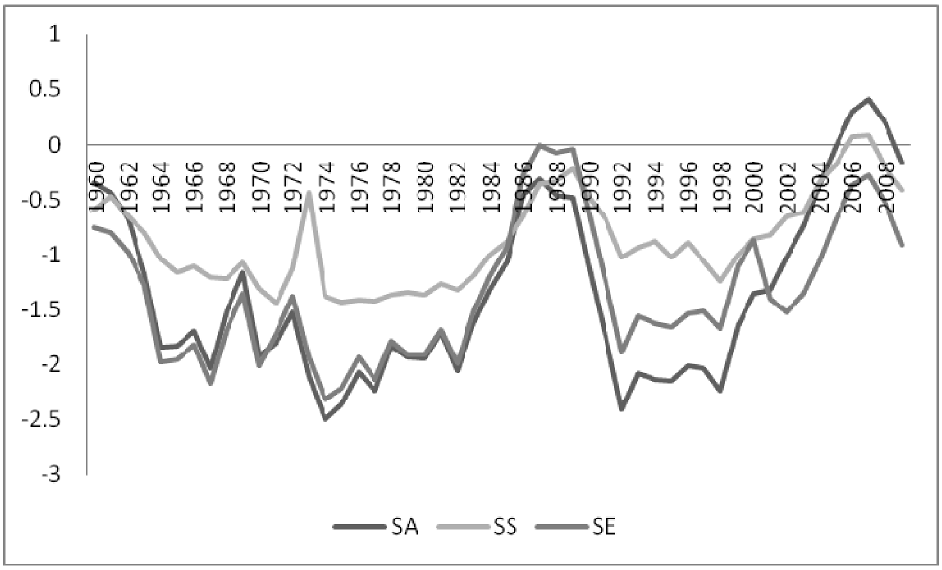
H_0: Normal Distribution of Residuals		*Joint Prob.*	
	Skewness	*Kurtosis*	*Jarque-Bera*
SA RM1 G	0.8899	0.0706	0.2634
SS RM1 G	0.4319	0.1046	0.1795
SE RM1 G	0.8295	0.3092	0.6128

Table 12: White's VEC Residual Heteroskedasticity Test (No Cross Terms)

H_0: Normal Distribution of Residuals	SA RM1 G	SS RM1 G	SE RM1 G
Joint-Prob	0.4653	0.8234	0.7628

Figures

Figure 1: Japan's Financial Structure Indices Development



SA: Structure Activity, SS: Structure Size, SE: Structure Efficiency

Figure 2: Generalized impulse responses for model SA RM1 G

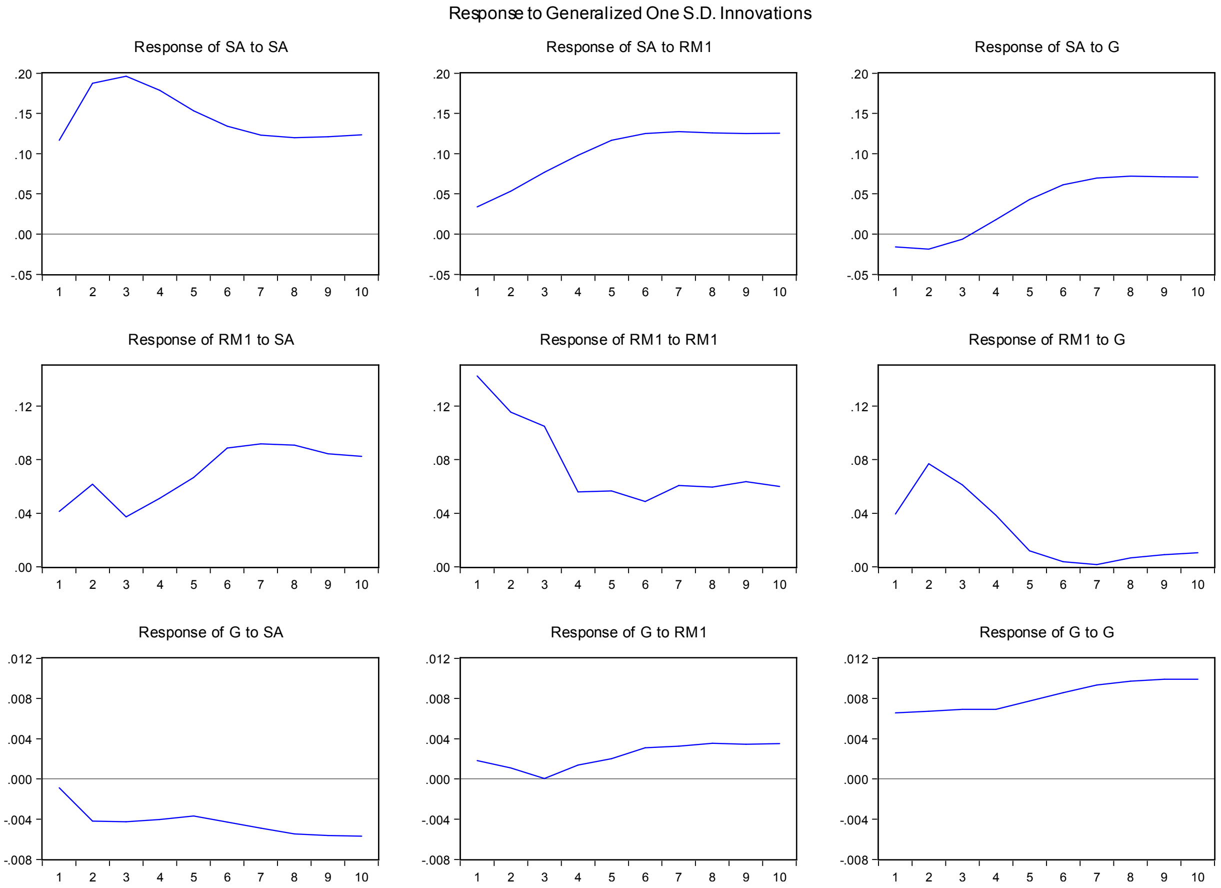


Figure 3: Generalized impulse responses for model SS RM1 G

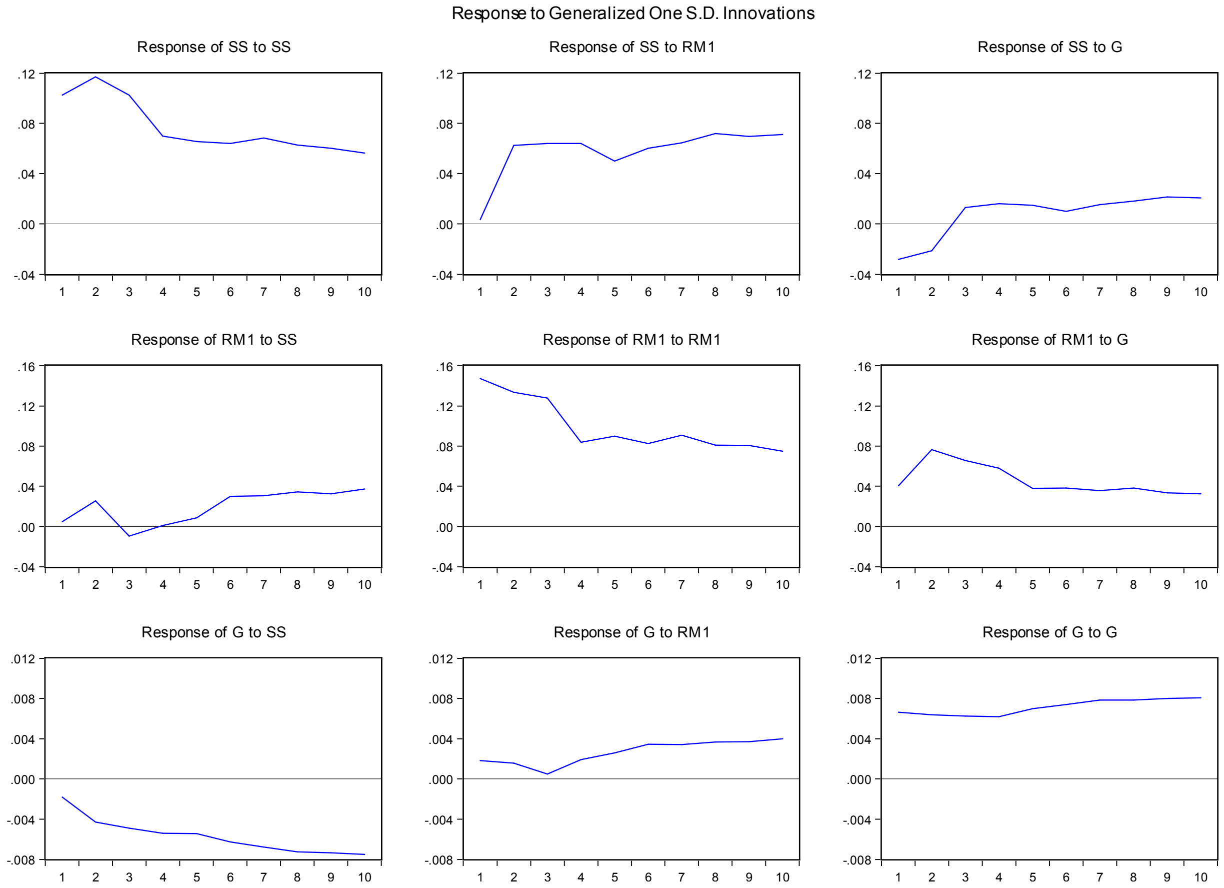


Figure 4: Generalized impulse responses for model SE RM1 G

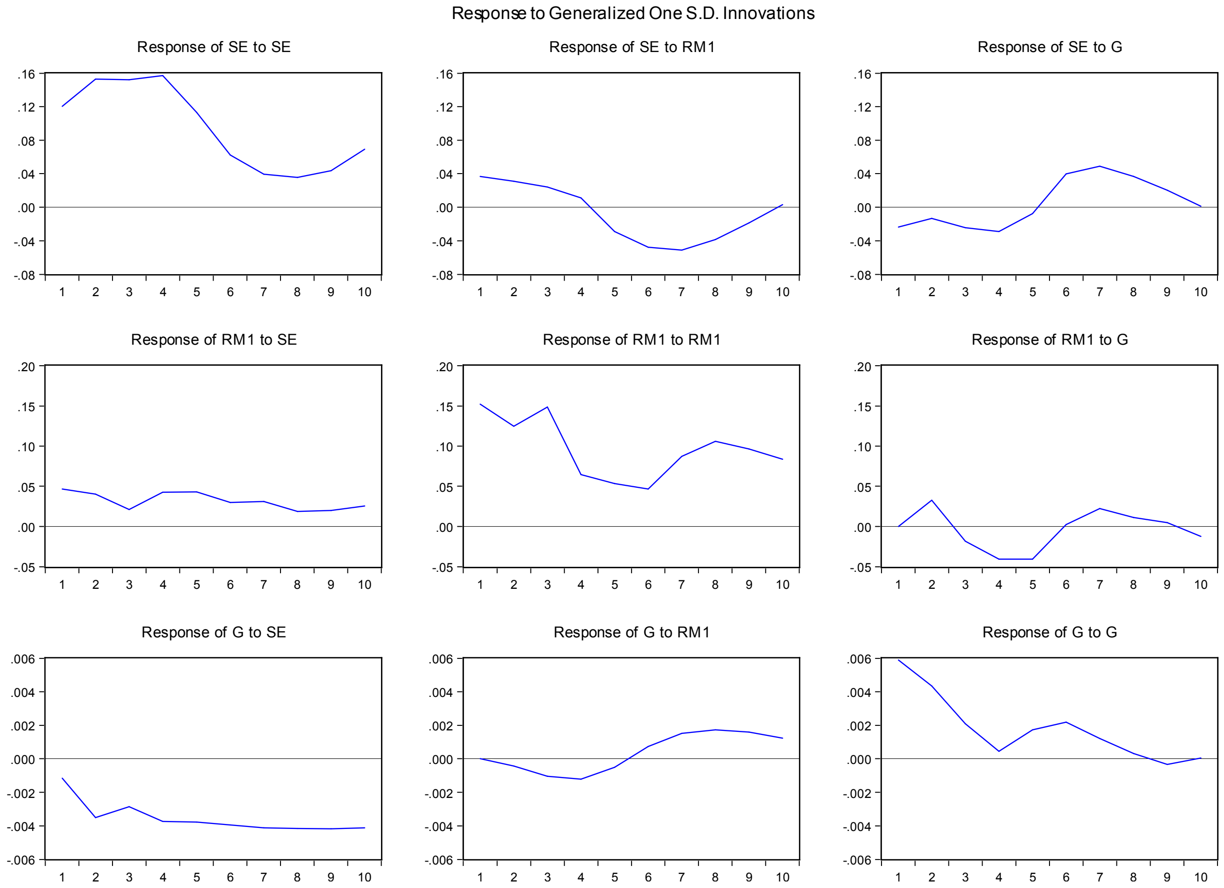


Figure 5: Development of real narrow money (RM1) and real fiscal consumption (F) in Japan, in US $

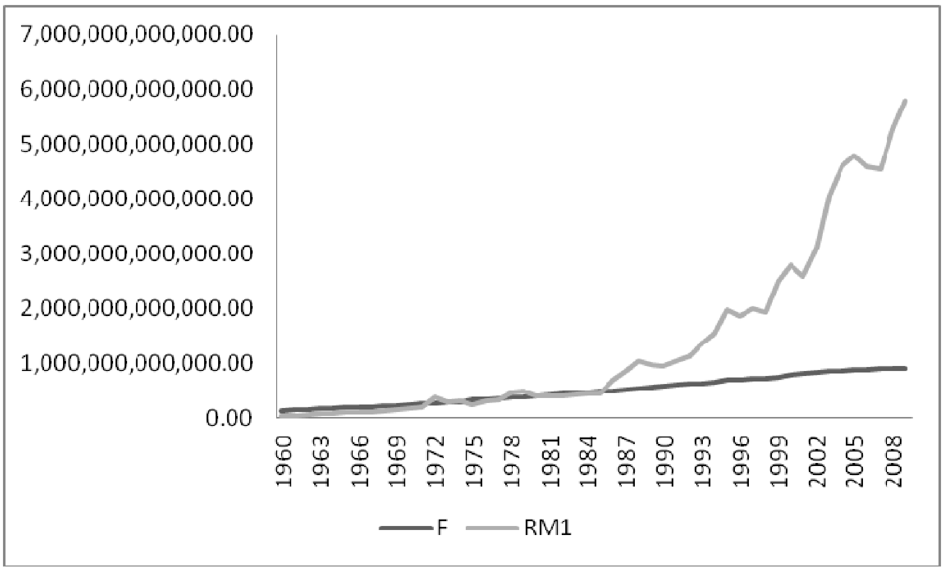


Figure 6: Singapore's Financial Structure Index Development

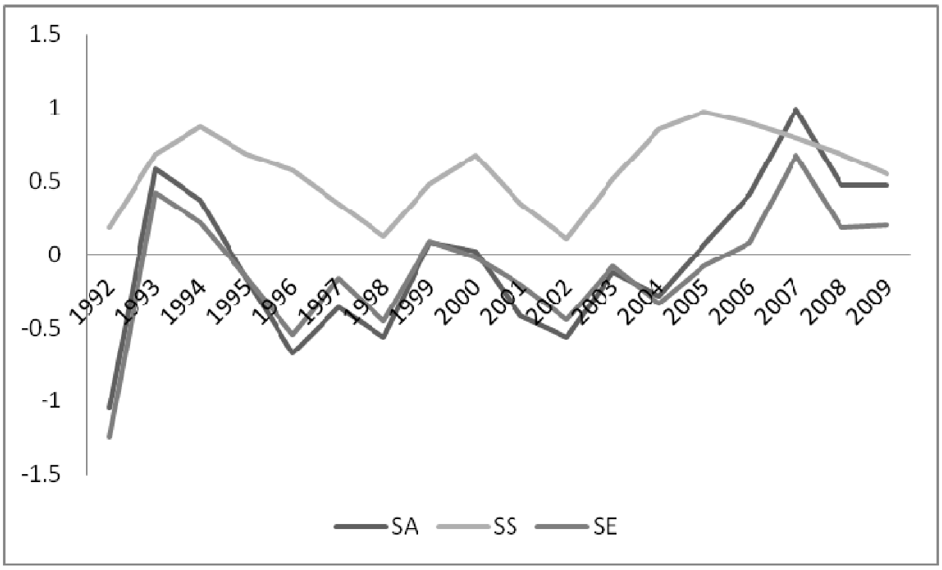


Figure 7: USA's Financial Structure Index Development