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**“Non-Traditional” Open Market Operations:
Lessons from FDR’s Silver Purchase Program**

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Abstract

When faced with a liquidity trap, a “traditional” open market purchase will generally be ineffective. Theoretical studies have suggested that intervention in other markets could offer a means of escaping from this trap. We provide some empirical evidence on the importance of non-traditional open market operations by examining the economic effects of FDR’s Silver Purchase Program. We employ a structural VAR to assess silver’s role in influencing overall money growth, inflation and output over the 1934-1938 period. The results suggest that the US silver purchase program was effective and highlight the potential importance of non-traditional methods for reflating modern economies in a liquidity trap.

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“Non-Traditional” Open Market Operations: Lessons from FDR’s Silver Purchase Program

New Federal Reserve Chairman Ben Bernanke (2002) stoked interest in alternatives to conventional open market operations with his consideration of effective monetary policy strategies for a low, or zero, interest rate environment. Bernanke (2002) cites the 40% devaluation of the dollar against gold in 1933-1934 under President Franklin D. Roosevelt (FDR), and the associated program of gold purchases, as a “striking example” of how rapid recovery from deflation can be achieved even with nominal interest rates near zero. US money growth certainly accelerated sharply after the United States left the gold standard in 1933, with the overall money supply rising by 9.5% from June 1933 to June 1934 (and then by 14% and 13% over the next two fiscal years). Nevertheless, George Wallace, architect of FDR’s gold purchase program “understood that commodity prices in late January 1934 had already incorporated the anticipated impact of the devaluation, and that commodity markets were signaling that a gold price of \$35/oz. was not nearly sufficient to produce the desired reflation” (Sumner, 2001, p. 165).¹

In 1934 FDR’s policy focus clearly shifted to silver. The May 12, 1933 amendment to the Agricultural Adjustment Act, sponsored by Senator Elmer Thomas of Oklahoma, had already authorized free coinage of both gold and *silver*. On December 21, 1933 FDR proclaimed that the mints should coin into silver dollars any silver mined in the United States (after retaining half of this silver as seigniorage) and large-scale silver purchases were formally authorized under the Silver Purchase Act of June 19, 1934.² Under the terms of the 1934 Act the silver certificates issued in exchange for the silver received were to “be placed in actual circulation ... [and] be legal tender for all debts, public and private, public charges, taxes, duties, and dues, and ... redeemable on demand at the Treasury of the United States in

¹Although Temin and Wigmore (1990) also emphasize the devaluation’s importance in helping dispel expectations of continued deflation, Eichengreen (1995, p. 344*n*) points to disappointment with the course of the expansion in the second half of 1933 and a renewed fallback in industrial production pending sustained recovery in 1934.

²For detailed discussions of the evolution of the US silver policy, see Westerfield (1936); Brattner (1938a,b); Paris (1938); Leavens (1939); Friedman and Schwartz (1963); and Friedman (1992).

standard silver dollars ...”³ As the Federal Reserve continued to issue circulating silver certificates in exchange for the new silver acquired, silver rose from less than 12% of total US currency in 1932-33 to nearly 25% of total currency in 1938 (see Table 1). In terms of M1, silver’s share goes from 3.5% in January 1934 to 5.5% in December 1938. This almost certainly severely understates the impact of silver money, however, given that silver certificates deposited in the banking system would immediately form the basis for creation of new non-silver money. Applying just the overall M1 money multiplier of 3.5 or so, a 2% increase in silver money would still translate into a far-from-trivial M1 shock of 7%.⁴

The political motivations behind the silver purchases likely included the opportunity to combine support from the congressional representatives of the silver-producing states (accounting for fully one-seventh of the US senate) with the farm lobby, supporters of bimetallism, and inflationists who favored monetary expansion by any means attainable (see, for example, Friedman, 1992, Chapter 7).

Contemporary observers not only scathingly attacked the rationale for the Silver Purchase Act but also questioned its effectiveness.⁵ Paris (1938, p. 109), for example, dismissed the silver purchases and issuance of silver certificates as “just one of several ‘currency-dilution’ items.” More recently, Romer (1992), while concluding that monetary expansion accounted for nearly all of the US economic recovery prior to 1942, makes no mention whatsoever of the contribution of the silver purchase program. Finally, in an otherwise extensive review of alternative monetary policy proposals for a zero-interest rate environment (many of which have never been implemented in practice), Yates (2004) does not even recognize commodity-based open market operations as a policy option.

The role of the silver purchase program is noted by both Friedman and Schwartz (1963) and

³From the text of the Silver purchase Act of 1934 as reprinted in Leavens (1939, pp. 384-385).

⁴The actual ratio of M1 to the monetary base ranged from 3.69 at year end 1934 to 2.99 at year end 1938 (Friedman and Schwartz, 1963).

⁵The negative effects of the US silver purchase program on other countries, particularly China as the only remaining country on a silver standard in 1934, remain an ongoing source of controversy (see, for example, Friedman, 1992, Chapter 7, and Burdekin, 2005).

Eichengreen (1995). Friedman and Schwartz (1963, p. 488) suggest that, although some net expansionary effect likely remained even after taking account of reduced gold purchases after the silver program was adopted, “the sums involved were small compared to either the total increase in the stock of money or the concurrent inflow of gold.” Eichengreen (1995, p. 346) notes an increase in currency in circulation as the silver purchases began in August 1934 and a temporary reversal of US gold inflows. The continuing tendency for currency in circulation to expand by much less than the overall gold inflows in both 1934 and 1935 is, however, seen by Eichengreen (1995, p. 346) as evidence of the continuing “largely passive” nature of US monetary policy overall. While such criticisms have been widely shared (cf, Wheelock, 2002), we show in this paper that the Silver Purchase Act did itself make a real difference – with its expansionary effects giving rise to significantly better output performance than the United States would have enjoyed in its absence.

Somewhat surprisingly, there appears to have been no prior systematic empirical analysis of the effects of the Silver Purchase Act on the US economy. Estimation of a structural VAR provides a new look at silver’s role in influencing overall money growth, inflation and output over the 1934-1938 period. We find meaningful, consistent effects of silver on both prices and output. Moreover, these effects persist and are not just a one-time blip associated with the initial purchases in the late summer of 1934. These results point to the potential relevance of non-traditional open market purchase programs in helping reflate an economy faced with deflation and zero, or near-zero, interest rates – a scenario that has once again come to the fore in economies such as Japan’s (cf, Burdekin and Siklos, 2004). Fukao (2003, p. 15), for example, has already argued that “laws must be amended to allow the Bank of Japan to buy all securities, not just bonds, for its open market operations and purchase real assets ... up to a few trillion yen per month.” Our results also suggest that, whatever the political machinations that produced the Silver Purchase Act, its practical effectiveness offers a precedent for considering broadened, non-

traditional open market operations today.⁶

1. DATA AND EMPIRICAL ANALYSIS

We use monthly financial and macroeconomic data for the period January 1934-December 1938 to assess the effectiveness of the silver purchase program.⁷ We specify a five-variable vector autogression (VAR) that includes industrial production, non-silver money, silver money, consumer prices, and the 90-day commercial paper rate. The industrial production index (Y) is taken from the on-line database of the Federal Reserve Bank of St. Louis. We employ two measures of the money supply that are derived from Friedman and Schwartz's (1963) monthly estimates of M1 and original data from Board of Governors of the Federal Reserve System (1943, pp. 412-13).⁸ The first measure, non-silver money (NSM), is defined as M1 minus the silver component of the money supply. The silver component of the money supply is the sum of standard silver dollars, silver certificates, and subsidiary silver, and silver money (SM) is defined as M1 minus the non-silver component of money. Consumer prices minus volatile food prices (P) are taken from the NBER macro-history database. The 90-day commercial paper rate (I) is employed to capture fluctuations in interest rates. This short-term interest rate measure is also taken from the NBER macro-history database.

Figure 1 shows graphs of the five macroeconomic time series. Non-silver and silver money possess an upward trend over the sample period as a whole, with silver money continuing to expand after the initial burst in mid-1934 when large-scale purchases began. Industrial production generally increases

⁶This direct government involvement in the money supply process came in the midst of well-documented inconsistencies in Federal Reserve policy during the Great Depression, including the institution's apparent reactions to the stock market run up and collapse (Siklos, 2005).

⁷Although the link between money and prices has certainly prevailed through wartime episodes (cf, Burdekin and Weidenmier, 2001), we end our sample prior to the outbreak of the Second World War given both the impact on world commodity markets and the consequences for the monetary policy regime.

after 1934 before falling in late 1937 on the heels of a period of temporarily lower money issue. Economic activity begins to recover in early 1938 while money growth rates also pick up. Consumer prices are flat for the early part of the sample period before rising significantly in late 1936 and early 1937. Inflation begins to slow at the beginning of 1938 following the tapering off of industrial production and the Federal Reserve's raising of reserve requirements that dampened bank lending. Interest rates are low for the entire period, although they do fall at the beginning of the sample and briefly rise in early 1937 before declining with the onset of recession.

A p -th order dimensional vector autoregressive model with Gaussian errors can be written as:

$$x_t = A_1 x_{t-1} + A_2 x_{t-2} + \dots + A_k x_{t-k} + \gamma D_t + \varepsilon_t, \quad t = 1, \dots, T \quad (1)$$

where x_t is a $p \times 1$ vector of stochastic variables, and D_t is a vector of dummy variables that captures seasonal fluctuations. The error term, ε_t , is assumed to be a vector white noise process. We then imposed the following structure on the variance-covariance matrix to identify the effects of silver purchases on output, prices, and interest rates:

$$e_{1t} = \varepsilon_{yt} \quad (2)$$

$$e_{2t} = \alpha_1 \varepsilon_{yt} + \varepsilon_{pt} \quad (3)$$

$$e_{3t} = \alpha_2 \varepsilon_{yt} + \alpha_3 \varepsilon_{pt} + \alpha_4 \varepsilon_{SM} + \alpha_5 \varepsilon_I + \varepsilon_{NSM} \quad (4)$$

$$e_{4t} = \alpha_6 \varepsilon_{yt} + \alpha_7 \varepsilon_{pt} + \alpha_8 \varepsilon_{NSM} + \alpha_9 \varepsilon_I + \varepsilon_{SM} \quad (5)$$

$$e_{5t} = \alpha_{10} \varepsilon_{yt} + \alpha_{11} \varepsilon_{pt} + \alpha_{12} \varepsilon_{NSM} + \alpha_{13} \varepsilon_{SM} + \varepsilon_I \quad (6)$$

Equation (2) states that industrial production does not respond to shocks in the other endogenous

⁸This focus on M1 is consistent with prior studies such as Romer (1992) and Christiano, Motto and Rostagno (2003).

variables in the system within a month. Thus industrial production is modeled as the most exogenous variable in the system, reacting contemporaneously only to supply-side shocks. In equation (3), prices respond contemporaneously to output, but not to the other variables in the system. Equations (4) and (5) represent central bank reaction functions for the silver and non-silver money supplies. The non-silver money (NSM) responds contemporaneously to industrial production, prices and interest rates. The silver money (SM) reacts within the month to the same three variables. Silver and non-silver money also respond contemporaneously to each other in the two central bank reaction functions. In equation (6), interest rates (I) react contemporaneously to all four other variables in the system.⁹

We employ two standard model selection criteria (the AIC and the BIC) to select the number of lags in the VAR. Although we allowed for up to 6 lags in the empirical analysis, both model selection criteria select a lag length of one. The model is then estimated using maximum likelihood. We test the identification restrictions imposed on the variance-covariance matrix using a log likelihood ratio test. The restrictions cannot be rejected at the 5 or 10 percent level of significance. Figure 2 presents the impulse response functions of a one-standard deviation shock to each variable in the system along with the equivalent of 90 percent fractiles (Sims and Zha, 1999). The impulse response functions show that a shock to non-silver and the silver money stock significantly increases output for approximately 11 months. A one-standard deviation shock to the silver money supply can explain about 3, 11, 13, and 10 percent of the movements in industrial production at the 4, 8, 12, and 16- month forecast horizons. A one-standard deviation shock to the non-silver money supply can explain 3, 3, 7, and 10 percent of the fluctuations in output at the 4, 8, 12, and 16-month forecast horizons. A shock to the silver money supply also increases non-silver money and raises consumer prices. Overall, shocks to the money supply have their maximum effect at a forecast horizon of one-year to 16-months while innovations in money account for approximately 20 percent of fluctuations in output.

As for the other variables in the system, a shock to industrial production increases prices and interest rates and lowers silver and non-silver money. A shock to consumer prices lowers output and does not have a statistically significant effect on the two measures of money. Innovations in interest rates, on the other hand, have little effect on the macroeconomic variables in the system although a shock to the commercial paper rate decreases silver and non-silver money.

The results are robust to modifications in the basic set-up that (i) allow non-silver money and silver money to react with a one-period lag to each other or (ii) also allow prices to respond contemporaneously to the two measures of the money supply (see Appendix Figures A.1 and A.2). The effects of silver money on non-silver money, prices and output are both economically and statistically significant and the size and persistence of the indicated output effects suggests that the silver purchases, and the silver certificates issued in exchange for the silver acquired, played an important part in reflating the US economy. The only significant change in the impulse response from Figure 2 is that a shock to interest rates that lowers money and non-silver money has much greater statistical significance.

Given that silver money never accounted for more than 5.5% of total M1 over our sample period, it may seem implausible that the empirical work ascribes near equal weight to silver money and non-silver money in boosting output during 1934-1938. The silver certificates were distinct, however, in allowing for a direct monetary influx into the economy in return for the new silver deposited at the mint. By contrast, the standard mechanism involving purchases of government securities by the central bank produces an expansion in commercial bank reserves but will have no multiplier effects unless banks choose to employ those reserves for new loans or security purchases. The well-known ballooning of bank excess reserve ratios during the 1930s (Friedman and Schwartz, 1963) attests to the potential gains from injecting money directly into the economy rather than working through the banking system in the

⁹We allow for potential effects of monetary expansion on interest rates despite the near-liquidity trap conditions in line with Hanes' (2004) finding that reserve supply changes did exert effects on interest rates during 1934-1939.

traditional way.¹⁰ Silver certificates could, of course, be deposited in banks, thereby fueling new non-silver money growth in the traditional way as noted earlier. But silver money's potentially more direct role appears to be reflected in its significant impact on output and prices in the impulse response functions (across all three specifications) occurring at much shorter forecast horizons than is true with non-silver money.

2. CONCLUSIONS

The significance of the silver effect detailed in the paper's empirical work is not only of historical interest, but also represents a more longstanding lesson that purchasing government bonds is by no means the only way of achieving monetary expansion. Our study provides new insight into the potential usefulness of commodity purchase programs when very low interest rates and a liquidity-constrained banking system call into question the effectiveness of open market bond purchases – a scenario that applied to the United States in the 1930s and has recently returned to the fore today. Proposals for the Bank of Japan extending the range of its activities in buying land and stocks (cf, Fukao, 2003) to counter its deflationary spiral are certainly not without historical precedent and the US episode suggests that such non-traditional open market operations can potentially be quite effective.

¹⁰The overall rise in excess reserve ratios was itself, in part, a reaction to the bank runs and widespread failures of the early 1930s (see Calomiris and Mason, 2003a,b, on the causes and consequences of bank distress during that episode).

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TABLE 1: Composition of US Currency Before and After the 1934 Silver Purchase Act

End of June	<u>Total</u>	<u>Gold</u> ^a	<u>Silver</u> ^b	<u>Federal Reserve Notes</u>	<u>Other Currency</u> ^c
	<i>(in millions of dollars)</i>				
1932	5,408	882	640	2,780	1,107
1933	5,434	299	647	3,061	1,428
1938	6,461	78	1,612	4,114	655

Notes:

^a Includes both gold coin and gold certificates

^b Includes silver dollars, silver certificates, Treasury notes of 1890 and subsidiary silver

^c Includes National Bank notes, minor coin, US “greenback” notes and Federal Reserve Bank notes

Source: Friedman and Schwartz (1963, p. 492)

Figure 1

Monthly Macroeconomic Indicators, 1934-1938

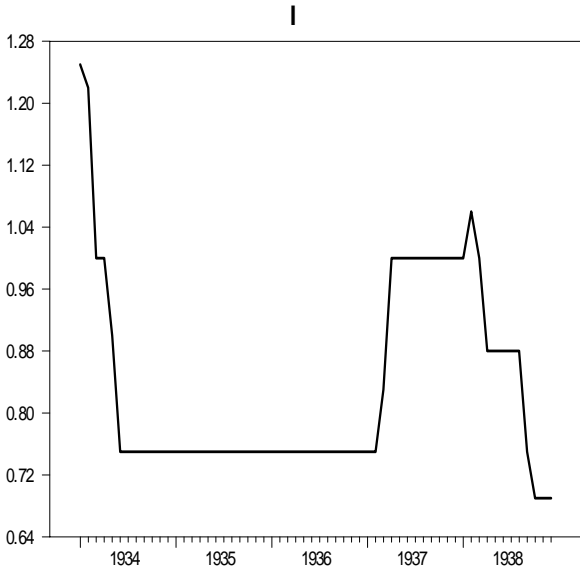
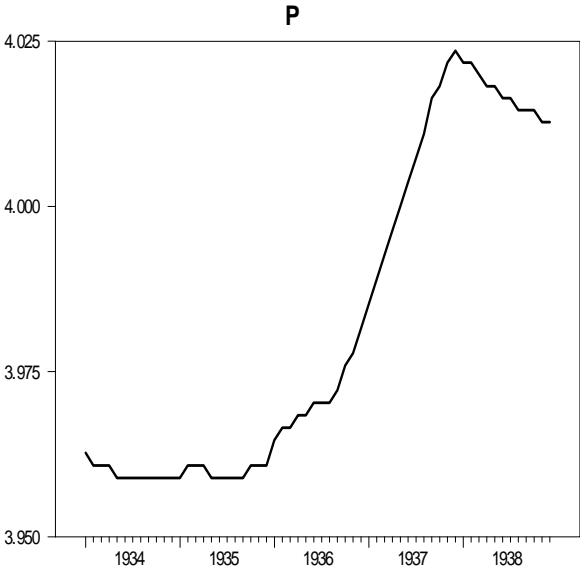
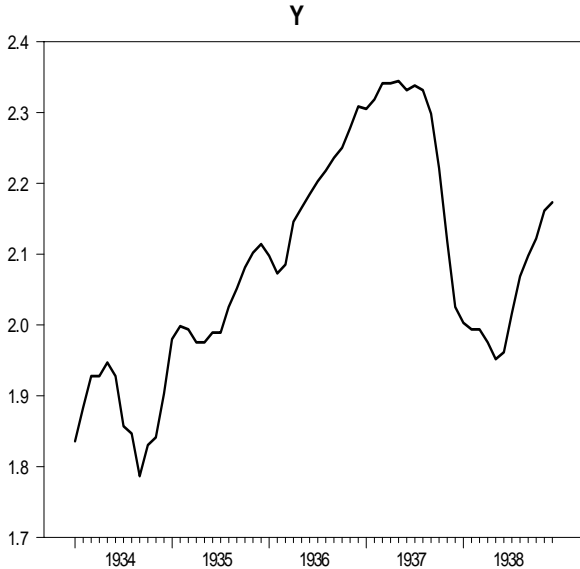
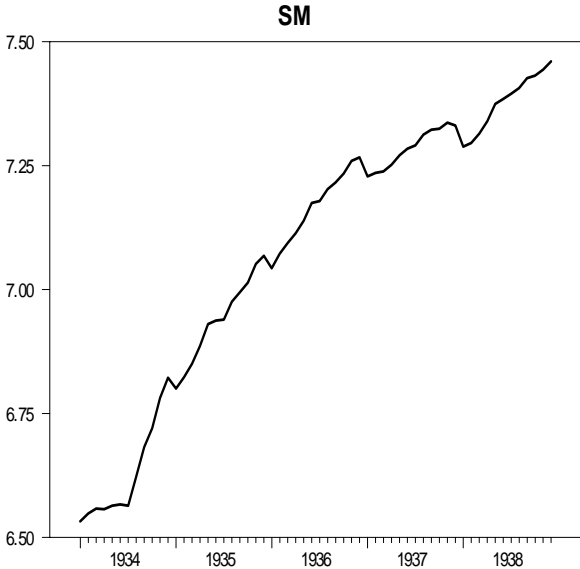
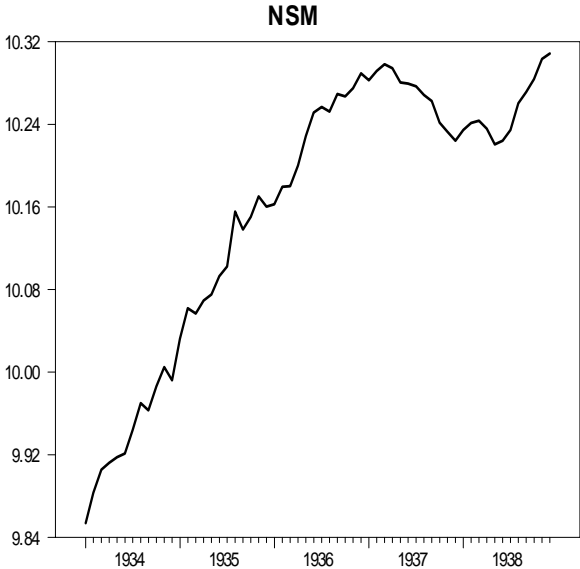


Figure 2. Impulse Responses

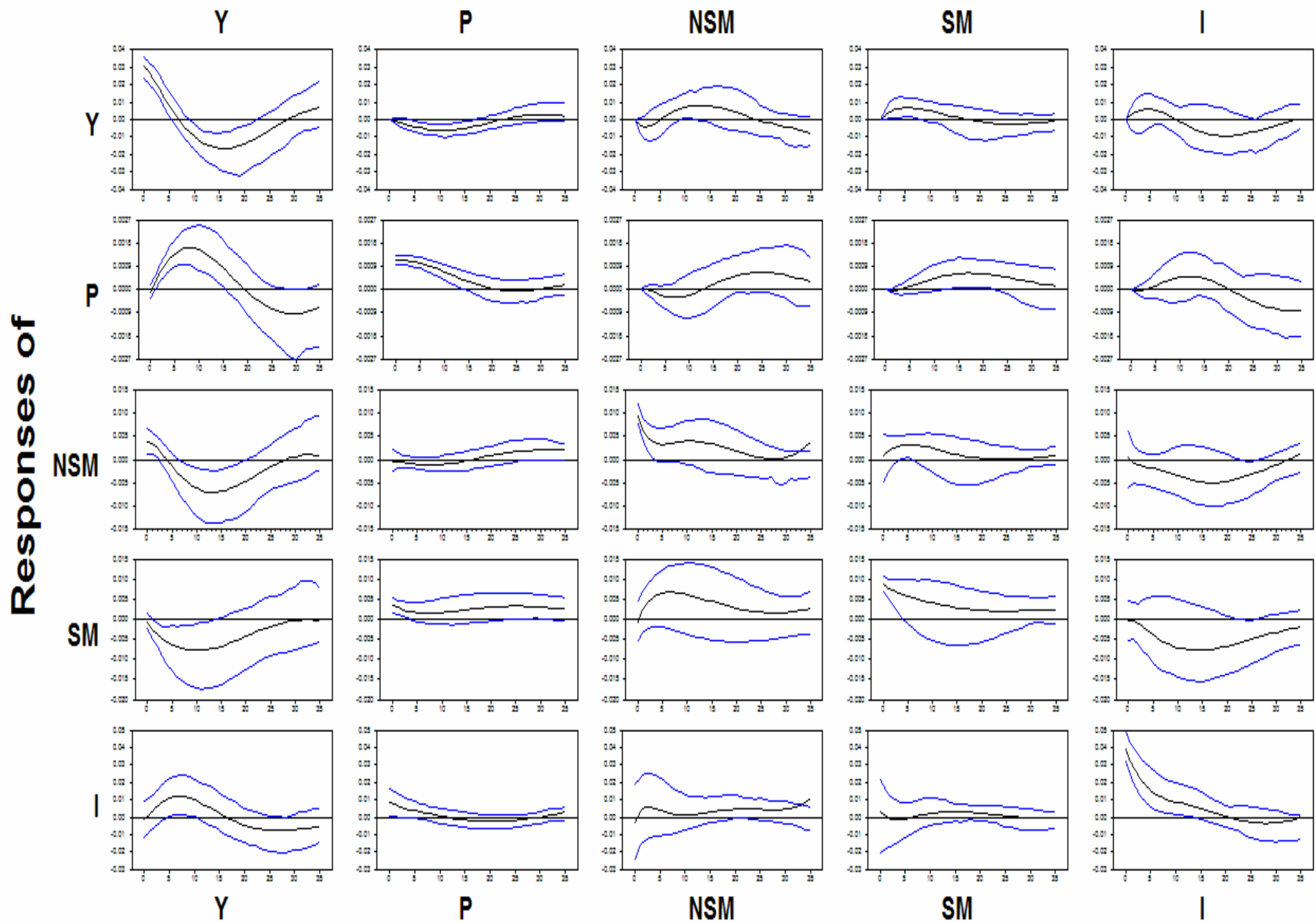


Figure A.1. Impulse responses

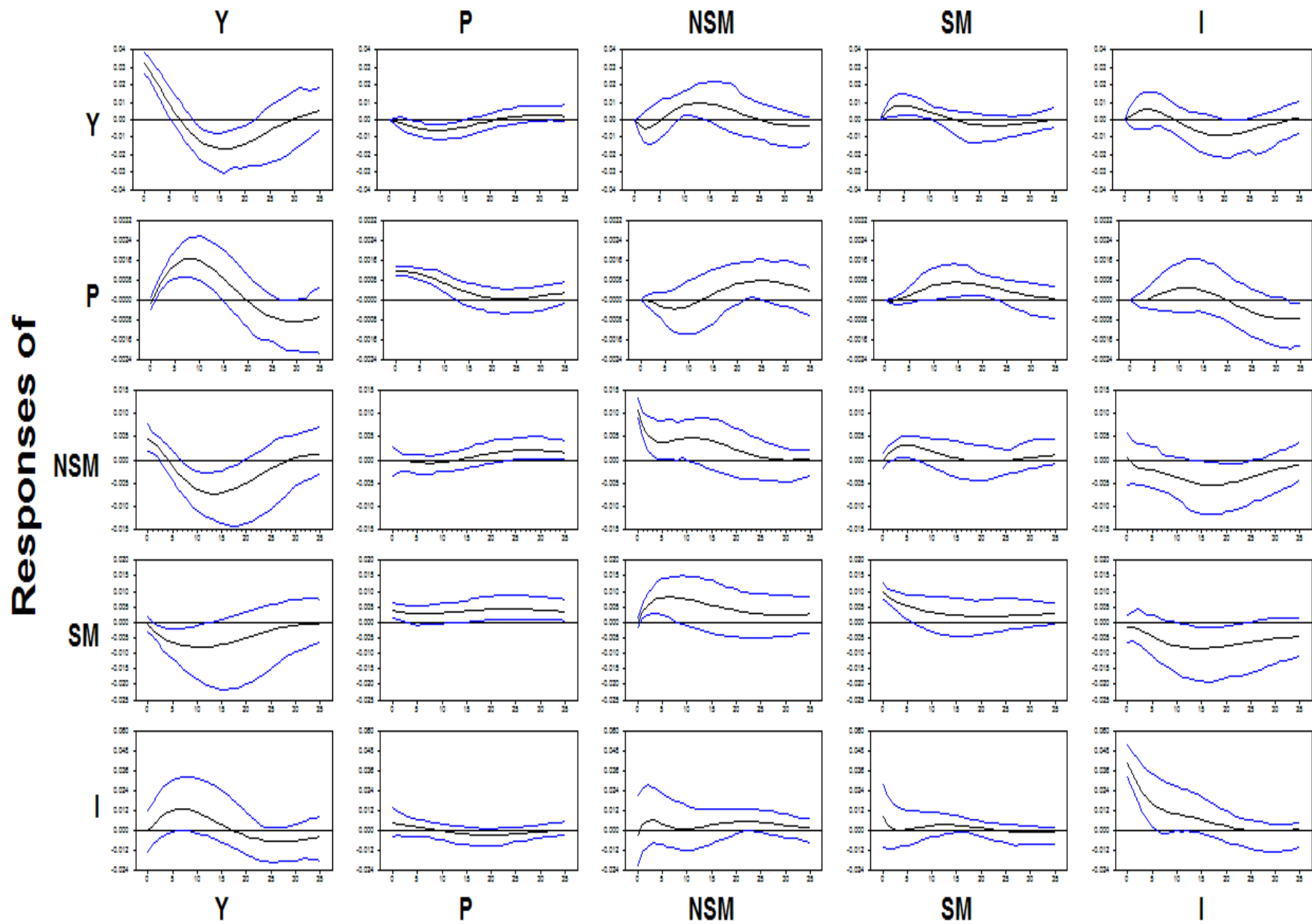


Figure A.2. Impulse responses

