Is there a credit channel in the transmission of monetary policy? Evidence from four countries

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I. INTRODUCTION[1]

The mechanism by which changes in the market for liquid reserves engineered by the monetary authorities affect the level of economic activity has always been a topic of great interest to academic economists and policy-makers alike. Research in this general area has focused lately on the particular role played by the assets side of the banking sector's[2] balance sheet in this transmission mechanism and, more specifically, on the question of whether bank loans play a special and independent role that is not captured by conventional analysis.

The standard IS-LM type analysis assumes that there is imperfect substitutability between money and other financial assets grouped under the category "bonds". Moreover, the quantity of money is dependent on the availability of liquid reserves. The monetary authorities, by controlling the amount and/or price of these reserves, can influence the ability of the banking system to attract deposits. When a central bank drains reserves from the system, the resulting "liquidity squeeze" drives up interest rates and affects negatively all interest rate sensitive expenditure. This ability of monetary policy to influence aggregate demand hinges on three assumptions:[3] (1) that the central bank can control the quantity of banking system reserves, (2) that there are no close substitutes for bank deposits, and (3) that some sort of nominal rigidity in the system does not allow nominal magnitudes to adjust fully and instantaneously to the level of reserves, therefore necessitating certain quantity adjustments. This is what has been (somewhat loosely) referred to as the "money view" of the transmission of monetary policy.

The IS-LM model maintains a feature of the Arrow-Debreu framework, viz. that informational imperfections are absent, which renders all debt instruments perfect substitutes. The analysis can thus be based on a well-defined and well-behaving demand schedule for interest rate elastic components of aggregate expenditure. The "credit view" of the transmission mechanism relaxes this assumption and also moves away from the Modigliani-Miller theorem. It introduces the concept of agency costs in the interaction of borrowers and lenders and underlines the importance of the borrower's liabilities structure in determining the terms on which credit can be obtained. An important result of this analysis is that financial intermediation can play a major role in mitigating these costs either by avoiding redundant duplication of borrower evaluation and monitoring by a group of lenders,[4] or by providing a platform permitting longer-term relationships to be established that, in turn, reduce the scope for informational asymmetries and thus agency costs.[5] These arguments suggest that intermediated loans are different in nature from other types of market credit such as bonds or commercial paper. When a central bank reduces the amount of reserves in the system it is not only bank liabilities that are affected but also bank assets. A reduction in the quantity of bank

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1 This paper has benefited from the comments of Dr. Horst Bockelmann.

2 Throughout the paper I use the term "bank" to denote deposit-taking financial intermediaries.

3 None of these three assumptions are part of the Arrow-Debreu setting.

4 See for example Diamond (1984).

5 Two examples of such models are Sharpe (1992) and Gertler (1992).

loans supplied, because of the absence of close substitutes, will be reflected in a *quantity* constraint on *intermediated* credit to bank customers. A reduction in the total supply of external funds will have negative effects on their activity level. It is important to note here that although this mechanism works parallel to the conventional one stipulated by the "money view", it represents a distinct channel because it entails a shift in the supply of bank credit in addition to any movements along the demand curve for loans induced by the higher level of interest rates.

The empirical investigation of the importance of this "bank loan channel", as it is otherwise known, has focused mainly on the United States. Although results compatible with the theory have been presented, the evidence is far from being compelling and unambiguously in favour of the "credit view". The present study investigates the issue from a cross-country perspective, to examine whether one can exploit the fact that alternative arrangements regarding the financial structure should, in theory, emphasise to a different degree the effects of the credit channel. In other words, the idea is to use the institutional differences as an "instrument" (loosely speaking) that could help us to disentangle the responses of the two sides of banks' balance sheets after a monetary policy tightening.

Of the countries included in this study, the United States and the United Kingdom may be thought of as being the representatives of the "Anglo-Saxon"[6] model, where the relationships between borrowers and banks are more arm's-length and deposit-taking institutions are not permitted to develop ownership and control relationships with their corporate customers. The situation in Japan and Germany, on the other hand, is quite different. Banks in these countries not only supply the majority of external funds to the non-financial sector, as their capital markets tend to be quite "thin", but they also play a very important role in corporate governance through their close ties to industry, which frequently take the form of substantial equity holdings and participation in companies' boards. Relationships of this type should help reduce agency costs and thus make bank credit more "special". One might then expect the bank lending channel to be stronger under these conditions than in the more "market-oriented" Anglo-Saxon countries.

The second part of the paper explains the methodological approach adopted, usually referred to as the "narrative method", which provides the main results of this study, and those financial market characteristics of the four countries examined that are relevant to the analysis of the transmission mechanism. Section III presents the results of a series of tests that try to gauge the predictive ability of different financial variables for various real activity measures. Section IV studies the behaviour of money, bank loans and output following episodes of monetary policy tightening, and Section V contains the conclusions.

II. METHODOLOGY AND THE SAMPLE OF COUNTRIES

A crucial first step in any analysis of the effects of monetary policy on economic activity is the definition of the term "monetary policy" itself. The macroeconometric literature abounds with studies that have proposed, and used, different identification methods in order to distil from the data a measure of monetary policy "purged" of the impact of other economic developments beyond the control of the monetary authorities. Although it is not the purpose of this paper to provide a detailed critical review of these alternative methodologies, it is still instructive to make some broad comparisons between the main strands in the literature in order to clarify the merits and limitations of the particular scheme used.

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6 Even though the term "Anglo-Saxon" fails to capture the essence of the distinguishing characteristics in the financial structure of these countries, it has been used in the literature extensively. Although I am aware of its shortcomings, for lack of a better term I shall use it throughout the paper simply as an identifier for the United States and the United Kingdom.

It is possible to classify the different identification methods into two major categories. The first approach amounts to "declaring" a particular variable as representing the monetary policy stance. Various monetary aggregates (or growth rates of aggregates) were the natural candidates which suggested themselves first for the role but it was soon realised that their use was subject to serious endogeneity problems. In recent years many researchers (focusing mainly on the US economy) have proposed particular interest rates, interest rate spreads or narrow definitions of the monetary base as being good representatives of the policy stance.[7] Movements in these variables, the authors argue, are influenced mainly by policy actions, and the feedback from the underlying level of economic activity is relatively unimportant. Although these arguments are quite persuasive, the choice of variables is heavily influenced by the particular institutional environment present in each country, and this makes international comparisons difficult.

The second method uses the framework of a statistical model for the economy and employs coefficient and/or error covariance restrictions in order to identify the impact of monetary policy.[8] This statistical approach has the advantage of providing a platform that can accommodate international comparison but has been a source of endless controversy, as the results of the analysis depend heavily on the restrictions imposed. Alternative economic theories typically imply quite different sets of restrictions. Moreover, to the extent that some of these restrictions are not overidentifying, they cannot be subjected to statistical verification.

In this paper I have used yet a third method, that has frequently been referred to as "the narrative approach".[9] Its has its intellectual roots in the seminal work of Friedman and Schwartz (1963), which used the historical record to provide evidence of the importance of money in determining the level of economic activity in pre-World War II United States. In keeping with this approach Romer and Romer (1989) used the policy records of the Federal Reserve to identify a number of dates during the post-war period when monetary policy was tightened in order to reduce inflation. Equivalent dates have been identified for Japan by Ueda (1993) and Fernandez (1994), and for the United Kingdom and Germany by myself.

Even though the motivation of the narrative and the statistical methods is the same, the philosophy that governs the choice of dates is rather different from the econometric identification techniques. Rather than representing the error term in the authorities' policy reaction function, which is orthogonal to the other sources of random disturbances of the system, these dates represent major shifts in the policy stance, aimed explicitly at reducing aggregate demand. This difference in the way "shocks" are defined in each method seems to have produced a great deal of confusion and controversy. Since the narrative approach is used in this paper it would be useful to attempt to clarify the matter in this section.

It is true that the purpose of this particular scheme, like any other identification scheme, is to isolate the effects of monetary policy actions on financial variables and to filter out the influence that the underlying level of economic activity has on them. This is especially important when one's final objective is to analyse the impact of monetary policy on real activity. What is *not* true about these dates is that they represent monetary policy shocks that are entirely *independent* of, and *not explainable* by, other macroeconomic variables or events. Such actions may reflect a dramatic change in the way policy-makers view the economy (e.g. a new model, a new attitude towards deviations of various objectives from their target values), or in some cases the simple realisation that the current situation had not been dealt with appropriately within the existing policy framework (correction of policy mistakes). In fact, for each one of these episodes there was a single (but not always the same) concern that clearly determined the monetary authorities' strategy and rendered the particular policy response necessary. So in this sense the policy shifts are not exogenous, since they have well-defined

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7 A small sample of recent papers includes Bernanke and Blinder (1992), Stock and Watson (1989), Friedman and Kuttner (1992) and Estrella and Hardouvelis (1991).

8 See, for instance, Gerlach and Smets (this volume).

9 The term was coined by the Romers in their first paper on the subject (Romer and Romer (1989)).

causes. These causes, however, have always been nominal disturbances, and the policy-maker's response was explicitly aimed at reducing aggregate demand in order to restore a more favourable macroeconomic equilibrium.

A defining characteristic of these "policy shifts" is that they represent unambiguous[10] changes in attitude, major corrections (if not complete reversals) of the path followed up to that point, towards a more restrictive policy. Apart from being by their very nature big headline events, they were also documented, and the rationale behind the decision was clearly explained in official sources published contemporaneously with each episode.[11] In a way, they can be interpreted as being the closest real-world approximation to a leftward shift of the LM curve as it is interpreted in a standard macroeconomics textbook.

Another characteristic that distinguishes a policy tightening episode from the "normal operation" of monetary policy is that it is, in a sense, backward rather than forward-looking. By this I mean that the policy-maker intended to correct the current problem (that problem being what was perceived as excessive inflation or an exchange rate crisis) by actually inducing a recession. Pre-emptive strikes in anticipation of future inflation, of the type announced early in 1994 by the Federal Reserve in the United States, for example, are *not* included in the list of episodes.[12]

As a general approach this method of identification is subjective by its very nature. Not only does it rely on the policy-maker's published account of his own actions, but there is a potential problem of the analyst interpreting this record with the benefit of hindsight since he will know what happened after the policy action. Unfortunately there is not much that the researcher can offer in his defence, since there are no quick verification tests. Also, from a more practical point of view, there are some other obvious limitations of the narrative method, which one should be fully aware of in order to be able to evaluate the results correctly. The dates identified represent discrete episodes that mark only the beginning of a policy-tightening period. Therefore, the statistical analysis that uses them as reference points has to take account of the fact that the period of restrictive policy extends over several months after a particular date, and that the policy effects are typically felt over even longer periods subsequently. It is also important to note that there is an asymmetry in the treatment of policy actions, because only tightenings are identified. This is not intentional but a necessary consequence of the way policy is made and documented, as it seems that the monetary authorities have a bias towards acting (or at least appearing to be acting) on the restrictive side. Monetary policy easing is much more gradual and tentative and is typically accompanied by relatively cautious language, warning of the risks of excessive relaxation. It is much easier to isolate policy measures with a clear contractionary objective than to identify exactly when the monetary authorities were actively seeking to reflate the economy.[13] Another dimension of policy-making not captured by these "dates" is the intensity of the policy tightening. Although this is a clear limitation of the method, one could argue that because the identified policy shifts have all been quite severe, they can be grouped together and their effects analysed in an average sense.

On the other hand, this methodology has some advantages. Instead of letting "the data decide" when there was a policy shock, the researcher plays an active role in choosing the dates. This

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10 To the extent that the term can be used when referring to economic policy actions.

11 The Romers used the FOMC minutes and the Record of Policy Actions of the Board of Governors. Ueda used the dates of increases in the discount rate in Japan on institutional grounds and his results have been confirmed and documented by Fernandez. For the United Kingdom and Germany I have used the discussion of current economic conditions in the Quarterly Bulletins of the Bank of England and Monthly Reports of the Bundesbank respectively.

12 Other examples of apparent policy tightenings that do not qualify as "dates" are the 1966 "credit crunch" in the United States, and the interest rate increases in the latter part of the 1980s in Germany. In all of those episodes the intent of the policy-makers (at least the one publicly declared) was to merely anticipate overheating of the economy and prevent pressures on price level from building up and feeding the wage-price spiral.

13 In fact, the only deliberate monetary policy easing that I found easy to identify is the monetary expansion that accompanied the "Barber boom" in the United Kingdom in 1971-72.

way the interpretation is more straightforward and closer to what seems to be a typical episode of monetary policy tightening that economic commentators (and many economists) refer to in more casual discussion. The strongest argument in favour of the narrative approach is its usefulness in comparative analysis. The episodes in question are entirely comparable across different countries and can serve as points of reference for an event-based analysis similar to that undertaken in this paper. Finally, this methodology should be viewed as complementary to, rather than competing against, other techniques, and as such can offer additional insights in the analysis of monetary policy effects.

The episodes of monetary policy shifts in the United States,[14] as identified by Romer and Romer (1989, 1994), are: December 1968, April 1974, August 1978, October 1979 and April 1988. For Japan, Ueda (1993) identified policy shifts with the first date of a discount rate increase by the Bank of Japan: July 1961, March 1963, September 1967, September 1969, April 1973, April 1974 and May 1989. Mechanistic as this approach may seem, the results were confirmed by Fernandez (1994), with one exception (September 1969), when the latter author felt that the increase in the discount rate was not an independent tightening but rather a continuation of the previous episode (September 1967). The five periods that I have identified as policy shifts by the Bundesbank are: February 1960, January 1966, September 1969, May 1973 and February 1981. There have also been five monetary policy tightening episodes since 1963 in the United Kingdom: October 1964, November 1967, July 1973, November 1978 and August 1988.

1. Individual country characteristics

The four countries included in this study, besides being the ones for which sets of policy shifts have been identified, are of interest because they represent a diversified group in terms of the structure of their respective financial systems, and the manner in which domestic monetary policy is conducted. In the remaining part of this section I shall briefly review some of these characteristics. My objective is to underscore the contrasting features among them that may help in identifying the channels of the transmission mechanism.

It has become commonplace to distinguish between those countries whose financial structure follows the so-called "Anglo-Saxon" model and those whose financial structure more closely resembles the "continental" one. The United States and the United Kingdom are frequently put forth as the two major representatives of the former category, while Germany and several other mainland European economies are thought of as representing the latter. Japan is another example of the "continental" system.

The major difference between the two systems is the role that banks are allowed to play. The Anglo-Saxon system is rather restrictive with respect to the activities that banks are permitted to undertake. There is a separation between investment and commercial banking activities, which generally may not be conducted by the same entity, and more importantly there are limits on a bank's ability to hold substantial equity stakes in non-financial companies. The "continental" system not only allows banks to supply directly a wider array of services but also to some extent encourages the active participation of financial intermediaries in the governance of big corporations and makes them partners in the decision-making process.[15] The "Hausbank" institution in Germany and the "keiretsu" groups of industrial and financial firms in Japan are very clear illustrations of this philosophy. Also regulatory and institutional arrangements in these countries not only favour intermediated credit but

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14 I am including only episodes falling within the sample period used in the paper for each country (1959-93 for the United States, 1961-93 for Japan, 1957-90 for Germany and 1963-93 for the United Kingdom).

15 The term "continental" should not be interpreted as encompassing all the countries of mainland Europe. Italy, for instance, has been an exception in terms of the direct role that banks are permitted to play in corporate governance.

have in the past discouraged, to varying degrees, the development of alternative, market-oriented forms of finance such as commercial paper.[16]

It is not easy to quantify the effect of credit market structure and the degree of dependence of the non-financial sector on bank loans. Some descriptive evidence is provided in the following table, which summarises the composition of non-financial corporations' balance sheets. The data are from Borio (1990), where the interested reader can find a more detailed analysis. The first four rows represent the percentage of total credit market debt attributed to banks, other financial intermediaries and private securities issues. The last row shows the ratio of debt to total assets (at market value).

Composition of external finance for non-financial corporations, 1985

(numbers in percentages)

	United States	United Kingdom	Japan	Germany
Domestic banks	32	62	53	73
Other domestic institutions	9	6	38	5
Securities	56	19	8	4
Other	4	13	2	17
Debt/Asset ratio	0.50	0.52	0.73	0.71

N.B.: The data are not fully comparable. See Borio (1990), Tables 2 and 14, for exact definitions.

The effects of the institutional arrangements I referred to in the previous paragraph are clearly demonstrated in terms of the lower corporate leverage ratios of US and UK companies.[17] The comparison of the relative contribution of different sources of external finance shows that corporations in Germany and Japan rely more heavily on intermediated credit, especially bank loans, for external funding. In the other two countries, capital markets play a much more important role. It is a well-known problem with these figures that they are not fully comparable across countries because of differences in the respective agencies' data collection "philosophies", and in accounting practices. However, the differences are clear enough to suggest that any corrective adjustments for these discrepancies should not substantially alter the main picture.

The greater dependence of non-financial firms on bank-intermediated credit in Germany and Japan and the active involvement of banks in the governance of corporations are factors that mitigate the agency costs of financial relationships in these countries. The strengthened role of the banking system should theoretically enhance the attractiveness of bank loans as sources of credit and reduce the degree to which they can be substituted by other forms of external finance. In other words, bank loans are relatively "more special" in these countries and the credit channel of monetary policy transmission could therefore be expected to be, if anything, stronger.

The structure of credit markets is not the only differentiating characteristic of these economies that might have some influence on the transmission of monetary policy. There are, and have been in the past, substantial differences in the conduct of monetary policy, as well as in the particular methods and instruments used by the monetary authorities in their effort to achieve their objectives. In this respect the United States and Germany could be grouped together as two countries

16 See Prowse (1994) for a good discussion of such regulatory practices and how they have influenced the development of capital markets in Japan and Germany.

17 These differences are even more dramatic if one compares net debt to the level of real assets.

with independent central banks that rely almost exclusively on money market forces in the operation of monetary policy. In the United Kingdom and Japan, on the other hand, the monetary authorities have, at times, made extensive use of the informal but well-established channels of direct communication with the banks in order to achieve their purpose through moral suasion. In the United Kingdom this has taken the form of the letters from the Governor of the Bank of England to the banking community informing it as to what the desired credit policy would be from the central bank's point of view.[18] In Japan, several authors refer to the central bank's previous policy of "window guidance" by which banks were instructed during their frequent individual contacts with the Bank of Japan on the way in which the authorities would prefer to see their balance sheets adjusted. The tightly controlled system of interest rates, on both bank liabilities and loans extended, increased the leverage that the Japanese monetary authorities had on the banking system.[19]

There have been large-scale changes in the way in which monetary policy operates in all four countries. An event which affected everybody was the collapse of the Bretton Woods system and the subsequent emergence of the floating exchange rate regime.[20] Another was the switch to a strategy of monetary aggregate targeting sometime in the second half of the same decade. But more relevant for this study is the radical transformation in the way in which monetary policy is conducted in Japan and the United Kingdom. With the liberalisation of the money market and the creation of a secondary market for government and commercial securities the Bank of Japan lost (or rather relinquished) its ability to tightly control bank balance-sheet movements. In the United Kingdom, the long process that started with the introduction of Competition and Credit Control in 1971 and continued for about ten years, resulted in the abolition of the London clearers' cartel and transformed existing monetary policy into one that tried to achieve its goals through manipulation of the short-run interest rates rather than by relying on explicit quantity controls. In both these countries the contrast between the earlier years and the period after 1980 is potentially instructive, as it will reflect any differences in the relative strength of the transmission channels that can be attributed to the instruments used in the conduct of monetary policy rather than differences in the structure of their credit markets.

III. PREDICTION TESTS

A method that has been frequently used in assessing the importance of financial variables in the determination of real economic activity is to evaluate their predictive ability with regard to various measures of economic activity. This "horse race" approach is related to the concept of Granger causality, although it typically omits the second part of the Granger test. More specifically the variable X is said to "Granger-cause" a variable Y if two conditions hold: first, that X contains information about future movements of Y beyond that already included in the latter's past history; second, that the converse is not true, and lagged values of Y cannot improve over the history of X in predicting future values of X. The standard tests performed in this literature only run the first type of prediction equation (of Y on past Ys and past Xs) and compare the performance of various explanatory variables. These tests are sensitive to the specification of the forecasting equations,[21] so

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18 Many of these letters have subsequently been published in various issues of the Bank of England's Quarterly Bulletin.

19 For a discussion of the conduct of monetary policy in Japan, see Suzuki (1987, 1984a, 1984b) and Ueda (1993). It is actually quite interesting to note that a tightening of monetary policy in Japan during the 1960s amounted to an increase in the official discount rate of only 25 basis points, another illustration that small price movements were enough to produce the desired effect as the quantities were also being directly influenced separately.

20 Although Germany has been part of the quasi fixed rate system in Europe since the mid-1970s, by having assumed the role of the system's de facto anchor, it has been relatively free to adjust the value of its currency vis-à-vis the rest of the world.

21 Whether one uses log levels or growth rates, whether a trend is included, and especially to the lag length of the r.h.s. variables.

one should not attach too much importance to their outcome. They are useful, however, as a means of determining the correlations between the various variables.

Tables 1a to 1d contain the results of such tests for each country conducted for the entire period and a smaller sub-period. This sub-period has been chosen to reflect what can be thought of as a period when the institutional framework and/or general economic environment within which monetary policy was operating had been significantly altered. The rationale for the particular choice of sample for each country has been discussed above, at the end of Section II.

The first set of tests comes from "bivariate" forecasting equations that have as dependent variable the measure of economic activity listed at the top of the column, and as regressors a constant term, six lags of the same variable, six lags of the financial variable listed in the first column and six lags of the price index. Output, production, employment and financial aggregates are all in growth rates, while interest rates, unemployment rates and interest rate spreads are in levels. There are four groups of financial variables used: monetary aggregates, interest rates, interest rate spreads and bank loans to the private sector. The inclusion of interest rate spreads is an attempt to evaluate the extent to which one can generalise the results of several studies that have found that these spreads are robust predictors of economic activity in the United States. The two spreads used are the term spread, the difference between comparable government security yields of different maturity (long minus short), and the quality spread, the difference between a commercial and a government security of the same (or similar) maturity. The term spread captures the idea that monetary authorities operate on the short end of the term structure and therefore movements in this spread should reflect the policy stance. The quality spread attempts to evaluate the extent to which a restrictive monetary policy that reduces the supply of loans from banks shifts credit demand towards other sources of funding and thus drives up their price. The top figure in each cell is the p-value for the joint significance test for all the lags of the financial variable, and the bottom number is the test statistic for the null hypothesis that the sum of its coefficients is equal to zero. A variable is a good predictor of the corresponding activity measure if the top value is below 0.05000 (5% significance level) and the direction of its influence significantly positive (negative) if the bottom figure is larger (smaller) than 1.960 (-1.960).

Tables 2a to 2d run the same type of prediction equation, augmented by the inclusion of six lags of a short-term money market rate. This interest rate is included as a monetary policy proxy variable. The choice of the particular rate for each country was based on institutional grounds or the results of previous studies that established its significance. The variable used is the federal funds rate in the United States, the day-to-day money market rate in Germany, the call rate in Japan and the local authorities' three-month rate for the United Kingdom.[22] The idea is that this latter set of tests will show how much of the predictive ability of the financial variables is not attributable to their contemporaneous correlation with monetary policy actions. In other words, it will indicate the extent to which these variables play an independent role in determining the level of real economic activity.

The overall picture is not very clear, and few generalisations can be drawn with confidence from these tables. Probably the most surprising result is the limited success of the federal funds rate in forecasting economic activity in the United States. On the other hand, M_2 seems to perform quite well in all samples, whether the prediction equation includes the federal funds rate or not. The clear winners of the contest, however, are the two spreads, which consistently outperform the other variables.[23]

In Germany the interest rates perform very well in both samples, but it appears that their predictive ability is linked to their relationship with the policy variable. The two spreads also do not seem to survive the inclusion of the day-to-day rate in the equation, despite their reasonable

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22 The last rate was chosen because it moves very closely in line with the Minimum Lending Rate (previously called Bank Rate) but, being a market rate, it does not have the stepwise path of the official rate that tends to remain fixed for relatively long periods of time.

23 The robustness of the spreads' predictive ability confirms the results of Friedman and Kuttner (1992) and Estrella and Hardouvelis (1991).

performance in the unconditional prediction tests. Monetary aggregates are not very successful, and their performance is again influenced by whether or not the monetary policy proxy is included. Loans, on the other hand, although marginally better performers, seem to be unaffected by the presence of the policy interest rate.

The good performance of the monetary aggregates in Japan is quite robust across samples and different equation specifications. On the other hand, interest rates are not very successful, with the exception of the commercial bill rate in the earlier period and the spread between the long-term commercial bond yield and the ten-year government equivalent for the same sample.

Little of the predictive ability of UK interest rates seems to remain after the inclusion of the policy proxy. The spreads, however, seem to fare better in the later sample and their performance is not affected so much when controlled for the policy stance. Monetary aggregates are quite successful in all four settings, as are loans, which seem to fare better when the short-term rate is included, especially in the later part of the sample.

The more robust conclusion reached as a result of this exercise points to the generally good forecasting ability of the spreads and some of the monetary aggregates in all countries except Germany. These variables seem to perform well even after a monetary policy proxy has been added to the right-hand side variables. By contrast, the performance of all the financial variables as predictors of the economic activity in Germany seems to be related to their co-movement with the short-run interest rate, indicating their limited independent influence on economic activity.

The inability to draw other strong conclusions from these numbers reflects the fact that such exercises are quite sensitive to the exact specification of the test and therefore not very helpful in international comparisons, since it is difficult to find a single common framework for all countries. Nevertheless, as already mentioned above, they set the scene for the discussion of the results of the analysis of movements of the financial variables at times of monetary policy shifts.

IV. THE POLICY EPISODES

In this section I shall examine the behaviour of money and loans immediately after an episode of monetary policy tightening in the four countries. To the extent that the response of monetary aggregates differs from that of bank credit, one can afford to make some inferences about their relative role in the propagation of the policy "shock" through the banking sector's balance sheet. Two different techniques will be used: a "limited information" methodology, where I look at the prediction errors of single forecasting equations for a period following an episode, and a "full information" methodology, where I estimate a VAR system that includes all three variables and then look at their responses to a policy tightening. The results of the two exercises, combined with the evidence from the statistical tests presented in the previous section, can provide some insights into the channels that the monetary transmission follows.

Before presenting the analysis in greater detail it should be underlined once more that the reader should apply considerably more caution than the proverbial "grain of salt" in interpreting the actual numbers in Figures 1a-1d and 2a-2d. As mentioned previously, the nature of any exercise using the episodes of policy tightening as discrete events necessarily removes one dimension from the information the data can possibly supply, viz. the intensity of the tightening. The analysis, therefore, has to be interpreted in an "average" sense over several episodes, and the numbers provide a measure of the order of magnitude of the policy effect rather than a precise estimate of a specific variable's elasticity in response to policy actions.

1. Forecasting equations

The aim of this exercise is to examine to what extent money, bank credit and output deviate from what can be called their "normal cyclical behaviour" in response to monetary policy tightening. This "normal" path is estimated using univariate forecasting equations of the following type:

$$\Delta\ln(X_t) = c + t + \sum_{i=1}^{n} \Delta\ln(X_{t-i}) + \sum_{i=1}^{p} S_i + \varepsilon_i$$

where X_t is the variable of interest (in turn the measure of economic activity chosen, a monetary aggregate or bank loans), S_i are seasonal dummies that are included when necessary, c a constant and t is a linear trend. A full year of lags (i.e. n=12 for monthly and n=4 for quarterly data) were included on the right-hand side of the equations, but the results are quite robust to the use of a greater lag length. I have then used the coefficient estimates from these equations and actual data up to the date of each tightening episode to produce dynamic forecasts for the growth rate of the variable in question. Forecast errors are then calculated as the difference between the actual and the predicted growth rates of the variable for three years following the policy shift date. Average forecast errors are subsequently calculated by averaging across all the episodes for each country. The top panels of Figures 1a to 1d plot for each country separately the *accumulated* average forecast errors of output, money and bank loans for three years after the policy shock. Since these are cumulative forecast errors for the *growth rates*, they represent the percentage deviation of the variable *level* from its predicted path.

As expected, all three variables eventually fall below their "normal" path, as the negative forecast errors imply. There are, however, a few interesting differences between countries. Economic activity shows a faster response to a policy shift in Germany and the United States, where the deviations become negative within the second six-month period after the episode, while it takes more than a year for output to decline in Japan and the United Kingdom. Moreover, the extent of the output decline is quite similar in Japan, Germany and the United States, with an average fall of 6-7% twenty-four months after the policy tightening, while the corresponding figure for the United Kingdom is about half that amount.[24] It is also interesting to note the very quick response of M_1 in Germany, which drops immediately after the policy shift, to reach a trough twelve months later. In the other three countries the response of the monetary aggregate is weaker, its pace much more gradual, and it does not show any tendency to return to "baseline" within the three-year period. Another important feature is the behaviour of loans: in Germany and the United States bank lending seems to lag behind industrial production,[25] suggesting that a probable cause of its decline can be found in the reduced demand for loans because of the poorer economic prospects. In the other two countries, bank loans not only seem to lead output but their deviation from their respective forecasts is greater than that of the monetary aggregates.

In an effort to further investigate the extent to which the deviations of the two financial variables from their predicted path can be attributed to the underlying level of economic activity, I have repeated the same exercise after augmenting the forecasting equation by adding half a year of leads and lags of the output measure as explanatory variable. The new equation thus takes the form:

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24 It is of course, possible that this difference is (at least partly) due to the fact that I have used quarterly GDP data for the United Kingdom as a measure of economic activity, while monthly industrial production is the corresponding variable for the other countries.

25 In the case of the United States the loan lag is quite substantial, as can be seen from Figure 1d. This is something that has been observed in several studies, including Bernanke and Blinder (1992), Romer and Romer (1990) and Gertler and Gilchrist (1993).

$$\Delta\ln(X_t) = c + t + \sum_{i=1}^{n} \Delta\ln(X_{t-i}) + \sum_{i=-\frac{n}{2}}^{\frac{n}{2}} \Delta\ln(Y_{t-i}) + \sum_{i=1}^{p} S_i + \varepsilon_i$$

where Y_t is industrial production for Germany, Japan and the United States and GDP for the United Kingdom. The leads are added to the usual specification that includes only lags in order to account for the possible effects that present expectations about future developments might have on the decision-making of economic agents. The lower panels of Figures 1a to 1d plot the percentage deviations of money and bank loans from their predicted path for the three years following a policy shift. The responses are again averages across all the episodes for each country. To facilitate the comparison with the upper panels, the response of the output measure is also included in the graphs.[26]

A few aspects of these graphs are well worth highlighting. As expected, the forecast errors are smaller than the univariate equation ones. The reduction in the size of these errors, however, is not uniform either across series or across countries. In particular, the contrast between Germany and Japan is rather sharp. In Germany, the inclusion of industrial production as a predictor does not seem to improve upon the univariate equation for the monetary aggregate, while the average forecast error of bank loans is almost 80% smaller two years after the policy shock. This appears to imply that most of the deviation in the level of bank lending could be attributed to a decreased demand for credit because of the decline in output. In the case of Japan the picture seems to be the reverse. While loans appear to be almost unaffected, the forecast errors for the monetary aggregate are virtually zero for the whole period, after the forecasts are made conditional on the path of output.

For the two Anglo-Saxon countries the results are less clear-cut. For the United States, the prediction errors of the bank loan equation are eliminated after the inclusion of industrial production as an additional explanatory variable, suggesting a strong demand-driven reaction of bank credit to a monetary policy tightening. On the other hand, the response of M_1 is also affected by this addition, (albeit to a lesser extent) and, given that it was not too large in the first place, one might be sceptical as to what degree a clear distinction can be made between the behaviour of the two financial variables. The situation is even more ambiguous in the case of the United Kingdom. Here we started with a loan response that was similar in pattern but greater in magnitude compared to that of M_4.[27] After the movements in output were taken into account, the relative position of the two variables was unchanged, only the percentage deviations from their "normal" path were now reduced proportionately. Thus it seems safe to assert that whatever the relationship between money and loans may be in the United Kingdom, it is not greatly affected by the position of the economy in the cycle.

There are a few conclusions that can be drawn from this exercise, some with greater confidence than others. First, it is quite clear that both the financial variables and output decline following a monetary policy tightening, i.e. monetary policy "matters", and it affects real as well as financial variables. The timing of the responses is not identical, however, and we can probably identify two general patterns that can be associated with the two sides of the money vs. credit debate. The clearest example of a transmission pattern implied by the "money view" is presented by Germany, and the case closest to the "credit channel view" is that of Japan.

In Germany M_1 declines immediately and at a rapid pace for about one year following the shock, reverting to its "normal" level for the next twenty-four months. This pattern is to a large degree independent of the movements in economic activity. Loans, on the other hand, not only lag behind output but most of the prediction error disappears when the forecasts are made conditional

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26 This is of course identical to the one from the univariate forecasting equation.

27 Because of frequent changes in the definition of the monetary aggregates in the United Kingdom during the sample period, there are no series for M_1 extending from 1963-93. The M_2 series that exists includes several discontinuities owing to revisions and, even though some of them can be dealt with by using the published M_2 changes, some jumps remain. That is why I used M_4 in this part of the analysis. When I experimented with M_2 the results were virtually the same.

upon industrial production. These patterns suggest that there is no independent role played by bank lending in the transmission of monetary policy shocks.[28]

In Japan the movement of the monetary aggregate is very little affected by the policy tightening and seems to follow the developments in output. In fact, its deviations from the benchmark value are entirely explained by output movements. On the other hand, loans lead output movements and are not explained by them. This evidence is consistent with the view that bank credit plays a special and independent role in the transmission of monetary policy shocks.

The other two countries can be classified along the same lines, but not with the same degree of confidence. The United States shares a lot of common features with Germany in terms of the general responses pattern of money and loans but the results are less pronounced. The United Kingdom bears some resemblance to the Japanese case but here the common features are even weaker.

2. Vector auto-regressions

In the previous sub-section single-equation methods were used to gauge the effect of policy tightening on money, loans and output. These methods are susceptible to the obvious criticism that they do not allow for a two-way interaction among the endogenous variables and impose explicit and sometimes questionable restrictions in order to identify the system statistically. This sub-section presents the results from the estimation of systems of equations where the endogenous variables are output, money and bank loans and the policy tightenings are included as exogenous events. More specifically, for each country a binary variable is created, which is equal to one on the dates of policy tightening episodes and zero otherwise. Three years of lags of this dummy variable are then included as exogenous components in a three-equation VAR system which also includes six months of lags[29] of the growth rates of money, bank loans and output, a vector of constants and linear trends. These systems are estimated over the entire sample period and include seasonal dummies where necessary. The following exercise is then performed: a one-period, unit shock is applied to the current period policy dummy, and the impulse responses of the endogenous variables are subsequently graphed for three years into the future. These responses are the sum of two parts: one component is the dynamics contained in the normal interaction of the endogenous variables and is captured by the matrix of coefficients of these variables; the second component is due to the effect of the monetary policy tightening and is captured in the coefficients of the dummy variable lags. The impulse responses to the policy variable "shock" therefore provide a more complete picture of the three-variables reaction compared to the single-equation methodology, as they allow their internal dynamics to be demonstrated.

Figures 2a to 2d contain the accumulated impulse responses of the endogenous variables' growth rates.[30] For each country three graphs were produced: one that contains the results of the estimation over the entire sample period (top panel), one which uses only the sub-sample up to the first oil shock[31] (bottom panel) and one for the later period (middle panel). The results of the different sub-samples allow one to examine the extent to which shifts in the structure of the financial environment that have occurred over the last twenty or so years have substantially changed the

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28 Or at least not one that is detectable by this aggregate data analysis.

29 For the United Kingdom, where only quarterly data are available for the entire period, I have included three quarters of lags for the endogenous variables to allow for richer dynamics. The results are not very sensitive to small changes in the lag length.

30 Thus they can be interpreted as representing the deviations of the corresponding variable's log level.

31 The choice of this break point is not completely arbitrary. Besides splitting the sample more or less evenly, it represents a turning-point in the long-run growth rate for most of the industrialised world (productivity slowdown). It also roughly coincides with the beginning of the floating exchange rate period and the introduction of monetary targeting policy regimes in the sample countries.

responses of money and bank loans to a policy tightening. In what follows I shall discuss the plots for each country separately and attempt a synthesis at the end of the section.

For Germany, the impulse responses from the VAR are strikingly similar to the plots of the average forecast errors of the same variables after a policy shock (Figure 1a). Not only does the general shape of the responses conform to that of the earlier graphs, but also the magnitude of the deviations is quite similar. Again a pattern emerges in which money seems to lead both industrial production and bank loans, while the two latter variables move closer together. It is also interesting to observe some differences between the early and late sample results. For the period before the oil shocks loans appeared to be lagging substantially behind the decline in industrial production and their deviation from "baseline" was considerably less pronounced than in the period after 1973. It appears that German banks were able to maintain high levels of lending despite the fact that they were facing constraints in expanding their liabilities during the periods of monetary restraint. This is a finding consistent with the view that bank lending is the major source of finance for the German economy, but at the same time the banking system has the flexibility to adjust its balance-sheet composition so as to insulate to a considerable degree the supply of loans from the direct impact of restrictive monetary policy.

For the other countries the results are less transparent. While the general pattern of the endogenous variables responses for Japan is similar to those from the single-equation estimation, the size of these deviations from baseline is quite different. We can see that money lagged behind output and loans in the early sample period but it hardly moves away from zero in the full sample. It is interesting to observe that following a policy tightening in the period after 1973 money actually remained *above* its predicted level given the movements of the other two variables, suggesting that monetary tightenings have little effect on the path of bank liabilities. The deviations of loans from their baseline are less pronounced than in the single-equation case, while the opposite is true for industrial production. Moreover, industrial production seems to have been more responsive to policy tightenings in the 1960s.

For the United States, the VAR results are generally in line with the single-equation ones, with one notable exception; viz. the period from the 1960s up to the first oil shock. The relative behaviour of money in the bottom panel is rather uncharacteristic, given all the results for this country shown so far. It is almost as if M_1 does not deviate at all from its baseline compared with the quite large deviation of output and loans. It is not altogether obvious how to interpret this effect other than to attribute it to the fact that there was only one tightening episode in this sample period, i.e. December 1968. Following this particular episode the deviation of M_1 from its baseline was rather weak, as documented by the Romers.[32] A further indication that this might actually be the case is the fact that the results for the entire period resemble more closely those for the post-1973 sample. There one can see the same pattern of money leading and loans lagging output more clearly than in the single-equation graphs, suggesting that the timing of relationships is consistent with the money view of the transmission mechanism.

The same phenomenon of a variable's uncharacteristically large reaction to a policy tightening that was observed with industrial production in Japan surfaces again in the UK results for the 1963-73 sample. The impulse responses for loans and the monetary aggregate show a decline of 40% and 30% respectively three years after the policy tightening, while the GDP decline is of the order of 6-8% (which is about double the corresponding error from the forecasting equations). The explanation for this deviation could be the fact that the two monetary policy shifts of 1964 and 1967 marked the beginning of prolonged periods of tightening aimed at correcting the United Kingdom's persistent balance-of-payments problems, which led to the 1967 devaluation and the eventual floating of the pound in 1972. Another possible factor, closely related to the monetary policy transmission channels, is the fact that during this period the Bank of England made extensive use of moral suasion in order to influence bank lending decisions. Frequently, credit letters addressed to the clearing banks

32 Romer and Romer (1990) present the cumulative deviations of M_1 from its forecast path when industrial production was included as one of the explanatory variables; see loc. cit., Table 4, p. 173.

and other financial intermediaries contained suggestions regarding their lending policies.[33] The picture is quite different for the later sample after the changes in policy that took effect with the introduction of Competition and Credit Control in May 1971. In this period one can see that the behaviour of the financial variables significantly lagged that of output and was less pronounced (in fact money remained virtually unaffected for most of the three-year period after the shock). This suggests that there have been substantial differences in the monetary policy transmission channels between the two periods of different monetary policy regimes in the United Kingdom.

The VAR impulse responses, therefore, generally confirm the results from the single-equation forecast error analysis. The few exceptions concern mainly the size of the reaction of some of the variables in Japan and the United Kingdom. It may tentatively be concluded that following a monetary tightening the response of financial aggregates differs not only from one country to another, but also over different time periods for the same country. For Germany, the results of the two tests are consistent in their rejection of the hypothesis that bank loans provide a distinct and independent channel in the monetary policy transmission. There is no evidence that German banks restrict the supply of credit to their customers after a tightening by the Bundesbank any more than might be expected because of the higher level of interest rates. On the contrary, in the early sample, when the credit channel might reasonably have been expected to be stronger, it was observed that bank lending was very little affected. The results for Japan, on the other hand, provide support for the credit view hypothesis that monetary policy tightening does have a negative effect on the supply of bank loans. This evidence is not, however, as strong and clear-cut as in the German case. Moreover, it is also sensitive to the sample period used in the analysis. The results for the United States and the United Kingdom are less conclusive. The best one can do is to cautiously classify the United States together with the countries where the money channel is stronger, and the United Kingdom (with even greater caution) together with the countries that show some evidence of bank loans playing an independent role in the transmission of monetary policy. In fact, as mentioned earlier, the UK results appear to reflect the earlier period of strong controls imposed informally but firmly by the Bank of England on British deposit-taking institutions.

V. CONCLUSIONS

The comparative analysis of monetary policy transmission channels in the four countries studied has yielded few strong conclusions. This confirms the difficulties faced by empirical analysis in producing results that distinguish sharply between the two competing hypotheses when relying exclusively on aggregate data. With the exception of Germany (and to a lesser extent Japan), where the same picture consistently emerges from the various tests and the results appear quite robust with respect to specification changes, definitive statements about the relative importance of the bank lending channel in the monetary transmission mechanism cannot be made with any great degree of confidence.

As mentioned above, monetary policy in Germany seems to work mainly through the conventional "money" channel. The timing of the money and loan responses following monetary policy tightening is not consistent with a theory that attributes most of the slowdown in economic activity to a fall in the supply of bank credit. This result is very robust, as the comparison of the single-equation forecast errors and the impulse responses from the VAR specification show. The large share of external finance supplied by banks and the prediction equation tests testify to the importance of bank credit in the functioning of the German economy. On the other hand, however, if one concentrates on the periods that immediately follow a severe monetary policy tightening, this variable does not appear to play an independent role in the transmission of the policy shock to the real sector. In fact, the impulse response functions for the sample before 1973, when arguably fewer substitutes

33 These letters actually went so far as to contain explicit quantitative targets for loans in periods when that was judged to be necessary.

for domestic bank credit were available, suggest that banks were quite successful in shielding the supply of loans to their clients from the adverse influence of restrictive monetary policy.

The results for Japan point in the opposite direction, offering evidence supportive of bank credit's primary role in the transmission mechanism. The timing of money and loans is almost the reverse of that in Germany, and monetary aggregates seem hardly to deviate from their "baseline" values following a tightening episode. This finding contrasts with the good performance of M_2+CD in the prediction equations in the presence of a monetary policy proxy, but it is consistent with the successful showing of the quality spread and the robust performance of bank loans in the same tests. This contradiction is quite persistent with Japanese money data, whether the monetary aggregates are included in real or in nominal terms. In fact, even though the use of deflated series has somewhat similar effects on the US and UK impulse responses, these are not nearly as important as in the case of Japan.[34] I have chosen to work with nominal variables to keep this study in line with the practice followed by other researchers.[35] It might actually be quite informative to investigate this apparent puzzle in greater depth in future research.

The results for the United Kingdom and the United States are quite mixed. The United Kingdom shows weak evidence consistent with the existence of a credit channel, as the analysis of the financial aggregates' behaviour after a policy shock suggests. But these results are far from conclusive and seem to be determined by the earlier part of the sample. They are also in conflict with the prediction equation tests that show bank loan growth as performing better as an independent predictor of future output growth in the 1980s. Finally, the United States could be weakly classified in the same group as Germany, where the transmission mechanism appears to work primarily through the liabilities side of the banking system's balance sheet. Money seems to move ahead of loans and output, at least in the later part of the sample, a finding consistent with the prediction equation results, where M_2 appears to be a better activity predictor than loans, especially when the federal funds rate is included as an additional explanatory variable.

If one accepts the validity of this empirical classification of the four countries as either "money channel" or "loan channel" countries, then a contradiction becomes apparent with a reasonable alternative classification which, based on theoretical arguments, emphasises the characteristics of their respective financial structure. On these grounds, one would have expected Germany and Japan to present stronger evidence in favour of the operation of a bank loan channel than the two representatives of the "Anglo-Saxon" model, because of the importance of bank financing in the former two economies. Instead, the empirical analysis seems to group together countries that share common features in the operational practices of their monetary authorities. The countries that show signs of bank loans having a strong leading role in the transmission of monetary policy are those in which monetary policy has in the past relied more heavily on directly influencing the quantity of bank credit. This was especially true of Japan and the United Kingdom prior to the reforms of the early 1980s, when quantitative controls, moral suasion and other direct methods were heavily employed by the two central banks in achieving their policy objectives. This is less true of Germany and the United States, where throughout the sample period monetary authorities have relied more on reserve management techniques and the manipulation of the short-term money market rates in order to indirectly exert influence on the quantity of bank credit in the economy.

So are the operational procedures of the monetary authorities responsible for the "bank loan" channel in the transmission process? The answer to this question is no. At least not in the sense that these procedures create the informational and incentive asymmetries that lie at the root of the credit view of the transmission mechanism. These procedures, however, impose additional constraints on the operation of the banking system, especially in the form of the adjustment of banks' balance sheets to monetary policy tightening. In countries where direct quantitative controls are present, the banking system does not have the option of rebalancing the composition of its assets by altering the

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34 The German results are virtually identical whether one uses nominal or real money and loans series.

35 Romer and Romer (1990) and Ueda (1993).

relative shares of loans and other marketable securities as the liabilities side of the balance sheet shrinks after an episode of restrictive monetary policy. It is in this sense that monetary policy becomes to a large extent a "credit availability" policy, hence the leading role of bank loans in shaping the slowdown in real economic activity. Loan levels above "baseline" in Germany for significant periods after a policy episode testify to the fact that banks tend to behave consistently with the theories that describe financial intermediaries as an efficient mechanism to address the agency problems in the market for credit.

Despite the fact that one might express reservations about the empirical methodology used, which is just one among several alternatives, each with its own particular strengths and weaknesses, this study provides some insight into the workings of the monetary policy transmission mechanism and the way it interacts with the financial structure. Even if in certain cases the analysis does not yield clear-cut conclusions, the fact remains that where the results are the strongest (the rejection of the idea of a credit channel in Germany and the evidence in its favour in Japan) they point to the implementation of monetary policy as a determining factor in the operation of the transmission channel that works through bank credit, rather than the characteristics of an economy's financial structure.

Table 1a

Prediction equation results

Germany

1957-90	Ind. prod.	Sales	Orders	Empl.	Unempl.
M_1	0.13444 *0.827*	0.44738 *2.263*	0.15632 *1.394*	0.60214 *1.447*	0.06017 *- 2.566*
M_2	0.23572 *1.110*	0.34913 *0.326*	0.95647 *0.413*	0.68205 *1.566*	0.29993 *- 1.017*
Day-to-day	0.00051 *- 4.666*	0.74299 *- 1.1148*	0.00140 *- 3.958*	0.00003 *- 4.689*	0.00169 *3.935*
Fibor	0.00020 *- 4.551*	0.01440 *- 0.657*	0.00087 *- 3.452*	0.00001 *- 4.515*	0.00100 *3.582*
Government bonds	0.00102 *- 3.637*	0.40961 *- 0.939*	0.00117 *- 3.417*	0.00408 *- 3.977*	0.00968 *3.016*
Term spread	0.03605 *- 3.057*	0.55035 *- 0.195*	0.02169 *- 3.633*	0.00373 *- 2.669*	0.34921 *2.434*
Quality spread	0.05411 *- 2.656*	0.00718 *- 1.000*	0.32161 *- 1.525*	0.40882 *- 2.147*	0.63540 *0.054*
Bank loans	0.02508 *0.577*	0.02938 *2.398*	0.09314 *- 0.194*	0.19096 *1.792*	0.80943 *- 0.904*

1974-90	Ind. prod.	Sales	Orders	Empl.	Unempl.
M_1	0.05156 *0.193*	0.03902 *1.225*	0.43761 *1.599*	0.26614 *0.682*	0.28966 *- 1.732*
M_2	0.79620 *0.356*	0.01332 *- 0.104*	0.77208 *- 0.148*	0.33557 *0.979*	0.52445 *0.507*
Day-to-day	0.00641 *- 3.755*	0.35145 *- 1.003*	0.00202 *- 4.223*	0.00002 *- 4.582*	0.00859 *3.604*
Fibor	0.00907 *- 2.914*	0.02091 *- 1.110*	0.00003 *- 3.363*	0.00001 *- 4.025*	0.03556 *2.694*
Government bonds	0.00011 *- 1.890*	0.92107 *- 0.087*	0.00979 *- 2.917*	0.16224 *- 2.641*	0.01600 *1.918*
Term spread	0.01151 *- 3.123*	0.51598 *- 0.487*	0.02765 *- 3.430*	0.00025 *- 3.852*	0.38442 *2.063*
Quality spread	0.32604 *- 1.371*	0.14861 *- 2.047*	0.07490 *- 1.344*	0.03371 *- 2.586*	0.90810 *1.030*
Bank loans	0.04898 *1.534*	0.29529 *0.751*	0.02765 *0.446*	0.11713 *2.529*	0.56096 *- 0.481*

Table 1b

Prediction equation results

Japan

1961-93	Ind. prod.	Sales	Stocks	Empl.	Unempl.
M_1	0.00000 *2.144*	0.85128 *- 1.253*	0.00997 *- 1.862*	0.20108 *0.005*	0.49676 *- 0.879*
M_2+CD	0.00000 *3.538*	0.89392 *0.470*	0.01118 *- 2.838*	0.30477 *0.957*	0.20438 *- 0.999*
Call rate	0.39923 *- 2.063*	0.92198 *0.115*	0.05857 *0.990*	0.12621 *- 1.861*	0.15609 *0.219*
Government paper ..... (two months)	0.99399 *- 0.451*	0.01339 *0.195*	0.82810 *0.014*	0.02856 *- 2.130*	0.01186 *0.121*
Commercial bills	0.07530 *- 1.898*	0.06825 *0.530*	0.00000 *- 1.160*	0.00007 *- 2.127*	0.00126 *1.377*
Term spread	0.21222 *2.711*	0.28649 *- 0.165*	0.27672 *- 2.482*	0.00000 *- 2.320*	0.02952 *1.875*
Quality spread ..... (long)	0.00031 *0.853*	0.05836 *- 0.449*	0.01172 *2.445*	0.02681 *0.868*	0.61786 *- 0.591*
Bank loans	0.46831 *1.958*	0.00308 *- 0.604*	0.65484 *- 0.652*	0.96885 *0.686*	0.66735 *- 0.471*

1980-93	Ind. prod.	Sales	Stocks	Empl.	Unempl.
M_1	0.00159 *1.295*	0.51875 *- 1.568*	0.12323 *- 0.031*	0.05665 *1.437*	0.11716 *- 1.100*
M_2+CD	0.00002 *3.947*	0.14977 *2.430*	0.65832 *- 0.261*	0.01246 *2.170*	0.00012 *- 2.831*
Call rate	0.96081 *0.045*	0.01087 *1.749*	0.58410 *0.157*	0.34004 *0.300*	0.23880 *- 1.495*
Government paper ..... (two months)	0.83071 *- 0.284*	0.00871 *0.906*	0.99632 *0.212*	0.69564 *- 0.207*	0.19931 *- 1.777*
Commercial bills	0.62214 *- 0.745*	0.12093 *0.798*	0.56765 *- 0.076*	0.31352 *0.434*	0.01131 *- 0.801*
Term spread	0.34655 *2.015*	0.03618 *0.555*	0.92236 *- 0.581*	0.82130 *0.133*	0.54020 *1.495*
Quality spread ..... (long)	0.08302 *- 1.343*	0.13036 *- 1.026*	0.12122 *- 0.072*	0.78252 *- 0.283*	0.05151 *1.985*
Bank loans	0.10363 *2.449*	0.00055 *2.522*	0.63278 *0.928*	0.72695 *1.534*	0.65466 *- 1.774*

Table 1c

Prediction equation results

United Kingdom

1963-93	GDP	Cons.	Invest.	Sales	Stocks	Unempl.
M_2	- *0.17693* *2.048*	0.06662 *2.481*	0.91664 *0.626*	0.00835 *3.123*	0.02175 *2.835*	0.00000 - *2.643*
M_4	0.39913 *1.320*	0.00930 *0.949*	0.55388 - *0.158*	0.07918 *1.958*	0.03466 *2.087*	0.47289 - *1.540*
Minimum lending rate	0.00919 - *3.011*	0.02333 - *2.291*	0.10672 - *2.087*	0.43767 *0.687*	0.03484 - *0.901*	0.00012 *3.073*
Treasury bill (three months)	0.02850 - *3.131*	0.01314 - *2.455*	0.12668 - *1.721*	0.93056 *0.390*	0.08001 - *0.708*	0.00005 *2.973*
Government bonds (ten years)	0.25513 - *1.147*	0.02829 - *0.971*	0.01000 - *0.705*	0.01085 *2.874*	0.66281 *0.147*	0.00087 *2.038*
Term spread	0.09469 *2.118*	0.15264 *1.971*	0.20941 *1.741*	0.00710 *2.782*	0.12866 *0.856*	0.22256 - *1.400*
Quality spread	0.07147 - *2.416*	0.43239 - *0.677*	0.29544 - *1.694*	0.12909 *0.459*	0.30602 - *1.283*	0.15756 *0.304*
Bank loans	0.43239 *1.500*	0.00403 *0.954*	0.85522 *0.822*	0.01048 *1.611*	0.07891 *2.455*	0.41054 - *1.512*

1979-93	GDP	Cons.	Invest.	Sales	Stocks	Unempl.
M_2	0.29562 *1.722*	0.41821 *1.411*	0.35329 *0.463*	0.05633 *2.412*	0.00003 *3.017*	0.00115 - *1.055*
M_4	0.01459 *0.744*	0.00443 *0.209*	0.16804 *0.274*	0.45837 - *0.341*	0.09831 *1.606*	0.66071 - *0.708*
Minimum lending rate	0.01127 - *3.165*	0.00323 - *3.439*	0.00131 - *3.809*	0.02031 - *2.698*	0.00004 - *2.750*	0.00996 *3.073*
Treasury bill (three months)	0.02548 - *2.976*	0.00523 - *3.118*	0.01729 - *3.025*	0.02658 - *2.789*	0.00142 - *2.280*	0.01817 *2.611*
Government bonds (ten years)	0.14281 - *1.841*	0.02223 - *2.261*	0.00626 - *1.516*	0.00024 - *3.394*	0.30578 - *1.719*	0.11354 *1.744*
Term spread	0.03751 *2.373*	0.01330 *2.960*	0.00196 *2.338*	0.28155 *0.791*	0.00030 *0.782*	0.14381 - *1.527*
Quality spread	0.99634 - *0.003*	0.38297 *0.546*	0.12355 - *1.722*	0.08461 - *2.074*	0.00006 - *4.683*	0.10606 *1.264*
Bank loans	0.23114 *0.564*	0.79171 *0.236*	0.21728 *1.145*	0.53664 - *0.337*	0.07347 *1.434*	0.89041 - *0.606*

Table 1d

Prediction equation results

United States

1959-93	Ind. prod.	Sales	Durables	Empl.	Unempl.
M_1	0.02888 *2.830*	0.29984 *1.633*	0.02695 *3.465*	0.02989 *2.918*	0.20993 *- 1.367*
M_2	0.00019 *3.976*	0.00011 *4.306*	0.00021 *4.533*	0.00160 *3.818*	0.09170 *- 2.051*
Federal funds	0.11965 *- 0.526*	0.43202 *0.930*	0.12841 *0.084*	0.45252 *0.549*	0.21796 *1.678*
Treasury bill (three months)	0.07255 *- 1.835*	0.89832 *- 0.751*	0.56312 *- 1.397*	0.14452 *- 1.046*	0.34161 *1.738*
Government bonds (ten years)	0.03097 *- 2.768*	0.00385 *- 1.328*	0.11386 *- 1.911*	0.25169 *- 2.064*	0.22524 *2.463*
Term spread	0.00079 *- 4.368*	0.00169 *- 2.003*	0.03111 *- 2.680*	0.01183 *- 3.337*	0.00041 *3.457*
Quality spread	0.00000 *- 4.682*	0.33199 *- 1.811*	0.00016 *- 3.785*	0.00001 *- 3.375*	0.00216 *2.746*
Bank loans	0.55010 *1.453*	0.15668 *0.654*	0.50991 *1.218*	0.16375 *2.210*	0.04870 *- 1.032*

1973-93	Ind. prod.	Sales	Durables	Empl.	Unempl.
M_1	0.07210 *2.377*	0.25585 *0.608*	0.21602 *1.911*	0.12129 *1.274*	0.31480 *- 0.836*
M_2	0.08405 *2.844*	0.00321 *2.693*	0.42621 *1.621*	0.04759 *1.929*	0.22820 *- 1.726*
Federal funds	0.01091 *- 0.465*	0.73871 *0.583*	0.19213 *- 0.868*	0.12810 *- 0.299*	0.06740 *2.009*
Treasury bill (three months)	0.10560 *- 1.279*	0.89213 *- 0.783*	0.46071 *- 1.754*	0.11726 *- 1.316*	0.18773 *1.966*
Government bonds (ten years)	0.06558 *- 2.093*	0.00781 *- 1.528*	0.12308 *- 2.310*	0.30975 *- 2.243*	0.27376 *2.514*
Term spread	0.00240 *- 3.736*	0.00010 *- 2.782*	0.02749 *- 3.150*	0.00217 *- 3.348*	0.00318 *3.182*
Quality spread	0.00058 *- 3.172*	0.75015 *- 1.381*	0.03041 *- 2.772*	0.00660 *- 1.835*	0.00110 *1.473*
Bank loans	0.22318 *- 0.467*	0.22945 *- 0.503*	0.30276 *- 0.260*	0.00140 *0.213*	0.60474 *0.319*

Table 2a

Prediction equation results conditional on policy proxy

Germany

1957-90	Ind. prod.	Sales	Orders	Empl.	Unempl.
M_1	0.77554 *- 0.753*	0.52913 *2.063*	0.09625 *- 0.952*	0.77869 *0.091*	0.70237 *- 1.120*
M_2	0.25409 *1.320*	0.36672 *0.221*	0.67930 *1.054*	0.50517 *1.659*	0.40793 *- 1.140*
Day-to-day	n.a.	n.a.	n.a.	n.a.	n.a.
Fibor	0.48719 *- 0.643*	0.00567 *- 0.538*	0.14860 *1.250*	0.06569 *0.720*	0.66389 *0.998*
Government bonds	0.09782 *- 1.043*	0.54400 *- 0.326*	0.13687 *- 0.293*	0.30131 *- 1.035*	0.05777 *0.952*
Term spread	0.42492 *1.349*	0.21051 *1.887*	0.83575 *0.093*	0.18987 *1.687*	0.96749 *- 0.812*
Quality spread	0.64863 *0.118*	0.00241 *- 0.398*	0.28335 *0.972*	0.19977 *0.134*	0.99819 *- 0.142*
Bank loans	0.04418 *0.298*	0.02594 *2.351*	0.16387 *- 0.236*	0.27509 *1.226*	0.82143 *- 0.577*

1974-90	Ind. prod.	Sales	Orders	Empl.	Unempl.
M_1	0.05798 *- 0.775*	0.05763 *0.588*	0.32427 *- 0.071*	0.66355 *- 0.043*	0.79299 *- 0.265*
M_2	0.85801 *0.960*	0.01861 *0.232*	0.45565 *0.812*	0.06952 *2.188*	0.61642 *0.365*
Day-to-day	n.a.	n.a.	n.a.	n.a.	n.a.
Fibor	0.25003 *1.951*	0.17391 *0.378*	0.00245 *0.766*	0.06450 *1.321*	0.01297 *- 1.647*
Government bonds	0.00024 *0.782*	0.86529 *0.643*	0.26840 *- 0.110*	0.32187 *1.044*	0.06770 *- 1.225*
Term spread	0.32447 *0.085*	0.44281 *0.858*	0.24263 *0.293*	0.31344 *- 0.501*	0.87479 *- 0.192*
Quality spread	0.17547 *- 0.336*	0.72078 *- 1.076*	0.02424 *0.381*	0.16753 *- 0.407*	0.62585 *0.598*
Bank loans	0.15811 *1.265*	0.26737 *1.186*	0.04423 *0.878*	0.47205 *1.968*	0.67868 *- 0.404*

Table 2b

Prediction equation results conditional on policy proxy

Japan

1961-90	Ind. prod.	Sales	Stocks	Empl.	Unempl.
M_1	0.00000 *1.677*	0.81677 *- 1.319*	0.01002 *- 1.592*	0.18276 *- 0.394*	0.38833 *- 0.962*
M_2+CD	0.00000 *3.349*	0.88222 *0.593*	0.00405 *- 3.059*	0.44380 *0.756*	0.12415 *- 1.168*
Call rate	n.a.	n.a.	n.a.	n.a.	n.a.
Government paper (two months)	0.39642 *2.108*	0.01596 *0.213*	0.16949 *- 0.182*	0.15674 *0.081*	0.03698 *- 0.497*
Commercial bills	0.18129 *- 0.544*	0.09559 *1.681*	0.00000 *- 1.793*	0.00009 *- 1.376*	0.00153 *0.688*
Term spread	0.74116 *1.590*	0.34609 *- 0.053*	0.02493 *- 2.220*	0.24649 *- 0.026*	0.10825 *1.658*
Quality spread (long)	0.00207 *- 3.135*	0.01381 *- 1.049*	0.00919 *2.762*	0.00000 *- 2.137*	0.03488 *1.897*
Bank loans	0.41354 *2.040*	0.00067 *- 0.603*	0.77015 *- 0.871*	0.83052 *0.510*	0.52976 *- 0.522*

1980-93	Ind. prod.	Sales	Stocks	Empl.	Unempl.
M_1	0.00132 *1.231*	0.72017 *- 1.400*	0.04867 *- 0.244*	0.05596 *1.289*	0.09777 *- 1.012*
M_2+CD	0.00001 *4.348*	0.10613 *2.469*	0.68282 *- 0.410*	0.01561 *2.197*	0.00008 *- 2.595*
Call rate	n.a.	n.a.	n.a.	n.a.	n.a.
Government paper (two months)	0.31045 *- 0.375*	0.01425 *- 0.713*	0.91869 *0.169*	0.66370 *- 0.582*	0.01212 *- 1.583*
Commercial bills	0.45003 *0.148*	0.21979 *- 0.736*	0.14851 *0.243*	0.20492 *0.846*	0.00319 *- 1.285*
Term spread	0.14400 *2.414*	0.01642 *1.870*	0.98722 *- 0.530*	0.79527 *0.300*	0.70860 *1.129*
Quality spread (long)	0.05752 *- 1.441*	0.13817 *- 0.859*	0.12949 *- 0.281*	0.80829 *- 0.460*	0.04217 *2.210*
Bank loans	0.03637 *3.092*	0.00062 *2.418*	0.65447 *0.960*	0.57399 *1.935*	0.67474 *- 1.469*

Table 2c

Prediction equation results conditional on policy proxy

United Kingdom

1963-93	GDP	Cons.	Invest.	Sales	Stocks	Unempl.
M_2	0.37383 *1.507*	0.14510 *2.121*	0.98751 *0.245*	0.00367 *3.422*	0.02055 *2.874*	0.00000 *- 2.345*
M_4	0.09309 *2.104*	0.01638 *2.149*	0.26891 *0.764*	0.04573 *- 0.428*	0.04354 *2.059*	0.15608 *- 2.136*
Minimum lending rate	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Treasury bill ..... (three months)	0.20995 *1.373*	0.37306 *0.679*	0.04823 *2.442*	0.70266 *- 1.164*	0.71673 *0.398*	0.06896 *0.409*
Government bonds ..... (ten years)	0.33941 *1.505*	0.59262 *1.001*	0.28986 *0.944*	0.00086 *3.457*	0.63728 *1.207*	0.11496 *0.168*
Term spread	0.30755 *0.977*	0.43382 *0.767*	0.08307 *0.526*	0.00030 *3.999*	0.73865 *0.801*	0.90793 *- 0.377*
Quality spread	0.25460 *- 1.521*	0.30215 *0.816*	0.58629 *- 1.146*	0.04685 *0.520*	0.74508 *- 0.859*	0.05932 *- 1.119*
Bank loans	0.11401 *2.390*	0.00024 *3.024*	0.22841 *2.004*	0.01242 *1.651*	0.08371 *2.321*	0.06135 *- 2.607*

1979-93	GDP	Cons.	Invest.	Sales	Stocks	Unempl.
M_2	0.34874 *1.642*	0.48449 *1.375*	0.38878 *0.417*	0.29885 *1.433*	0.00001 *1.660*	0.00275 *- 0.778*
M_4	0.00225 *3.403*	.00717 *1.994*	0.00297 *1.783*	0.84421 *- 0.034*	0.00381 *2.968*	0.00036 *- 3.131*
Minimum lending rate	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Treasury bill ..... (three months)	0.41845 *1.540*	0.32521 *1.031*	0.00000 *5.205*	0.34995 *1.156*	0.02784 *2.963*	0.12186 *- 1.260*
Government bonds ..... (ten years)	0.23980 *- 0.720*	0.14169 *- 0.899*	0.05773 *0.370*	0.07400 *- 2.594*	0.27862 *- 1.020*	0.66733 *0.788*
Term spread	0.11500 *- 1.215*	0.33972 *- 1.399*	0.03327 *- 0.691*	0.00595 *- 2.961*	0.04589 *- 1.708*	0.54523 *1.376*
Quality spread	0.96987 *0.323*	0.47421 *- 0.899*	0.00944 *- 3.006*	0.44215 *- 0.780*	0.00114 *- 3.823*	0.10327 *0.745*
Bank loans	0.00387 *3.157*	0.32893 *1.705*	0.00024 *3.155*	0.82513 *- 0.312*	0.00013 *2.794*	0.01434 *- 3.166*

Table 2d

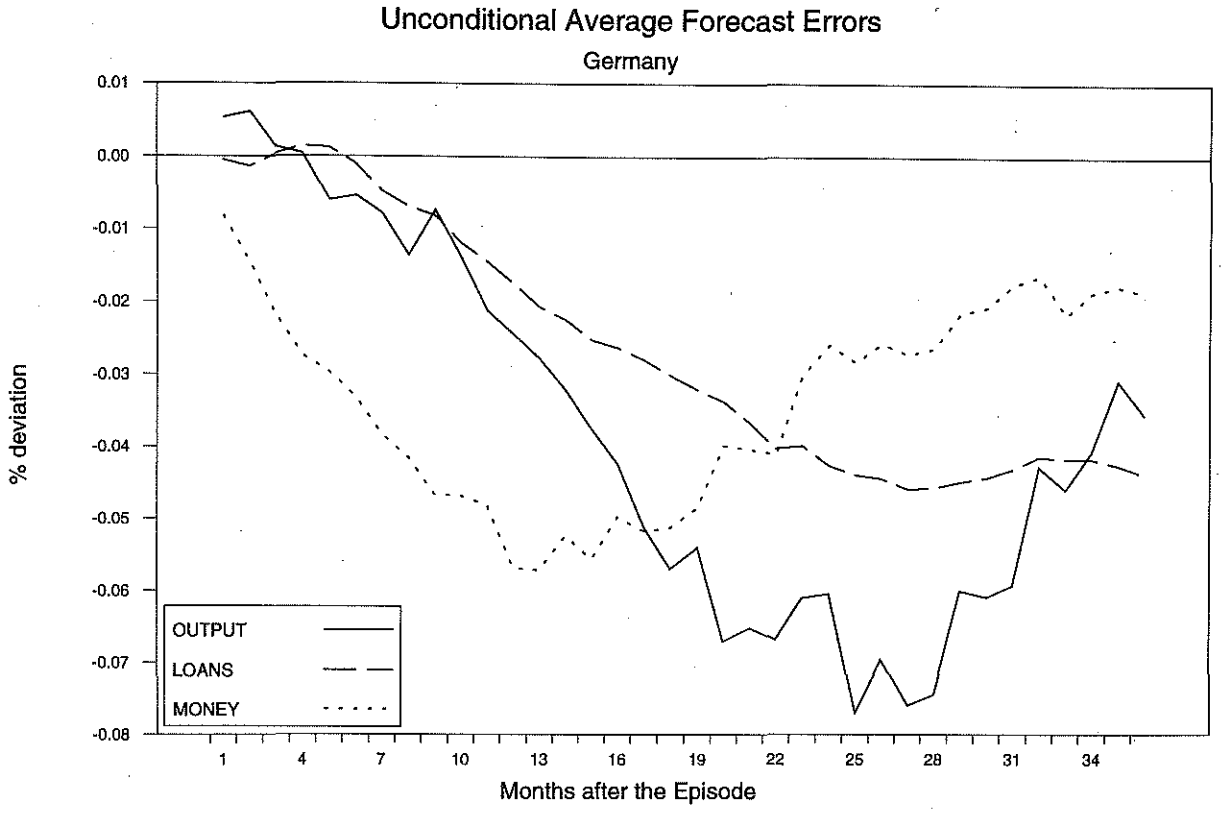
Prediction equation results conditional on policy proxy

United States

1959-93	Ind. prod.	Sales	Durables	Empl.	Unempl.
M_1	0.03982 *2.855*	0.33480 *1.464*	0.05465 *3.269*	0.04320 *2.804*	0.13352 *- 1.089*
M_2	0.00000 *5.263*	0.00047 *3.977*	0.00001 *4.885*	0.00037 *4.202*	0.03081 *- 2.315*
Federal funds	n.a.	n.a.	n.a.	n.a.	n.a.
Treasury bill ..... (three months)	0.01832 *- 3.441*	0.06026 *- 3.057*	0.02733 *0.004*	0.00881 *- 3.367*	0.51937 *0.357*
Government bonds ..... (ten years)	0.00026 *- 4.361*	0.00008 *- 3.199*	0.00168 *- 3.222*	0.00587 *- 3.913*	0.35590 *1.716*
Term spread	0.00030 *- 4.701*	0.00024 *- 2.850*	0.00168 *- 3.222*	0.00904 *- 3.651*	0.00321 *3.103*
Quality spread	0.00000 *- 4.565*	0.31315 *- 1.938*	0.00142 *- 3.789*	0.00002 *- 3.362*	0.00909 *2.382*
Bank loans	0.61643 *1.394*	0.19139 *0.659*	0.45086 *1.323*	0.34173 *1.927*	0.02836 *- 1.462*

1973-93	Ind. prod.	Sales	Durables	Empl.	Unempl.
M_1	0.28362 *1.933*	0.32415 *0.589*	0.37118 *1.748*	0.36335 *0.999*	0.17646 *0.033*
M_2	0.00190 *4.293*	0.00226 *2.545*	0.05240 *2.322*	0.00417 *2.892*	0.10247 *- 2.086*
Federal funds	n.a.	n.a.	n.a.	n.a.	n.a.
Treasury bill ..... (three months)	0.07822 *- 1.998*	0.17212 *- 2.479*	0.37924 *- 1.825*	0.08110 *- 2.397*	0.30088 *0.120*
Government bonds ..... (ten years)	0.00836 *- 2.803*	0.00056 *- 2.887*	0.09273 *- 2.456*	0.11930 *- 2.860*	0.72423 *1.208*
Term spread	0.00630 *- 3.828*	0.00002 *- 3.361*	0.02265 *- 3.035*	0.02270 *- 3.177*	0.05565 *2.562*
Quality spread	0.00161 *- 3.163*	0.61720 *- 1.481*	0.04465 *- 3.028*	0.01287 *- 1.954*	0.00316 *1.176*
Bank loans	0.24860 *- 0.607*	0.30730 *- 0.418*	0.29043 *- 0.055*	0.00513 *0.111*	0.55944 *- 0.414*

Figure 1a


Unconditional Average Forecast Errors
Germany
% deviation
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
1
4
7
10
13
16
19
22
25
28
31
34
Months after the Episode
OUTPUT
LOANS
MONEY

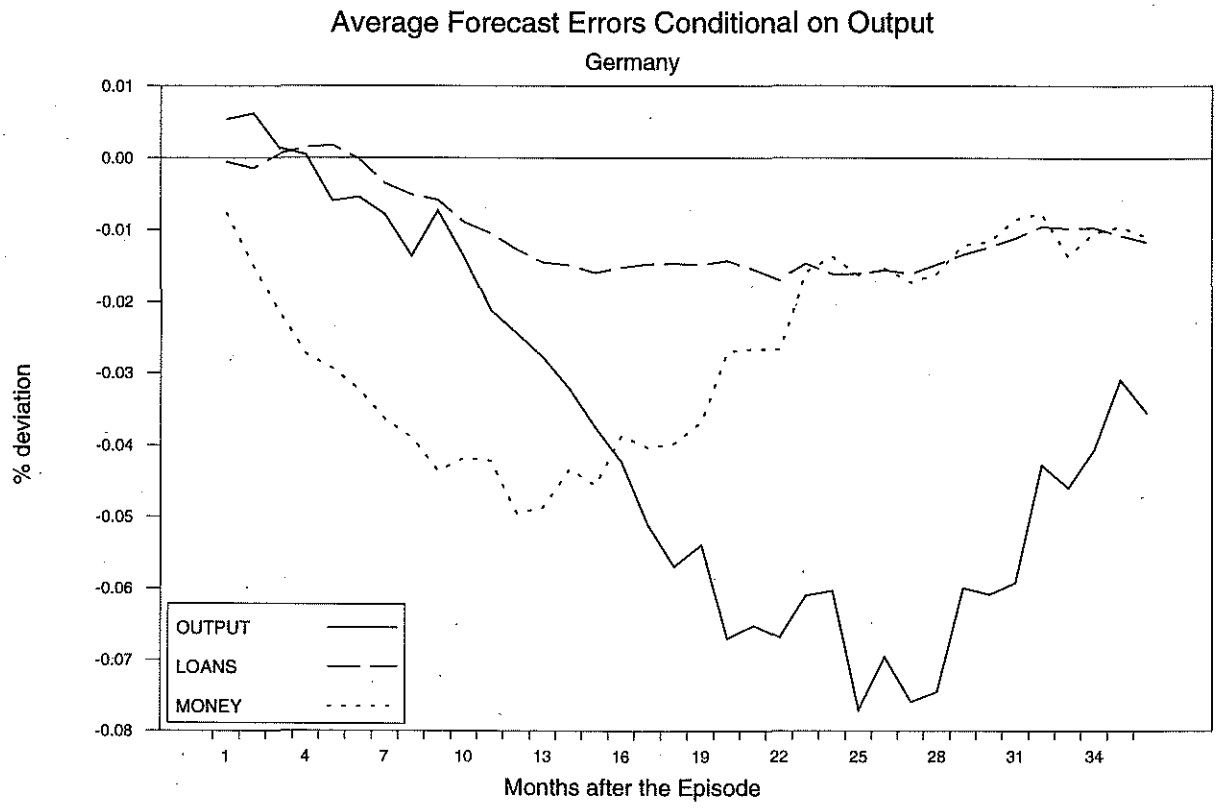
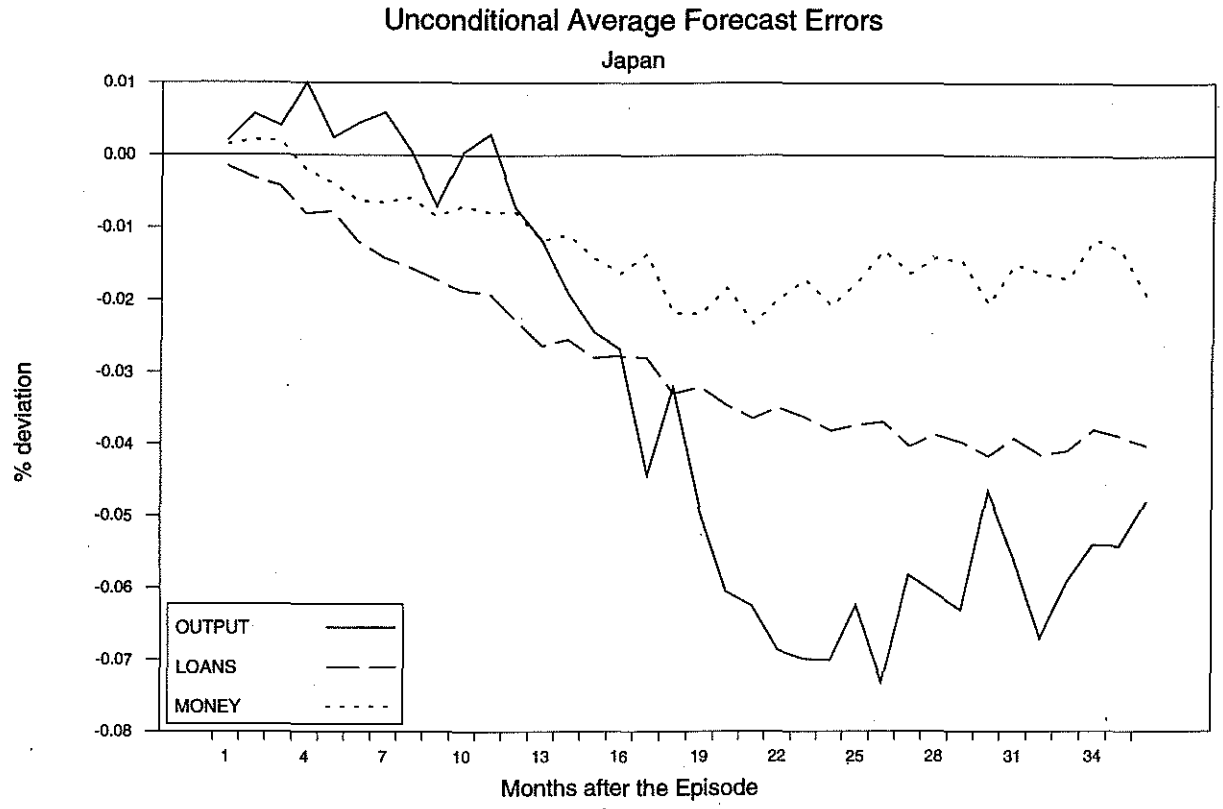

Average Forecast Errors Conditional on Output
Germany
% deviation
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
1
4
7
10
13
16
19
22
25
28
31
34
Months after the Episode
OUTPUT
LOANS
MONEY

Figure 1b


Unconditional Average Forecast Errors
Japan
% deviation
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
OUTPUT
LOANS
MONEY
1
4
7
10
13
16
19
22
25
28
31
34
Months after the Episode

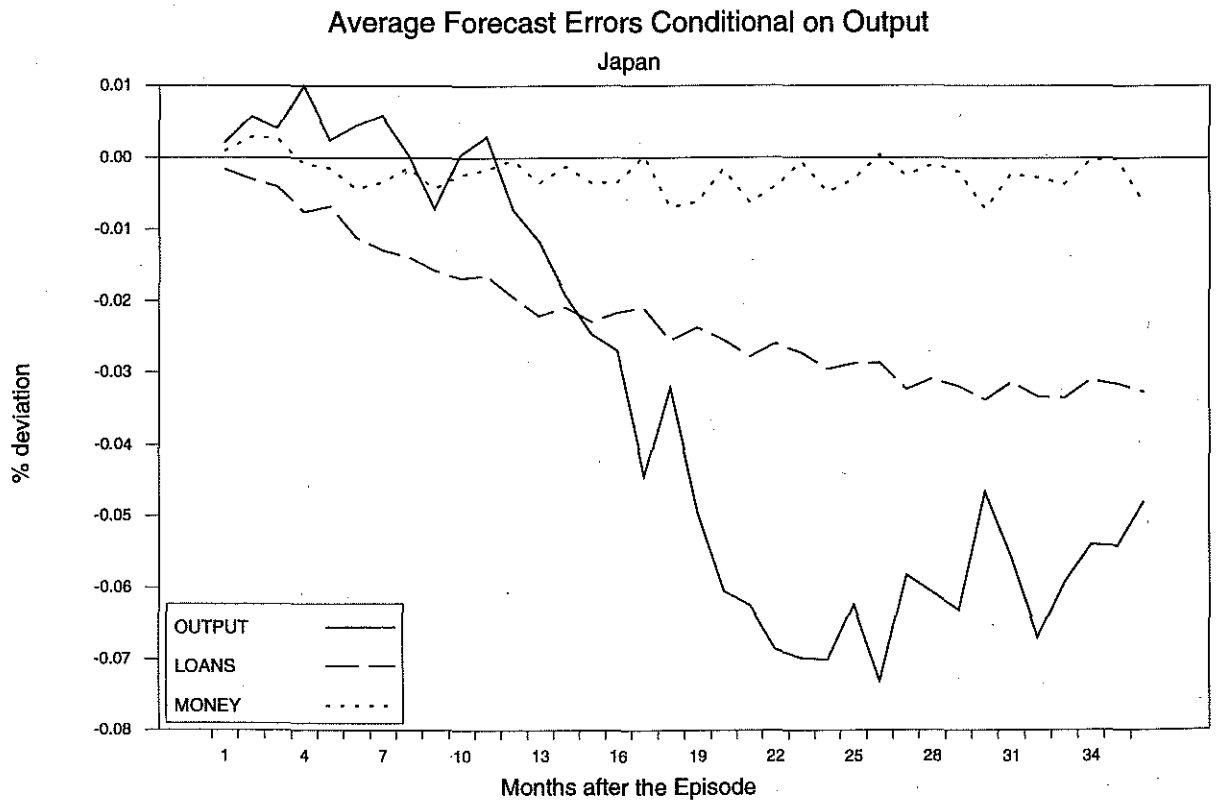
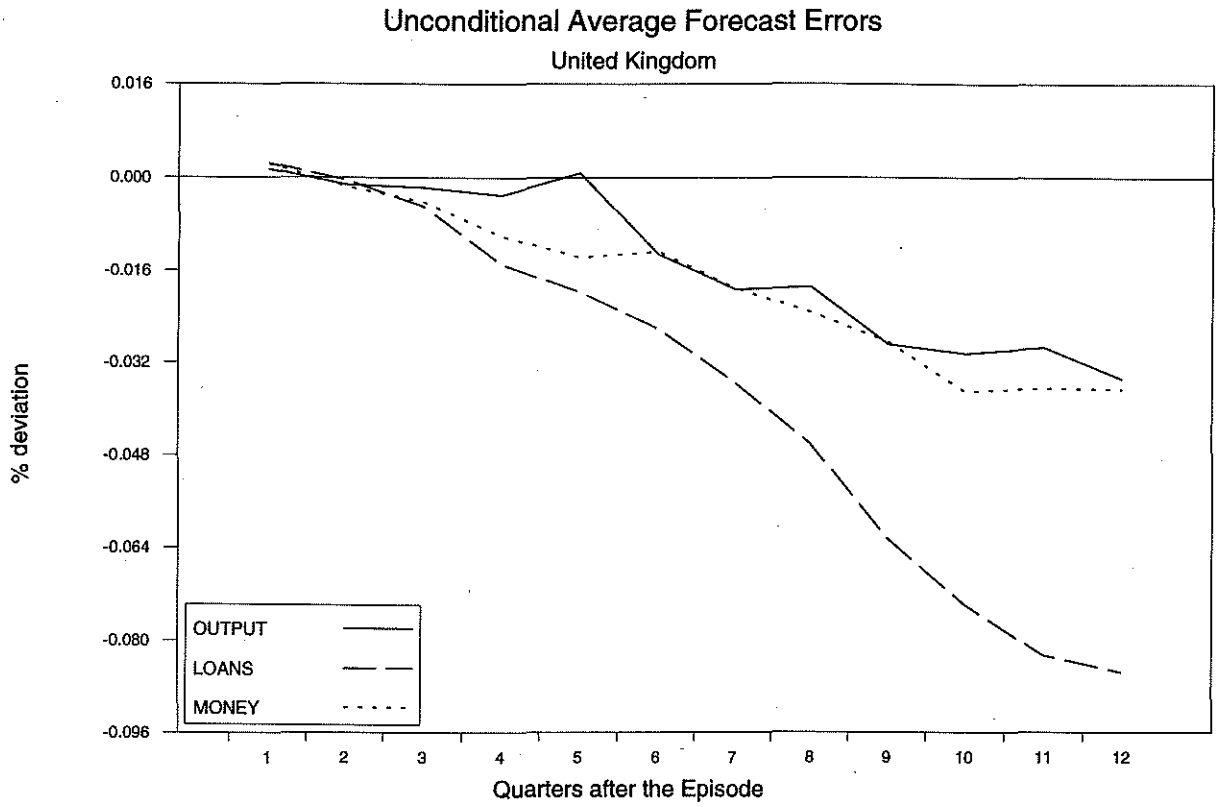

Average Forecast Errors Conditional on Output
Japan
% deviation
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
OUTPUT
LOANS
MONEY
1
4
7
10
13
16
19
22
25
28
31
34
Months after the Episode

Figure 1c


Unconditional Average Forecast Errors
United Kingdom
0.016
0.000
-0.016
-0.032
-0.048
-0.064
-0.080
-0.096
% deviation
OUTPUT
LOANS
MONEY
1
2
3
4
5
6
7
8
9
10
11
12
Quarters after the Episode

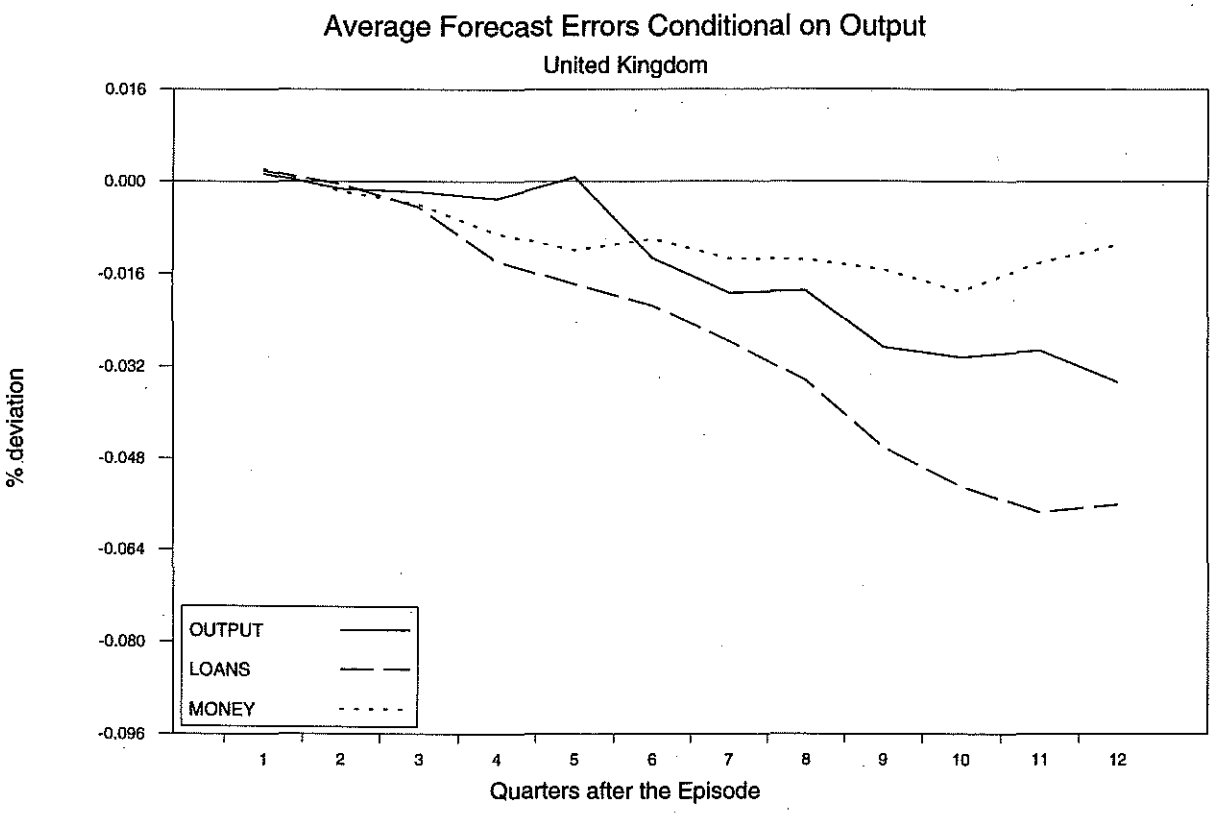
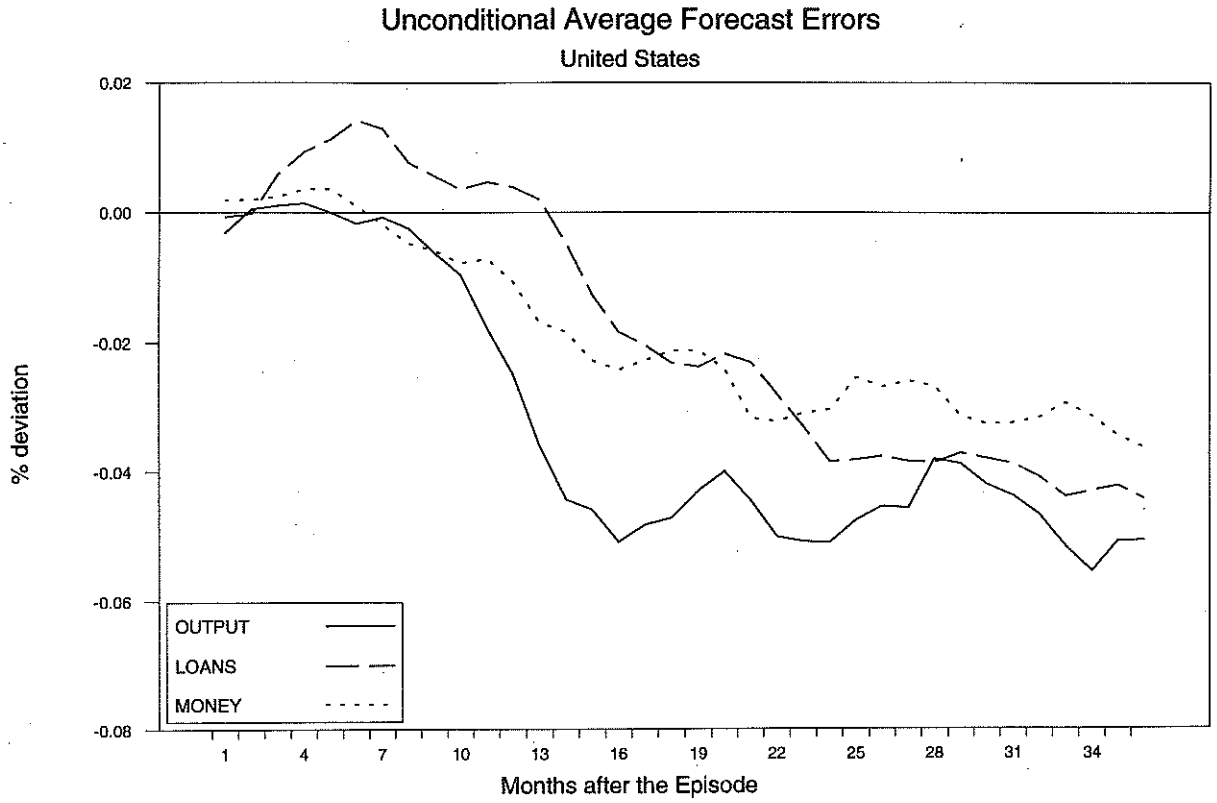
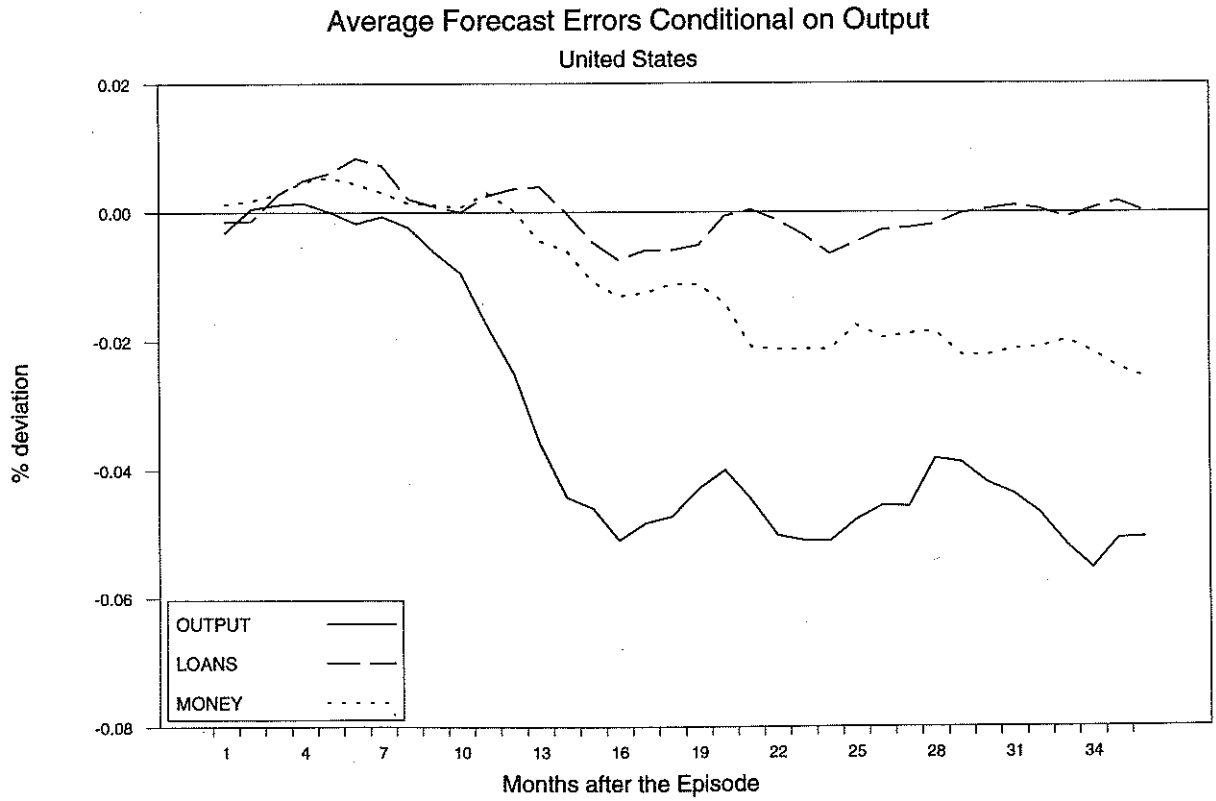

Average Forecast Errors Conditional on Output
United Kingdom
0.016
0.000
-0.016
-0.032
-0.048
-0.064
-0.080
-0.096
% deviation
OUTPUT
LOANS
MONEY
1
2
3
4
5
6
7
8
9
10
11
12
Quarters after the Episode

Figure 1d


Unconditional Average Forecast Errors
United States
% deviation
0.02
0.00
-0.02
-0.04
-0.06
-0.08
OUTPUT
LOANS
MONEY
1
4
7
10
13
16
19
22
25
28
31
34
Months after the Episode


Average Forecast Errors Conditional on Output
United States
% deviation
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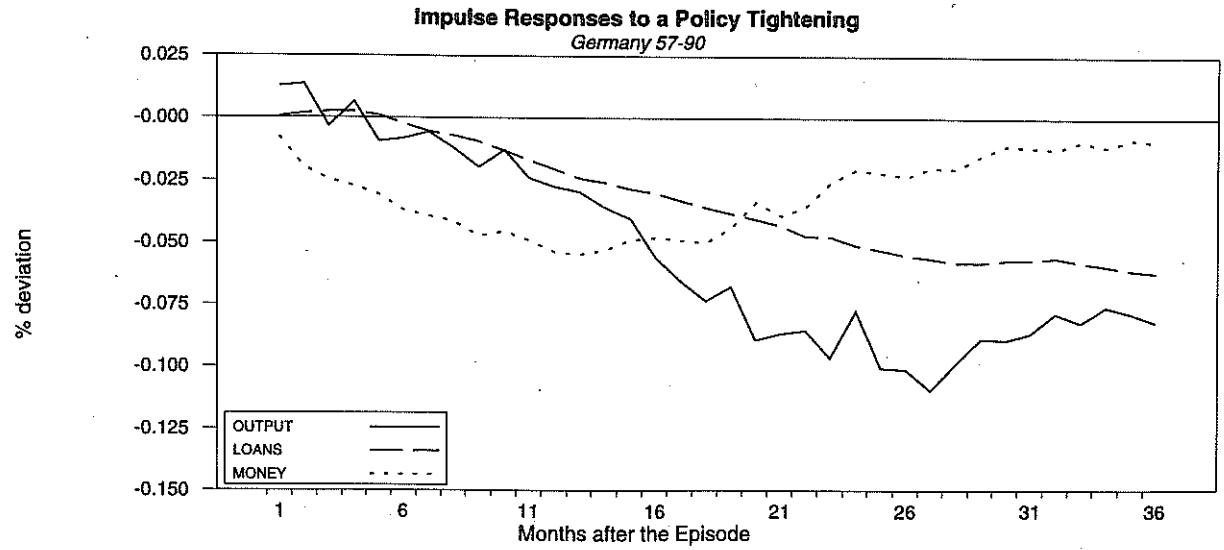
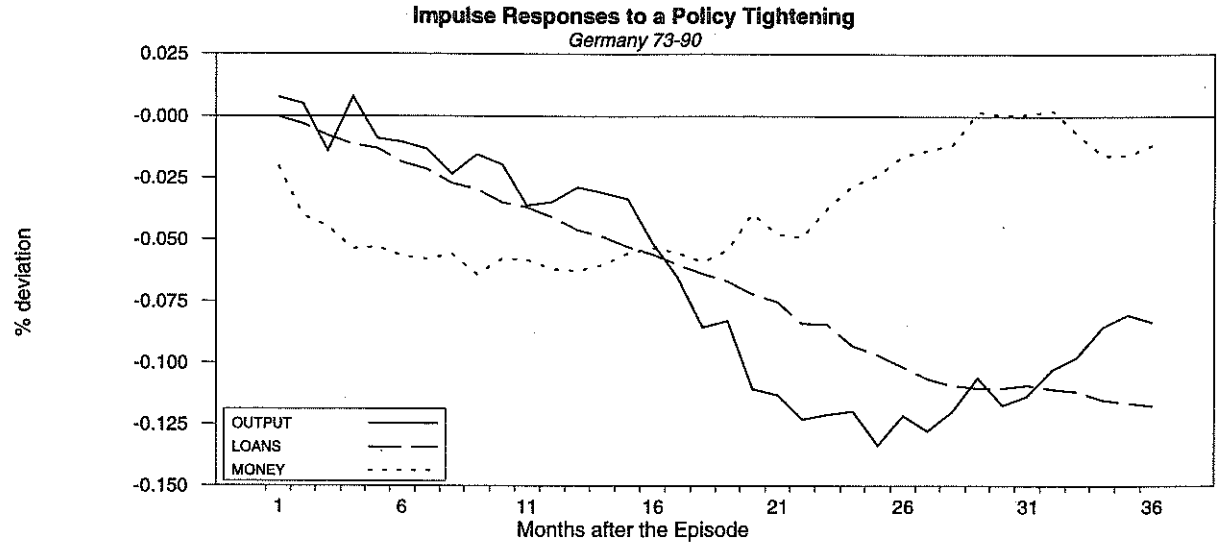
0.00
-0.02
-0.04
-0.06
-0.08
OUTPUT
LOANS
MONEY
1
4
7
10
13
16
19
22
25
28
31
34
Months after the Episode

Figure 2a


Impulse Responses to a Policy Tightening
Germany 57-90
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode


Impulse Responses to a Policy Tightening
Germany 73-90
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode

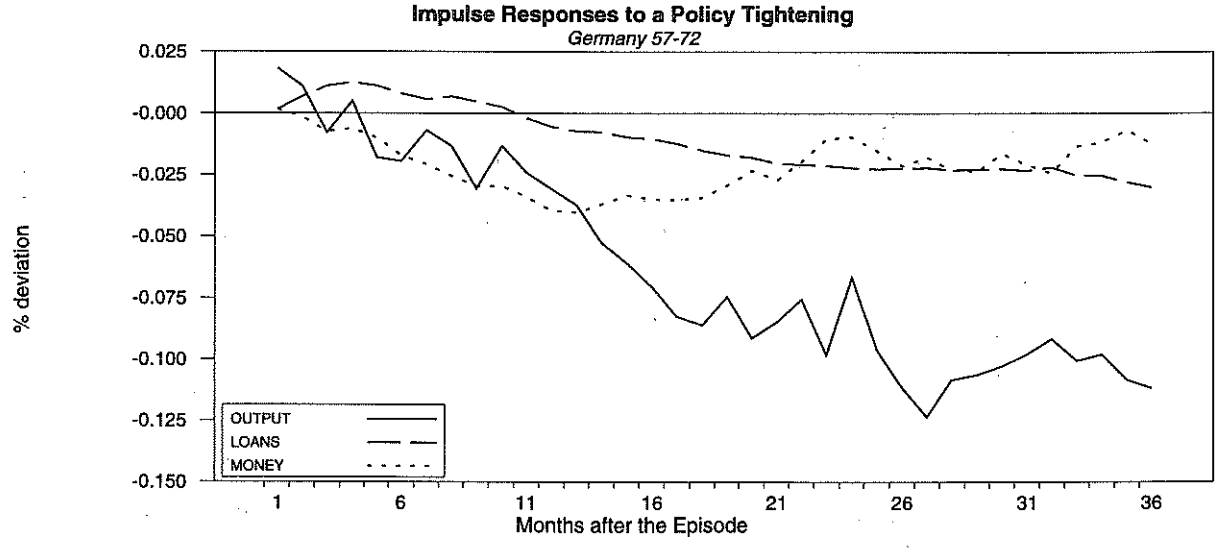
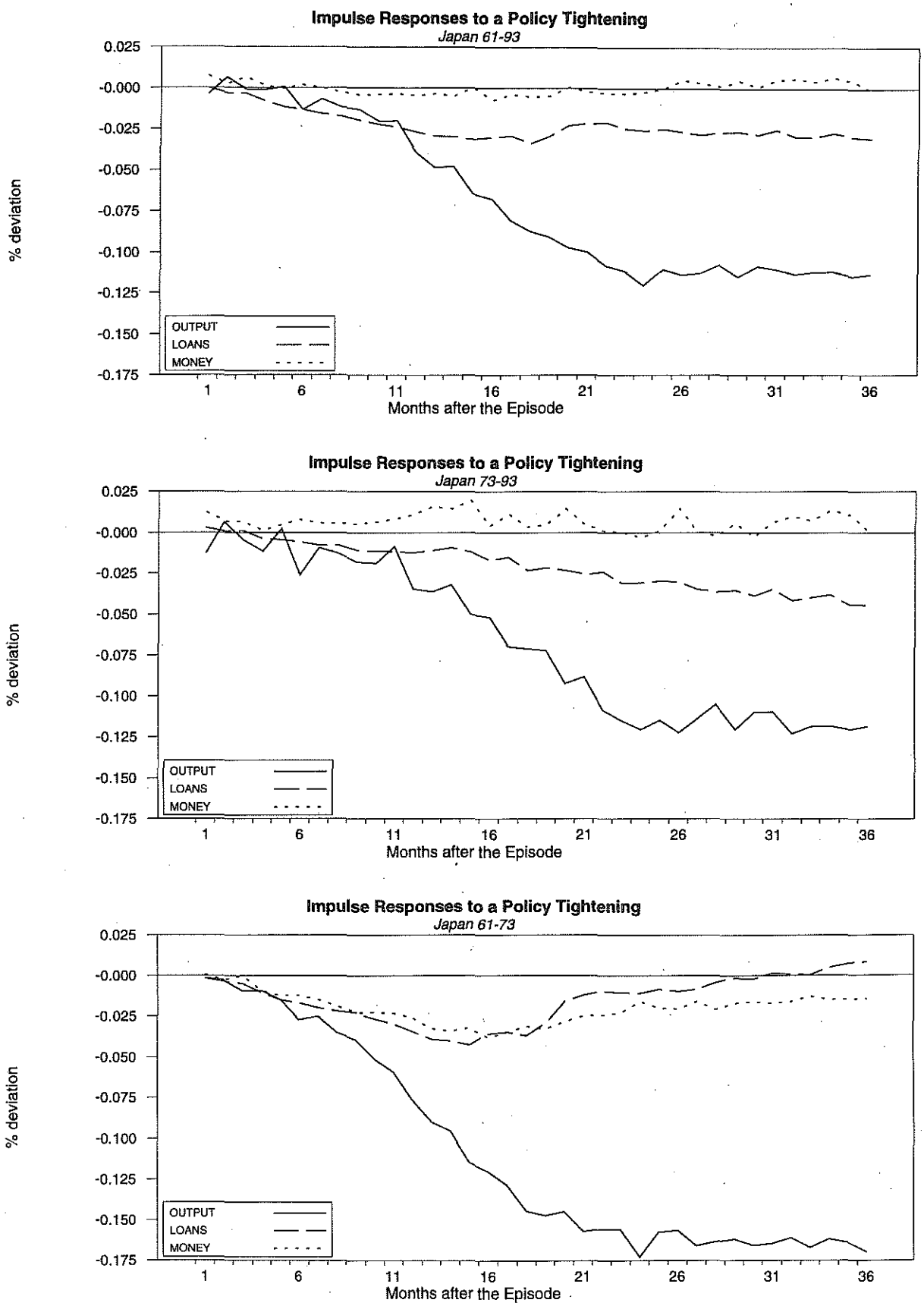

Impulse Responses to a Policy Tightening
Germany 57-72
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode

Figure 2b


Impulse Responses to a Policy Tightening
Japan 61-93
% deviation
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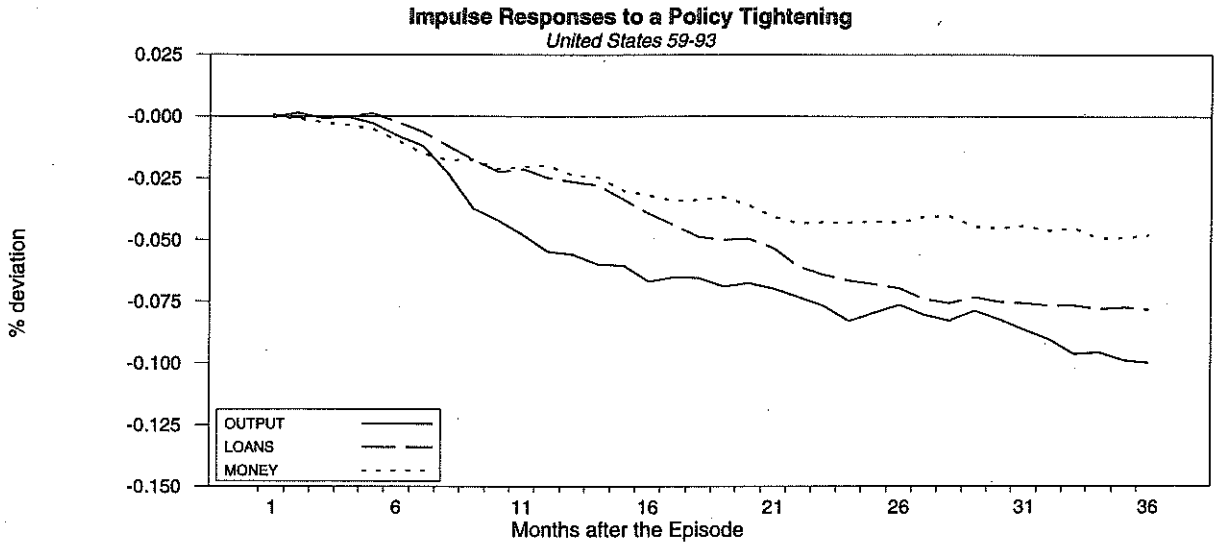
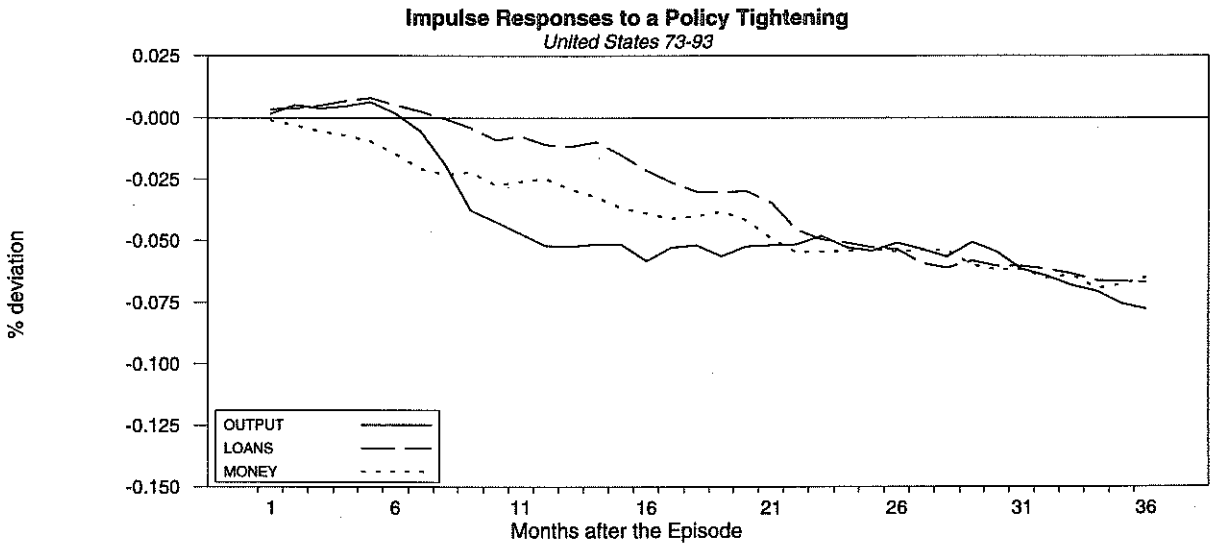
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
-0.175
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode
Impulse Responses to a Policy Tightening
Japan 73-93
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
-0.175
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode
Impulse Responses to a Policy Tightening
Japan 61-73
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
-0.175
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode

Figure 2c


Impulse Responses to a Policy Tightening
United States 59-93
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode


Impulse Responses to a Policy Tightening
United States 73-93
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
OUTPUT
LOANS
MONEY
1
6
11
16
21
26
31
36
Months after the Episode

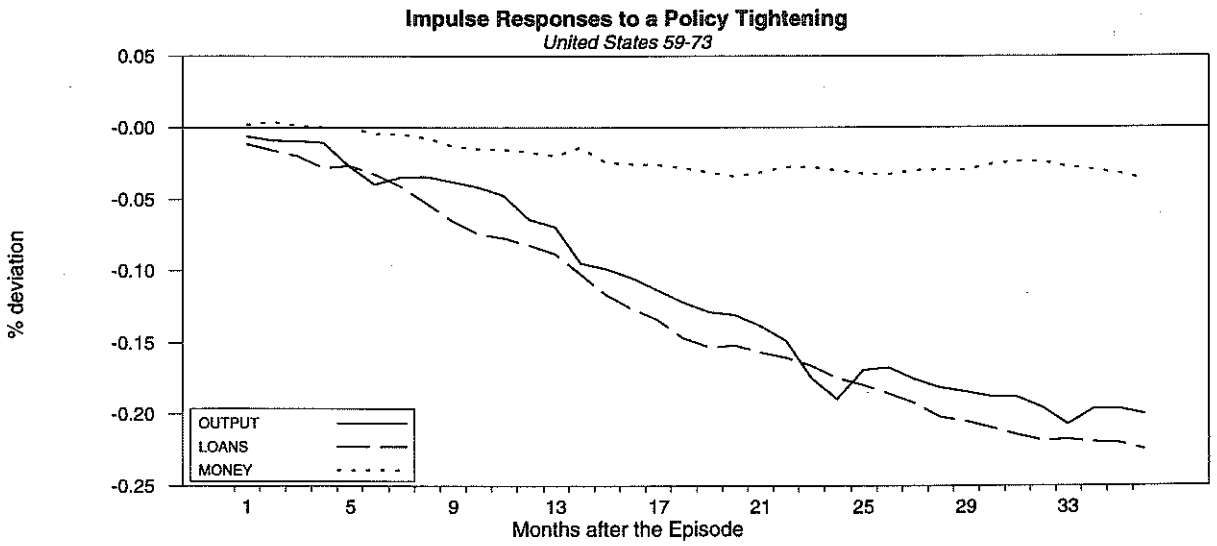
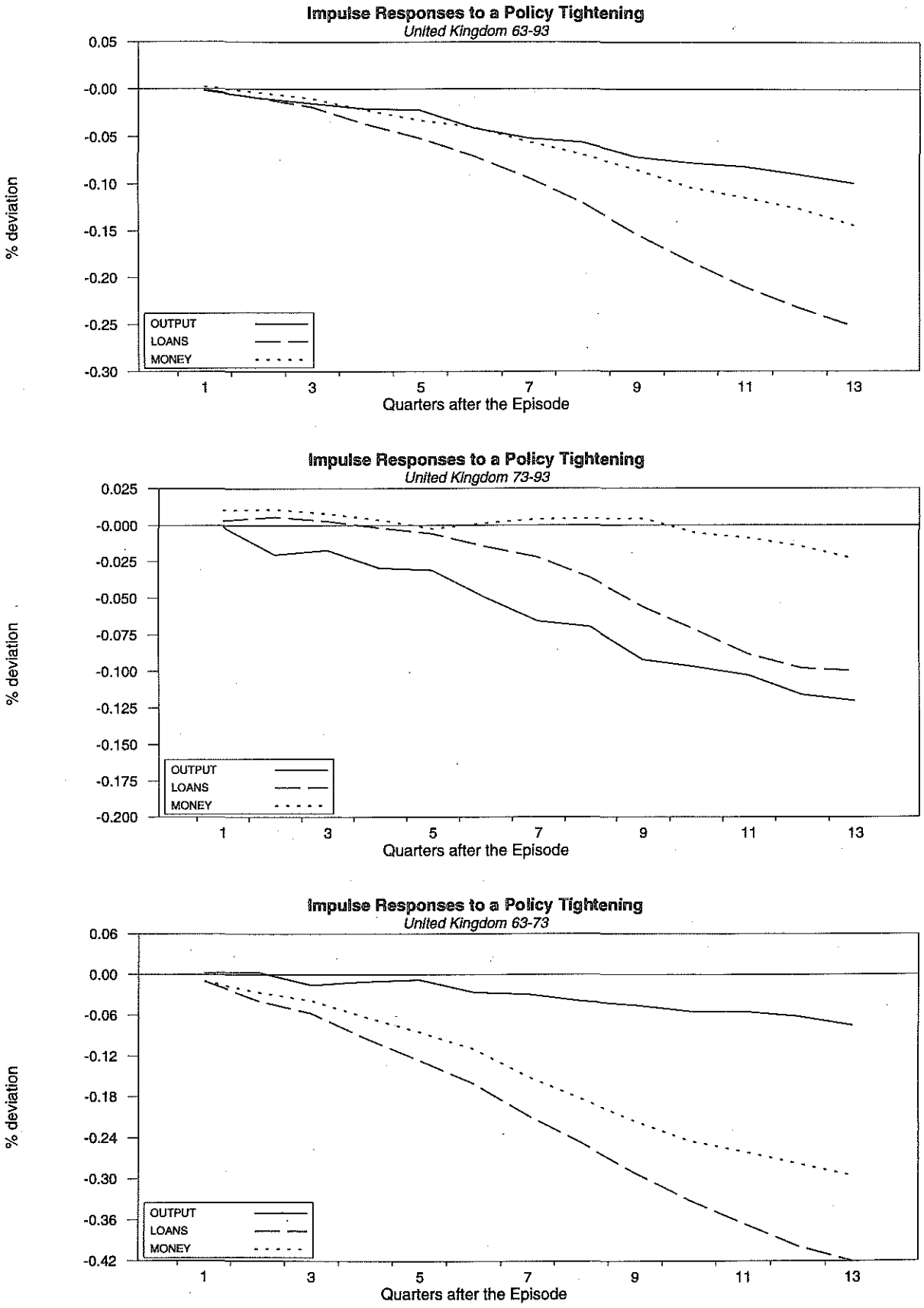

Impulse Responses to a Policy Tightening
United States 59-73
% deviation
0.05
-0.00
-0.05
-0.10
-0.15
-0.20
-0.25
OUTPUT
LOANS
MONEY
1
5
9
13
17
21
25
29
33
Months after the Episode

Figure 2d


Impulse Responses to a Policy Tightening
United Kingdom 63-93
% deviation
0.05
-0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
OUTPUT
LOANS
MONEY
1
3
5
7
9
11
13
Quarters after the Episode
Impulse Responses to a Policy Tightening
United Kingdom 73-93
% deviation
0.025
-0.000
-0.025
-0.050
-0.075
-0.100
-0.125
-0.150
-0.175
-0.200
OUTPUT
LOANS
MONEY
1
3
5
7
9
11
13
Quarters after the Episode
Impulse Responses to a Policy Tightening
United Kingdom 63-73
% deviation
0.06
0.00
-0.06
-0.12
-0.18
-0.24
-0.30
-0.36
-0.42
OUTPUT
LOANS
MONEY
1
3
5
7
9
11
13
Quarters after the Episode

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