Monetary policy, aggregate demand, and the lending behaviour of bank groups in Switzerland

Olivier Steudler and Mathias Zurlinden*

Introduction

According to the conventional interest-rate transmission mechanism presented in most textbooks, monetary policy operates through changes in the interest rate and the credit creation process can be ignored. In contrast, the bank lending view argues that monetary policy by changing the volume of reserves influences banks' ability to lend and through this the real spending of bank borrowers. The two channels are not exclusive. Most economists and observers of monetary policy accept the existence of the interest-rate channel, and disagreement is usually confined to the question whether the bank lending channel really matters. The answer has consequences for monetary policy. If the bank lending channel works central bank actions may influence aggregate demand even in the absence of a change in the interest rate.

The empirical literature on the bank lending channel generally has focused on the correlations between monetary policy variables, aggregate demand, and bank loans. The evidence is not conclusive however. In particular, there is the problem of disentangling loan supply effects from loan demand effects. Dissatisfaction with this situation has prompted some economists to experiment with disaggregated data. This paper follows Kashyap and Stein (1995), who looked at the differential effects of monetary policy on the investment policies of small versus large banks with US data. Kashyap and Stein argued that large banks have better access to non-deposit forms of external finance. As a consequence, large banks will reduce their loans slower than small banks and are more inclined to use their securities holdings as a buffer during a monetary contraction. In this paper, we test this prediction for Switzerland.

The strategy is to estimate small unrestricted VARs and to examine the impulse response functions. In particular, we investigate the responses of cross-sectional differences in bank lending behaviour to innovations in interest rates and in bank deposits. The three groups of Swiss banks considered are *Big banks*, *cantonal banks*, and *regional banks*. These groups are used as proxies for banks of different size. The balance sheet data are quarterly and refer to claims and liabilities on residents in Swiss francs. The estimation period is 1977:2-1996:3.

By confining ourselves to the traditional classification of the Swiss banking sector, we may omit potential information. In return, we obtain a longer time series, which covers more than one business cycle. Complete balance sheet data for individual banks are available for the period since February 1987 only, while aggregated series for the three bank groups start in the 1970s. We use the original aggregated series of this traditional classification for the period 1975-87 and reconstruct the time series from scratch for the 1987-96 period. This procedure is sensible because many banks have merged or have been taken over by other banks during this second period.

* Swiss National Bank, Economic Studies Section. The authors wish to thank Andreas M. Fischer, Koichiro Kamada, Barbara Lüscher and Georg Rich for their comments.

1. Background

In recent years, there has been considerable interest in the credit view of the transmission mechanism. Useful discussions of the theoretical and empirical literature are provided by Cecchetti (1995), Hubbard (1995), and Kashyap and Stein (1995). Somewhat simplified, we can distinguish between two variants: the balance-sheet channel and the bank lending channel. It is only in the bank lending channel that banks and bank credit play a special role. Yet the literature on the balance-sheet channel has influenced the way the bank lending channel is examined in this paper and is therefore discussed first.

The balance-sheet channel asserts that information problems between the borrower and the lender drive a wedge between the price of uncollateralised external funds and the price of internal funds. This premium is inversely related to the net-worth of the borrower. A contraction of monetary policy, reflected in a rise in short-term interest rates, increases the debt burden of the borrower and reduces the value of his collateral. The premium that must be paid for external finance rises and borrowers will curtail their real spending. Thus, monetary policy, by affecting the balance sheet of the borrower, can influence aggregate demand.

The second variant of the credit view stresses that monetary policy can have an impact on the supply for bank loans. Bernanke and Blinder's (1988) popular model of the bank lending channel is an IS-LM model with three assets, i.e., money, bonds and loans. The resulting picture of the transmission mechanism is as follows. A contraction of monetary policy by reducing reserves forces the banks to decrease their deposits. Lower deposits, in turn, trigger an adjustment of the asset side. Since bonds and loans are imperfect substitutes, the banks will attempt to reduce both forms of assets. Firms and households face a smaller supply of loans and have to reduce their investment projects.[1]

Notice that imperfect substitutability must hold for banks as well as for firms and households. This implies that at least some firms or households must depend on bank loans as a source of external finance. They cannot get hold of funds from other sources without additional costs. Equally, banks cannot compensate their loss of deposits by funds from other sources without additional costs. They cannot completely isolate their loan portfolio.[2]

In an empirical paper, Bernanke and Blinder (1992) examined the effects of US monetary policy on deposits, securities, and loans of the US banking sector. They estimate an unrestricted VAR and find that the deposits and securities fall immediately after a rise of the federal funds rate, while loans and output decline with a considerable lag. These results have been corroborated by McMillin (1996) for the United States, and Bacchetta and Ballabriga (1995) for a sample with 14 European countries.

Kashyap and Stein (1995) applied the same strategy on disaggregated US data. They construct bank groups by size and look at how deposits, securities and loans of these bank groups respond to monetary policy shocks. The basic assumptions are that the financing with non-deposit forms of external funds has rising marginal costs and that these costs are larger for small banks than for large banks.[3] Kashyap and Stein derive two predictions for a homogeneous competitive loan market. First, after a reduction of deposits loans of small banks decline more rapidly than those of large banks. Second, the securities of small banks decline less rapidly than those of large banks after a reduction of deposits. This implies that large banks are more willing than small banks to use their securities as a buffer when confronted with a monetary policy shock. Small banks value their

---

1 For extensions of the Bernanke-Blinder model, see Keeton (1992).

2 Romer and Romer (1995) have doubted the validity of the second assumption.

3 It could be argued for example that small banks face higher agency costs. See Myers and Majluf (1984), and Stein (1995).

securities higher because they face higher marginal costs of external funds. As a consequence, they are more willing than large banks to adjust their loans portfolio. The results presented by Kashyap and Stein (1995) are consistent with this story for loans; the results for securities are mixed.

The main motive for the disaggregation of the banking sector is to disentangle shifts in loan demand from shifts in loan supply. Gertler and Gilchrist (1994) pursued a similar strategy in a study on the response of small versus large manufacturing firms to US monetary policy. Kashyap and Stein's basic insight was that there is no fundamental difference between the bank's access to non-deposit forms of external finance and the firm's access to uncollateralised external funds. Disaggregation does not completely eliminate the identification problem, however. As Kashyap and Stein readily concede, it could still be argued that large banks lend to large customers whose loan demand is less cyclical. As a result, large banks should have smaller swings in loans than small banks because of heterogeneous demand. Kashyap and Stein (1997) tackle this issue in a subsequent paper by holding bank size fixed and by focusing on the differences in balance-sheet strength within a given size category. Their study is based on a panel data set that includes quarterly observations of every bank in the United States over the period 1976-93. Such a study is beyond the scope of this paper.

2. The bank balance sheets and the construction of the data

The construction of the data used in this study was a laborious task and is described here in some detail. The balance sheets of the various bank groups are then characterised, and the question of whether our sample is representative for the Swiss banking sector is briefly discussed. Information on the evolution of the resulting time series over time is given in the next section.

The data are based on the monthly balance sheets of banks in Switzerland and Liechtenstein with total assets of more than 150 millions Swiss francs (100 millions until 1993). These balance sheet data are available for each individual bank for the period since February 1987. For earlier periods monthly data exist for bank groups only (Big banks, cantonal banks, and regional banks). Useable aggregate figures for these traditional classification are available since July 1975 when the structure with subdivisions into "residents" and "non-residents" and "Swiss franc" and "foreign currencies" was adopted. The three bank groups were defined in the early 1970s, resulting at the time in 5 Big banks, 28 cantonal banks and 39 regional banks. Since 1975, the number of banks included in the sample has decreased, mainly because of mergers and take-overs between banks. Banks that were dropped from the sample were not replaced by newcomers. Two points are noteworthy. First, the concentration process led to a sharp decline in the number of regional banks, and an increasing dominance of the Big banks. Second, the share of the sample in the total has not changed much over time. The banks included in the sample were 72 in 1975, representing 77% of the Swiss banking sector (measured by total assets). At the end of 1996 the corresponding figures were 47 and 78%.[4]

With respect to mergers and takeovers, we make use of the observation that the number of banks included in the sample declined by one between July 1975 and February 1987, and by 24 between February 1987 and the end of 1996. Thus, the balance sheets of individual banks can be used to construct time series adjusted for the effects of mergers and takeovers for the period since February 1987. This is done because we are interested in the behaviour of banks over the business cycle. By taking out the jumps caused by the concentration process we tacitly assume that mergers and takeovers do not reflect the effects of monetary policy.

The construction of the time series is based on a procedure proposed by Kashyap and Stein (1995) and adapted for our purpose. For every two adjacent months, those banks among the 71

---

[4] A table with the banks included in the sample can be provided on request.

banks of our gross sample are identified, which are not involved in a merger or take-over in the second month, and for which complete data are available for both months. Then, the banks are assigned to the three groups, aggregated balance sheets are constructed for each group and both periods, and rates of change are calculated for each of the three groups and for all balance sheet items we are interested in. The same procedure is then repeated for the next pair of periods. The procedure is applied for all periods from February 1987 to November 1996.

Table 1 provides some basic information on the three bank groups' balance sheets. The date is February 1987; i.e., roughly the mid-point of the sample and the first date balance sheets for each bank are available. Several patterns emerge from Table 1. Big banks have relatively large claims and liabilities vis-à-vis non-residents. They also have relatively large assets and liabilities in foreign currencies. Both components are of little importance for cantonal banks and regional banks. For these two bank groups it does not make much difference whether the total balance sheet or the domestic Swiss franc component is focused on.

On the asset side Big banks hold a relatively large share as interbank time deposits and securities (mainly in foreign currencies), while the asset side of cantonal banks and regional banks is dominated by secured loans (mainly mortgages). If we focus on the Swiss franc claims on residents, the Big banks still hold a relatively small share of their assets as secured loans. On the other hand unsecured loans are more important for Big banks than for cantonal banks and regional banks. This is true for the overall total and for the Swiss franc claims on residents.

On the liability side the Big banks owe relatively large shares as sight deposits or time deposits (again mainly in foreign currencies). Cantonal banks and regional banks finance their business mainly through bonds and saving deposits. The large share of bonds may come as a surprise and contrasts with the data for the United States reported by Kashyap and Stein (1995). We examined this issue by ordering the balance sheets of all Swiss banks with total assets of more than 100 millions Swiss francs in accordance with size and by constructing asset size groupings for large banks (in the 98th percentile) and various degrees of smaller banks (defined as those at or below the 95th, 90th, and 75th percentile). The resulting figures (not included in the paper) indicate that the Big banks have particularly low bond obligations. The other banks line up as predicted with small banks having the lowest share of bonds.

Finally, a comparison between the balance sheets of the traditional groupings and the asset size groupings may help answer the question whether Big banks, cantonal banks and regional banks are representative for large, medium, and small banks, respectively. The results indicate that the Big banks coincide to a large degree with the class of the largest banks. Cantonal banks and regional banks, however, have distinctly lower claims and liabilities vis-à-vis non-residents and smaller business in foreign currencies than the corresponding groups of medium-sized or small banks. This mainly reflects the role of foreign banks in Switzerland not included in the traditional classification. Nonetheless, the three traditional groups of Swiss banking can be regarded as reasonable proxies for bank size. The balance sheet total of the average Big bank was roughly 15 times the corresponding figure of the average cantonal bank and more than 70 times the figure of the average regional bank in February 1987.

3. The empirical investigation

In this section, the response of Big banks, cantonal banks, and regional banks to monetary policy is examined. We proceed as follows. First, the data is described and presented in form of several charts. Then, the VARs are introduced and the impulse response functions are examined.

Table 1

Balance sheets of Big banks, cantonal banks and regional banks in February 1987

	Big Banks	Cantonal banks	Regional banks
Number of institutions	5	29	37
Average balance sheet total in million SFr	86,296	5,337	1,180
Group's share of total balance sheet total in %	68	25	7

	Share of group's balance sheet total in %				Share of group's balance sheet total in %		
Assets	**Big Banks**	**Cantonal banks**	**Regional banks**	**Liabilities**	**Big Banks**	**Cantonal banks**	**Regional banks**
Cash	6	3	3	Sight deposits	18	9	11
- of which Sfr. claims on residents	2	2	2	- of which Sfr. claims on residents	5	7	10
Interbank time deposits	27	14	6	Time deposits	44	15	7
- of which Sfr. claims on residents	2	11	6	- of which Sfr. claims on residents	13	15	7
Securities	12	7	9	Savings	14	37	41
- of which Sfr. claims on residents	4	7	8	- of which Sfr. claims on residents	12	36	40
Unsecured loans	13	5	6	Bonds	12	30	32
- of which Sfr. claims on residents	5	4	6	- of which Sfr. claims on residents	12	30	32
Secured loans	30	64	69	Capital plus reserves	6	4	5
- of which Sfr. claims on residents	25	63	69	- of which Sfr. claims on residents	6	4	5
Other assets	11	7	6	Other liabilities	6	4	3
- of which Sfr. claims on residents	4	6	6	- of which Sfr. claims on residents	4	4	3
Total	**100**	**100**	**100**	**Total**	**100**	**100**	**100**
- of which Sfr. claims on residents	41	93	97	- of which Sfr. claims on residents	51	96	97
- of which claims in other currencies on residents	8	2	1	- of which claims in other currencies on residents	9	1	1
- of which Sfr. claims on non-residents	16	4	1	- of which Sfr. claims on non-residents	7	2	1
- of which claims in other currencies on non-residents	36	0	0	- of which claims in other currencies on non-residents	32	0	0

Note: See annex for data description.

Data

The balance sheet items used in the empirical part of this study are *deposits, loans, cash and securities.* All series refer to Swiss franc claims and liabilities to residents. The series were constructed as described in the preceding section, and then deflated by the CPI to obtain real variables (in 1993 prices). Deposits consist of sight deposits, time deposits, and savings deposits. Loans can be divided into secured loans and unsecured loans. Cash includes currency and sight deposits with the SNB, the PTT, and other banks. Securities are bills and bonds.

Graph 1 shows the evolution of real deposits for Big banks, cantonal banks, and regional banks, both in levels and annual growth rates. All three bank groups reveal the contractions in monetary policy in 1981/82 and after 1989. Real loans are shown in Graph 2. Swings in bank lending are largest for the Big banks, followed by the regional banks and the cantonal banks. The turning points as measured by the peaks and troughs of annual growth rates indicate that loans follow deposits with a lag. Graph 3 shows the evolution of the three bank group's liquid assets. In comparison with deposits and loans, the liquid assets display larger swings. This goes for all bank groups and for Big banks in particular.

Some basic economic indicators of the Swiss economy for the period under review are summarised in Graph 4. There were two marked accelerations and decelerations in inflation (preceded by equally marked accelerations and decelerations in money growth; see Graph 1). Output growth dropped both in the early 1980s and in the early 1990s. Low output growth in 1978 can be attributed to the then exchange crisis. The exchange rate along with structural problems may also have played a role in delaying the recovery in the 1990s.

The indicator of monetary policy used in this study is a short-term interest rate (three-month Swiss franc deposits in the euromarket). This variable was chosen although it is not controlled by the SNB. The traditional monetary indicator of the SNB, the monetary base, is passed over because two innovations caused a significant shift in the demand for base money in 1988: the new system for reserve requirements and the gradual introduction of a new interbank clearing system (SIC). Thus the monetary base does not provide reliable information on the pre-history of the recession in the early 1990s.

Model

The empirical strategy is to estimate small unrestricted VARs for each bank group, and to examine the impulse response functions for monetary policy shocks. We consider five-variable VARs, consisting of the interest rate, real GDP, real deposits, real loans, and real cash and securities. We also present evidence for three-variable VARs described in the next section. Each VAR includes four seasonal dummies.[5] Data are quarterly as no monthly figures are available for output. All variables are in levels and (except the interest rate) in log-form. Lag lengths are determined by a sequence of encompassing tests performed in PcFiml 9.0. The estimation period is 1977:2-1996:3.

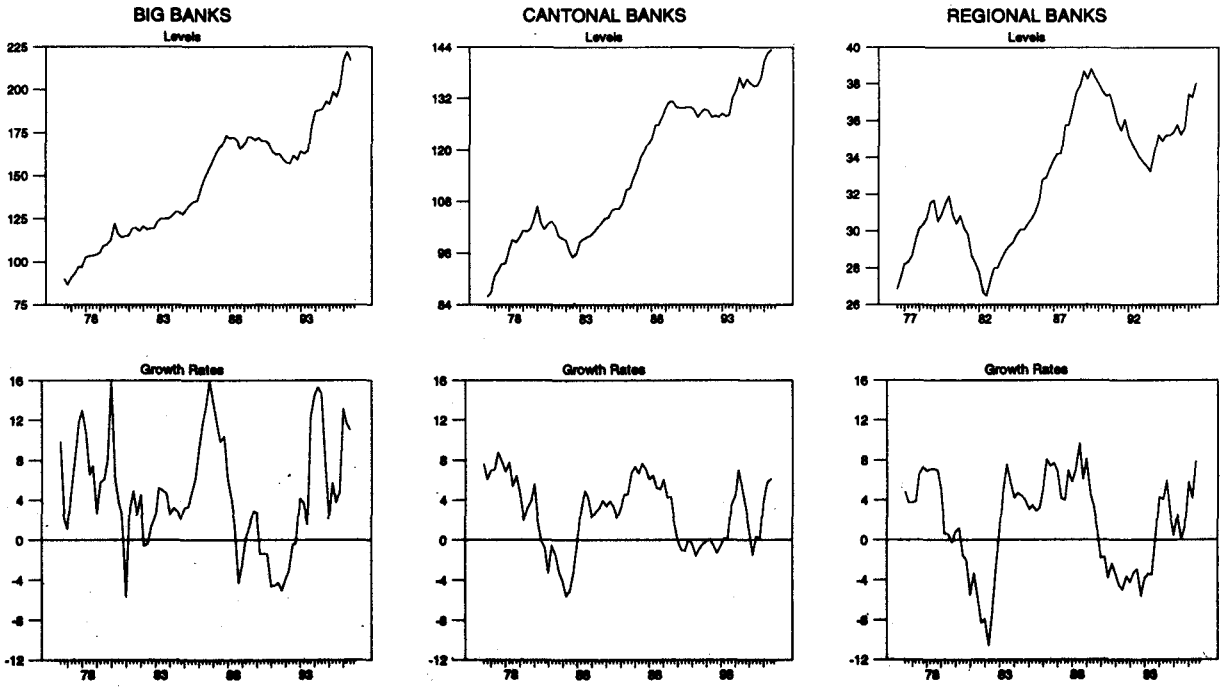
The unanticipated changes in monetary policy are identified by decomposing the residuals in a triangular fashion, the Choleski factorisation. Using this standard orthogonalisation method forces a causal structure on the system. Thus, the ordering of the variables may affect the results. We place the policy variable – the short-term interest rate – first. This implies that the policy variable has a contemporaneous effect on output and the banks' portfolio, but responds to output and the banks' portfolio only with a one-period lag.

---

[5] In addition, a dummy for the introduction of the SIC and the new reserve requirement system in 1988:1 is included in all VARs with cash and securities, and a dummy for the adoption of new accounting rules in 1995:1 is included in all VARs with loans.

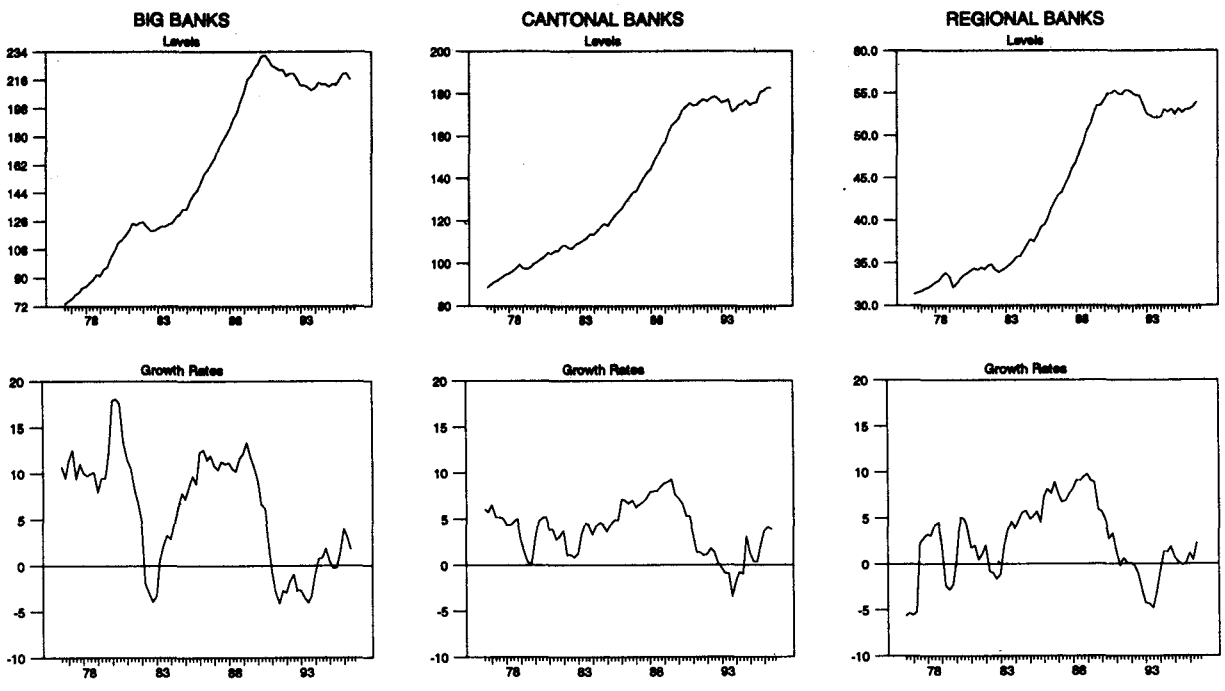
Graph 1

Real deposits



Graph 2

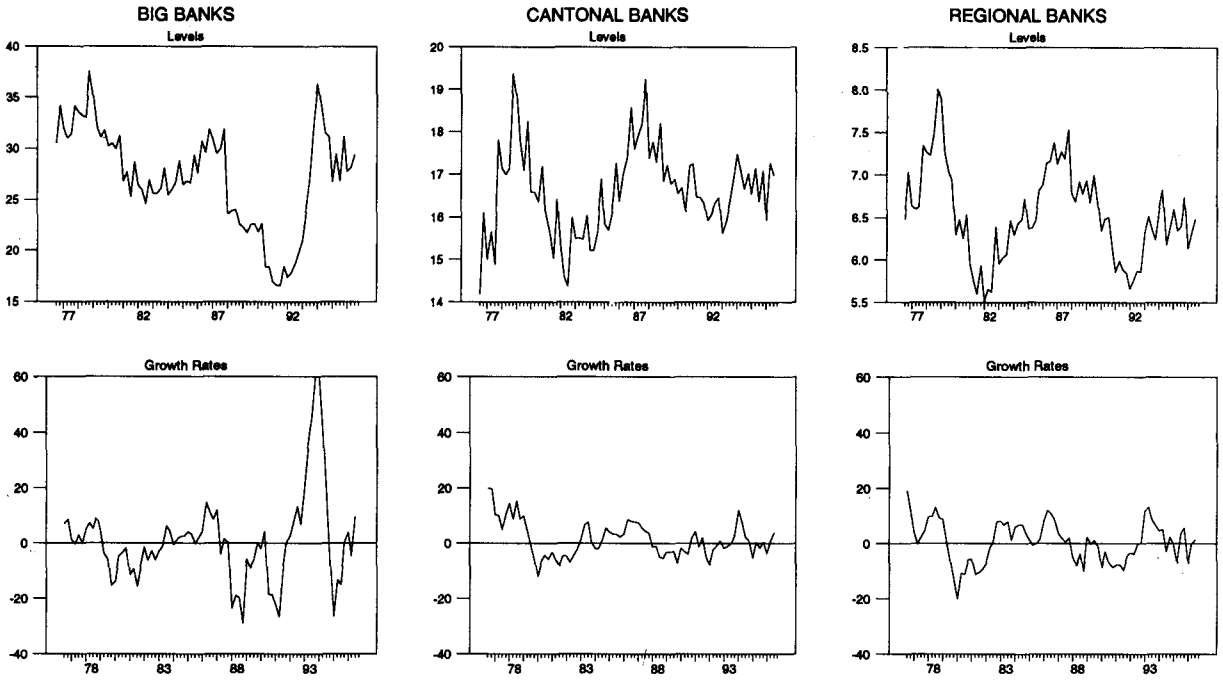
Real loans



Note: Quarterly data. Levels in billions of 1993 Swiss francs. Growth rates in year-on-year percentage changes.

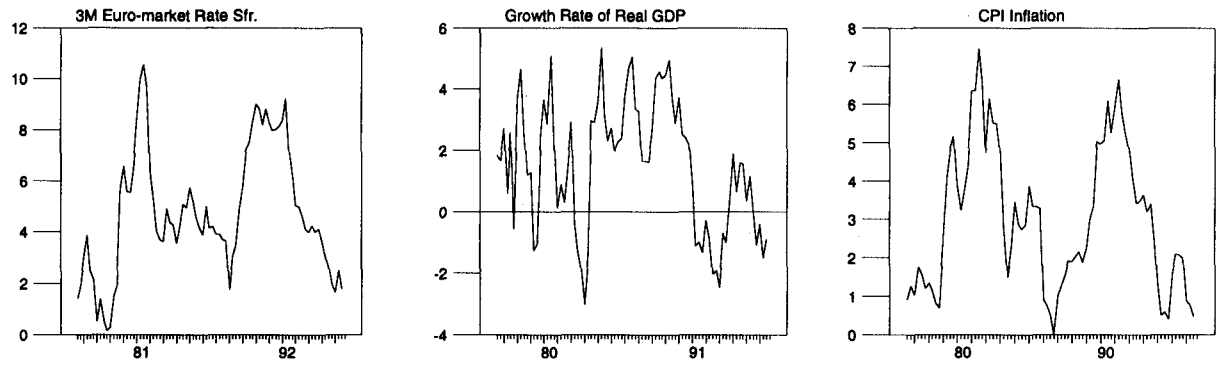
Graph 3

Real cash and securities



Graph 4

Interest rates, output growth and inflation



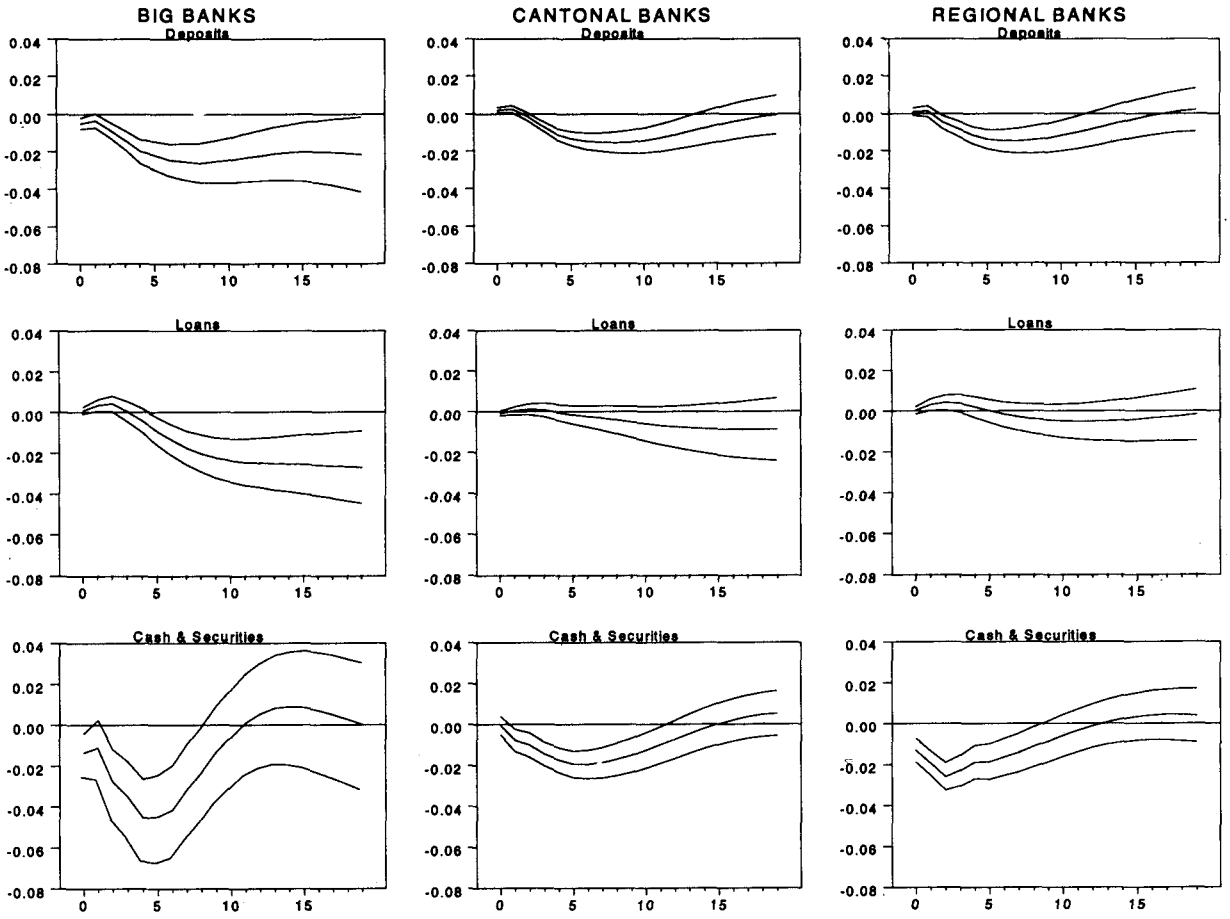
Note: Quarterly data. Interest rate in percent. Levels of other variables in billions of 1993 Swiss francs. Growth rates in year-on-year percentage changes.

Results

Graph 5 summarises the results for the five-variable VARs based on the impulse-response functions. In each panel the solid line plots the response to an interest rate shock which is normalised to correspond to a one percentage point increase in the current rate. The dashed lines indicate the plus and minus one standard deviation band of uncertainty associated with the estimate. The band is generated from Monte Carlo simulations with 1,000 draws. All responses are shown over a 20-quarters horizon.

Graph 5

VAR-5: responses to interest rate



Note: VARs with 5 variables (interest rate, output, deposits, loans, and cash and securities). Twenty-quarter response of variables to an interest rate shock (3-month euromarket rate Sfr.). Sample period is 1977:2–1996:3. Overall lag length is 3.

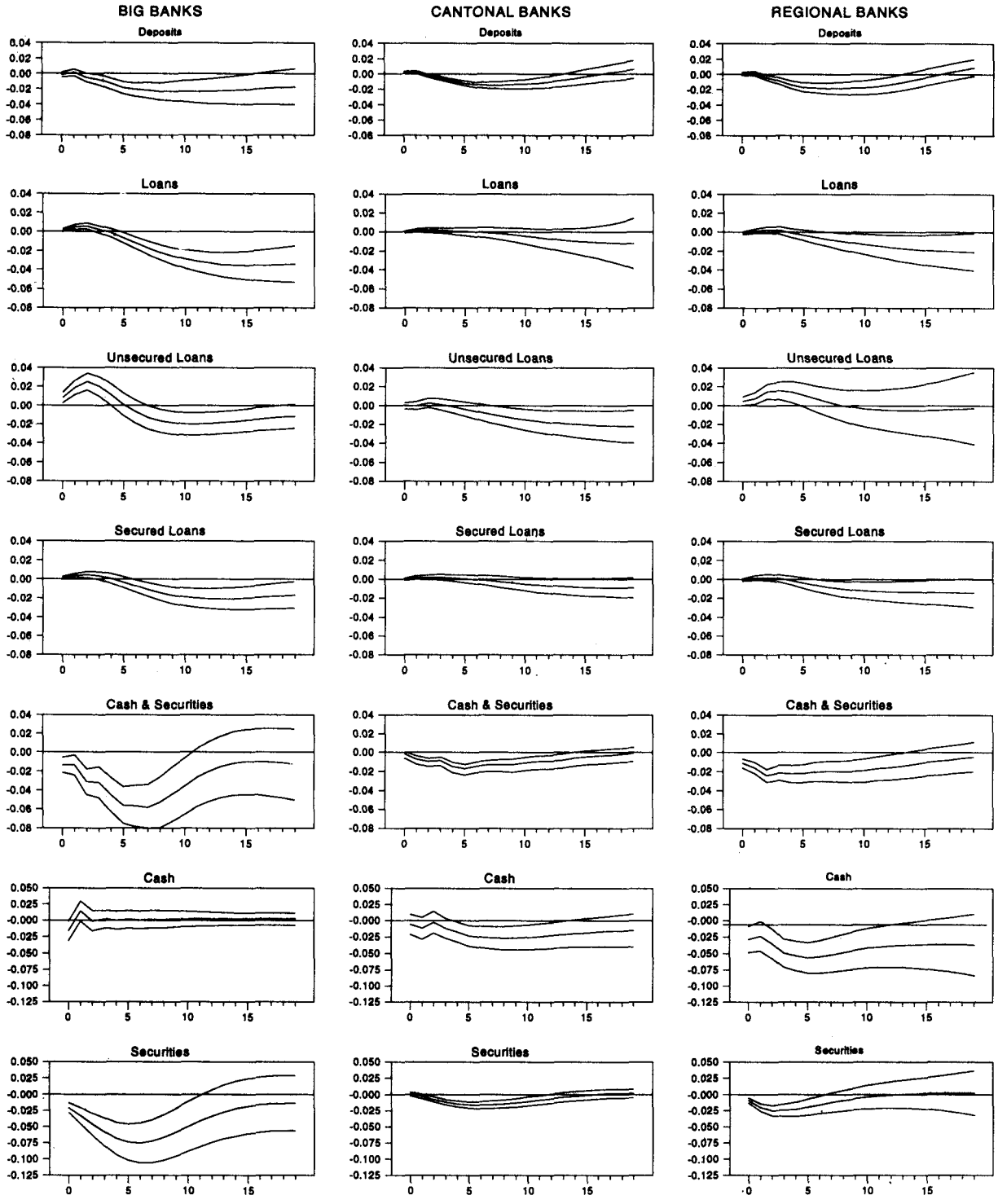
First, consider the effect on deposits portrayed in the first row of the graph. For all three bank groups we observe that the deposits decline after an interest-rate shock. The impact is similar for both cantonal banks and regional banks, while Big banks suffer somewhat larger losses in deposits. The evidence on the cross-sectional differences is weak however, because the one-standard-deviation bands around the point estimates overlap.

Turning to the impact of an interest-rate shock on loans, we observe that loans first rise and then decline. Notice, however, that the one-standard-deviation bands include the zero line for cantonal banks and for regional banks. A possible explanation of the 'perverse' short-term effect is that the stock-building of firms in the early stage of a recession may lead to a higher demand for bank loans. The subsequent decline of loans starts later than that for deposits and is more persistent. Based on point estimates, we find that Big banks display the largest response of loans among the three bank groups.

The effects on the banks' liquid assets are summarised in the third row of the graph. We find that an interest-rate shock triggers an immediate decline in the cash and securities at all bank groups. Again, the effect is largest for the Big banks. Differences between cantonal banks and regional banks once again are negligible.

Graph 6

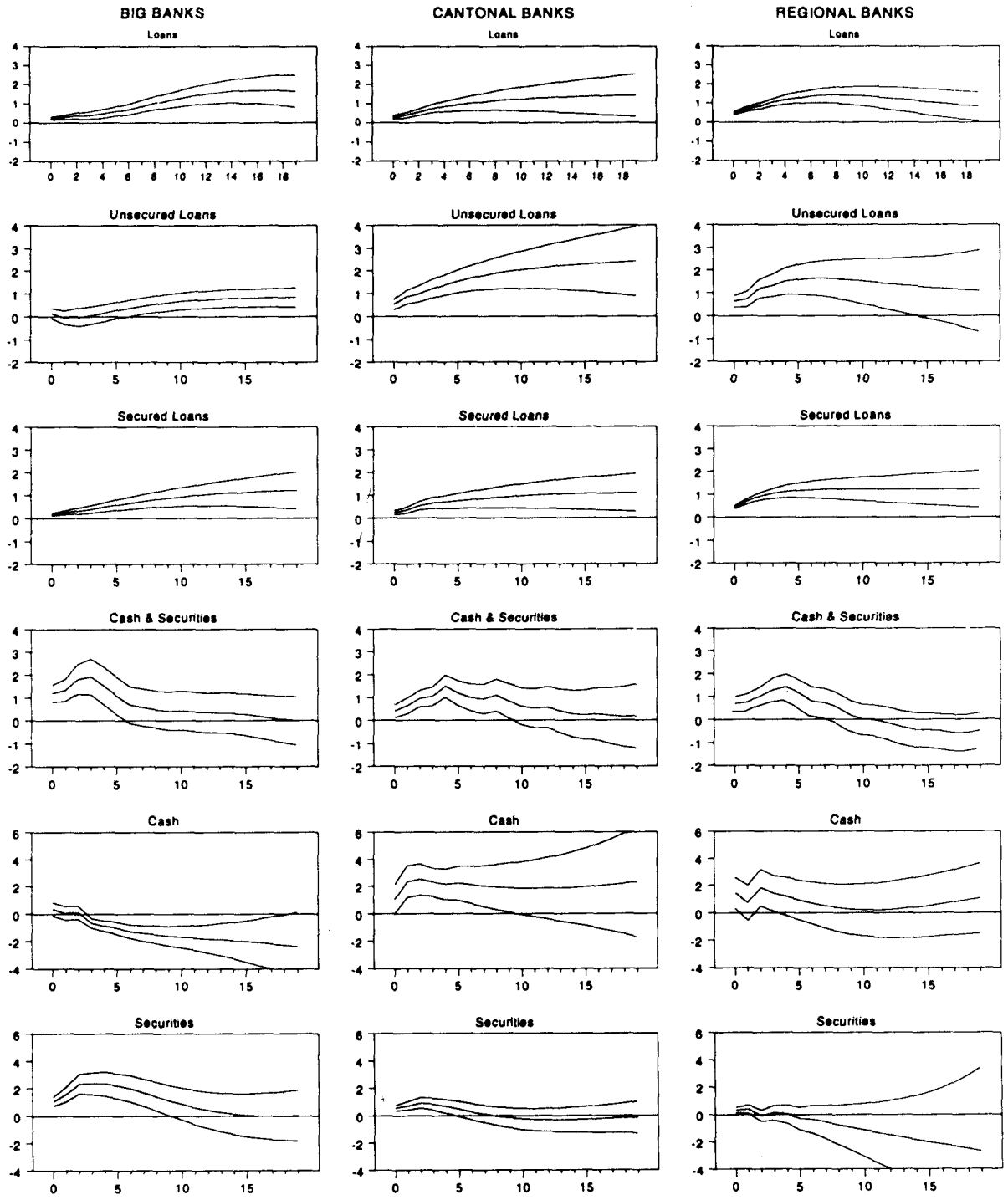
VAR-3: responses to interest rate shocks



Note: VARs with 3 variables (interest rate, output, and balance sheet position). Twenty-quarter response of variables to an interest rate shock (3-month euromarket rate Sfr.). Sample period is 1977:2–1996:3. Overall lag length is 5 for all VARs in rows 1, 2 and 5; 3 for VARs in rows 3, 4 and 7; and 2 for VARs in row 6.

Graph 7

VAR-3: responses to deposit shocks



Note: VARs with 3 variables (interest rate, output, and balance sheet position). Twenty-quarter response of variables to an interest rate shock (3-month euromarket rate Sfr.). Sample period is 1977:2–1996:3. Overall lag length is 5 for VARs in row 4; 4 for VARs in row 1; and 3 for VARs in rows 2, 3, 5 and 6.

The overall picture offered by Graph 5 is in line with the thrust of results from the literature on the bank lending channel. The decline in bank loans triggered by a monetary contraction lags the fall in banks' deposits and liquid assets. The cross-sectional implications of the bank lending channel, however, are barely borne out by the data. In particular, we do not find the response of loans to be largest for regional banks and smallest for Big banks as suggested by the predictions of Kashyap and Stein (1995).

A more detailed account of the impact of interest-rate shocks on bank balance sheets is provided by Graph 6. The graph summarises the response of individual components of loans (unsecured loans and secured loans) and liquid assets (cash and securities) to a monetary contraction. This extension is motivated by two observations. First, the composition of the loan portfolio varies across bank groups, possibly reflecting the relative importance of mortgage loans. Second, the demand for cash gradually shifted downward in 1988 and 1989, when the SIC was introduced and the SNB adopted a new system for reserve requirements. The impulse response functions shown in Graph 6 are based on three-variable VARs, consisting of the interest rate, output, and the balance sheet position in question. The number of variables in each VAR was reduced from five to three variables to have sufficient degrees of freedom. Notice, that the 21 panels of Graph 6 are based on the impulse response functions from 21 different VARs (while the nine panels of Graph 5 were from three different VARs).

The results for deposits, loans, and the total of cash and securities are in line with those from the five-variables VARs portrayed in Graph 5.[6] In addition, we find that the striking response of Big bank cash and securities is largely borne by the securities portfolio. We do not find much difference between the responses of unsecured loans and secured loans. Yet unsecured loans display a more pronounced temporary rise in the first few quarters after the interest rate shock.

We next focus on the impact of a shock in the bank group's own deposits on loans and on cash and securities. This is done because the response of deposits to an interest-rate shock differs across bank groups. Since we measured the effect of an interest-rate shock to be largest for Big banks, it is not entirely surprising that Big banks display the largest impact on loans or cash and securities too. We adopt the same strategy as for Graph 6, except that the bank group's own deposits take the place of the interest rate as the policy variable. The impulse response functions are computed from a normalised one-standard-deviation shock to deposits.

The responses displayed in Graph 7 show some interesting patterns. Overall, they are the most favourable in this paper in terms of sheer consistency with the predictions of the theory. In particular, unsecured loans of Big banks now respond relatively slowly to a monetary policy shock. At the same time, the pronounced and rapid response of Big banks' securities is still recognisable. Both patterns are consistent with the predictions of Kashyap and Stein (1995). Unfortunately, the results seem to be less robust to changes in the overall lag length and the ordering of the variables (the monetary policy variable placed last) than the results from the impulse response functions for interest rate shocks.

---

6 The responses to interest rate shocks do not depend critically on the ordering of the variables. We also examined several alternative specifications of the VARs reported in this paper to check the robustness of the results. In turn, we replaced (i) variables in levels by first differences, (ii) real variables by nominal variables, and (iii) quarterly data by monthly data (where monthly output figures were approximated with a spline function). The main results are not affected by these changes.

Concluding remarks

In this paper, we have examined the response of bank portfolios to monetary policy shocks across various bank groups in Switzerland. The hypothesis, which stems from Kashyap and Stein (1995), predicts that a contraction of monetary policy causes a relatively strong reduction of small banks' loan portfolio and of large banks' securities holdings. Based on the point estimates of the impulse response functions, we find that the responses are consistent with the predictions for securities but not for loans. In contrast to the theory, Big banks seem to have the strongest decline in loans after an interest rate shock. The evidence is weak, however, if the uncertainty of the estimates is taken into account.

A number of possible problems should be noted. One is the short sample period. The sample period covers only two distinct episodes when the SNB deliberately tightened monetary policy to bring down inflation. This is probably not enough for an investigation of cross-sectional differences of bank group responses to monetary policy.

Another problem is the measure of monetary policy. We have identified the monetary innovations based on a standard Choleski factorisation in an unrestricted VAR. Various authors have imposed more structure on the VAR and have proposed alternative identification schemes.

The third problem is the role of the Big banks. Switzerland's Big banks hold a large share of their balance sheet total as claims and liabilities vis-à-vis non-residents or in foreign currencies. This makes the asset and liability management more complex, and we may have a problem of omitted variables.

The fourth problem results from the observation that Big banks probably have a different structure of customers than the cantonal banks or regional banks. It raises the possibility that differences in the response of bank portfolios to a monetary policy shock are driven by differences in demand. This is, of course, the identification problem mentioned earlier. The solution proposed by some authors is to dig down to the level of the individual loan contract. Such a data set is not available, however. In their 1997 paper, Kashyap and Stein find an intermediate solution and examine the bank lending channel based on a large panel data set consisting of the quarterly balance sheets of virtually all US banks. A comparable exercise for Switzerland could be made for the post-1987 period only. For a study with a longer time horizon, there is no escape from the semi-aggregated figures for Big banks, cantonal banks and regional banks used in this paper.

Annex: data sources

Balance sheet variables

Nominal monthly series for 1975:07 to 1987:02 from the SNB-EASY-Databank. Construction of the corresponding series for 1987:02 to 1996:11 as described in the text based on the balance sheets from individual banks (SNB-IPSO-Databank).

In the empirical section all balance sheet variables refer to claims and liabilities in Swiss francs vis-à-vis residents; all variables are quarterly and (except interest rates) are in logs and deflated by the CPI (1993=100). The composition of the balance-sheet variables is as follows (see *Bankenstatistisches Beiheft*, *SNB Monatsbericht*, A10, A11, A20, A21):

Cash	*Kasse, Giro- und Postcheckguthaben + Bankendebitoren auf Sicht.*
Deposits	*Bankenkreditoren auf Sicht + Bankenkreditoren auf Zeit + Kreditoren auf Sicht + Kreditoren auf Zeit + Spareinlagen + Depositen- und Einlagehefte.*
Loans	Unsecured loans + Secured loans.
Secured loans	*Kontokorrent-Debitoren mit Deckung + Feste Vorschüsse und Darlehen mit Deckung + Hypothekaranlagen.*
Securities	*Wechsel und Geldmarktpapiere + Wertschriften.*
Unsecured loans	*Kontokorrent-Debitoren ohne Deckung + Feste Vorschüsse und Darlehen ohne Deckung.*

Other variables

Interest rate	Interest rate on 3-month Swiss franc deposits on the euromarket
Output	Real Gross Domestic Product

All data are from SNB-EASY-Databank, except where indicated otherwise.

References

Bacchetta, Philippe and Fernando Ballabriga (1995): "The impact of monetary policy and bank lending: some international evidence". Studienzentrum Gerzensee, Switzerland, *Working paper*, No. 95.08.

Bernanke, Ben S. and Alan S. Blinder (1988): "Credit, money, and aggregate demand". *American Economic Review*, Papers and Proceedings, 78, pp. 435-9.

Bernanke, Ben S. and Alan S. Blinder (1992): "The Federal Funds rate and the channel of monetary transmission". *American Economic Review*, 82, pp. 901-21.

Cecchetti, S. G. (1995): "Distinguishing theories of the monetary transmission mechanism". *Federal Reserve Bank of St. Louis Review*, 77, May/June, pp. 83-97.

Hubbard, R. G. (1995): "Is there a 'credit channel' for monetary policy?" *Federal Reserve Bank of St. Louis Review*, 77, May/June, pp. 63-77.

Kashyap, Anil K. and Jeremy C. Stein (1994): "Monetary policy and bank lending", in G. Mankiw (ed.), *Monetary Policy*, University of Chicago Press, pp. 221-56.

Kashyap, Anil K. and Jeremy C. Stein (1995): "The impact of monetary policy on bank balance sheets". *Carnegie-Rochester Conference Series on Public Policy*, 42, pp. 151-95.

Kashyap, Anil K. and Jeremy C. Stein (1997): "What do a million banks have to say about the transmission of monetary policy?" *NBER*, No. 6056.

Keeton, William R. (1992): "Monetary policy implications of bank security holdings and large CDs". Federal Reserve Bank of Kansas City, *Research Working Paper*, No. 8.

McMillin, W. Douglas (1996): "Monetary policy and bank portfolios". *Journal of Economics and Business*, 48, pp. 315-35.

Myers, S. and N. Majluf (1984): "Corporate financing and investment decisions when firms have information that investors do not have". *Journal of Financial Economics*, 13, pp. 187-221.

Romer, Christina and David Romer (1993): "Credit channel or credit actions? An interpretation of the postwar transmission mechanism", in *Changing Capital Markets: Implications for Monetary Policy*. Federal Reserve Bank of Kansas City, pp. 71-116.

Stein, Jeremy C. (1995): "An adverse selection model of bank asset and liability management with implications for the transmission of monetary policy". *NBER*, No. 5217.

Comments on "Monetary policy, aggregate demand, and the lending behaviour of bank groups in Switzerland" by Olivier Steudler and Mathias Zurlinden

by Koichiro Kamada*

Introduction

I have found that this is an impressive paper on lending channels of monetary policy transmission. As Kashyap and Stein (1994) state clearly, monetary channels and lending channels of monetary policy transmission are not exclusive. In the monetary channels view, there are two assets: money and bonds. Prices are assumed to be sticky and so an inflation rate is to be almost zero. When monetary authority reduces base money, money supply declines in nominal and also real terms. Nominal interest rates of bonds rise and so do real interest rates since the inflation rate is zero. High real interest rates mitigate private final demands and thus real economic activities. Advocates of lending channels (e.g. Bernanke and Blinder (1988)) claim existence of another source that affects real activities of the economy. They consider three assets: money, publicly issued bonds and bank intermediated loans. If bank loans are special in some sense, monetary authority can influence the real economy by controlling an amount of bank loans. A critical point is whether bonds and bank loans are imperfect substitutes. In order that lending channels of monetary policy transmission exist, both firms and banks take the two assets as imperfect substitutes.

Steudler and Zurlinden examine banks' imperfect substitutability between loans and bonds, using data of the Swiss banking sector. They use data disaggregated into three categories in size and explore the Kashyap and Stein hypothesis that small banks change loans more rapidly than large banks. They have found that the opposite is true in the Swiss banking sector.

My comments are constructed as follows. In Section 1, I first present theory that supports the Kashyap and Stein hypothesis. I then summarise the authors' empirical procedure and main result and present my interpretation of the main result. I claim that their result does not necessarily deny existence of lending channels. Finally, I also point out an interesting fact in the Swiss data. In Section 2, I list some identification problems that should be noted in finding lending channels. In Section 3, I present theory of firms' liability choice to complete lending channels. In the final section, I make some comments and questions on the econometric methods taken by the authors.

1. Reaction of banks against monetary policy

A bank's liability choice depends on its default risk (or a risk premium). Faced with a reduction in reserves, banks switch from deposits to liabilities that require less reserves (CD, CP, or equity). Kashyap and Stein (1994) argue that small banks may suffer from larger default risk than large banks. Hence, responding to reduction in reserves, small banks reduce loans rather than issue non-deposit liabilities. So monetary policy transmit more effectively through small banks. This can be called a default risk hypothesis of bank liability.

Using balance sheet data of the Swiss banking sector, Steudler and Zurlinden examine a variation of the default risk hypothesis by Kashyap and Stein (1995): small banks reduce their loans more rapidly than large banks during tight monetary policy. The authors have found that the

---

* The views in the comments above belong solely to Koichiro Kamada and not to the Bank of Japan.

hypothesis cannot be supported in the Swiss banking sector. That is, during tight monetary policy, large banks reduce loans more rapidly than small banks.

To begin with, the authors sort out the balance sheet data of the Swiss banking sector, based on size of banks. The authors claim that the traditional category of the Swiss banking sector (i.e. the Big, cantonal, regional banks) almost coincides with the grouping based on actual bank size after February 1987. This makes data available back to 1975. Next, the authors estimate unrestricted VAR with five variables: interest rates, real GDP, real loans, real deposits, and real cash and securities (level in log except for the interest rate). Using the estimated system, the authors examine impulse-response following an increase in the interest rate.

The authors have found that the Big banks reduce loans more rapidly than the cantonal and regional banks do, thereby denying the Kashyap and Stein prediction (1995). This is an impressive result. I am not sure, however, that the authors' result breaks the validity of the Kashyap and Stein prediction (1995) for the following reasons: (i) the authors use data concerned only with assets offered to residents. I am not sure whether this strategy is successful, since banks choose their portfolio, taking into account its total return and risk. So focusing on the partial data may generate misleading results; (ii) small banks do not reduce loans if the BIS risk-based capital requirements are already binding. So it is a natural result that loans by small banks react less to monetary shocks.

Moreover, the authors' result does not necessarily deny the existence of lending channels. Suppose that small banks deal with small firms. In this case, if small banks do not reduce loans, there are no effects through lending channels. If large banks also deal with small firms, however, there may exist lending channels.

Finally, using the Swiss data, I want to discuss the buffer hypothesis of liquidity asset holding that Kashyap and Stein (1994) find in the US banking sector. A bank's asset mix is a result of its optimal portfolio choice. To protect sudden withdrawal by depositors, banks have to keep some liquid assets. Liquid assets, however, earn low returns. Bonds are liquid but earn low returns; bank loans are illiquid but earn high returns. Kashyap and Stein (1994) argue that small banks have smaller shares of loans. The reason is that small banks need more liquid assets, since they are exposed to larger swings of deposits than large banks are. Table 1 shows us the validity of the buffer hypothesis by Kashyap and Stein (1994) in the Swiss data. On a residents-only basis, shares of liquidity assets (cash, interbank deposits, securities) are 8% for the Big banks, 20% for the cantonal banks, and 16% for the regional banks. So in a static sense, the Swiss banking sector has a similar tendency to that in the United States: the Big bank's share of liquidity assets is the smallest, the cantonal banks' is the middle, and the regional banks' is the largest. On an all-customers basis, similar shares are 45% for the Big banks, 24% for the cantonal banks, and 20% for the regional banks. This happens because assets against non-residents are held mostly as liquid assets. This may be specific to the Swiss banking sector. Graph 5 also shows us further evidence for the buffer hypothesis. Responding to a rise in the interest rate, deposits decrease first and then loans decrease. To balance banks' assets and liabilities, cash and securities decrease as a buffer.

2. Identification problems

As mentioned above, the authors do not necessarily deny lending channels. Then the next question is how to find lending channels. In this section, I discuss three points that should be noted in finding lending channels: (i) how to identify monetary policy stance, (ii) how to distinguish changes in loan supply from those in loan demand, and (iii) how to distinguish effects of lending channels from those of money channels.

First, I discuss identification of monetary policy stance. The authors use interest rates on 3-month Swiss franc deposits on the euromarket. A natural question is how well these interest rates reflect monetary policy stance of the Swiss National Bank. These rates, however, are likely to be exposed to shocks that the Swiss National Bank does not intend. Policy stance should be distinguished

from other shocks on the interest rates. One way to do so is to specify an interest rate equation in the VAR model so that it reflects monetary policy stance. A useful specification is a variety of Taylor rules. This makes the models' interpretation easy. Note that somewhat ironically, if lending channels are so effective that monetary authority can control an amount of bank loans without raising any interest rates in the economy, monetary policy stance is hard to be identified.

Second, it is difficult to distinguish responses in loan supply from those in loan demand against interest rate shocks. Lending channels assume the former. A simple way of finding lending channels, though not satisfactory, is to see causality between loans and GDP. Real loans and GDP respond to interest rate shocks and react to each other in the following ways. GDP decreases due to a reduction in loan supply (the banking sector reduces loan supply) or loan demand decreases due to a reduction in GDP (the manufacturing sector reduces loan demand). Unfortunately, the authors present neither figures nor test statistics to show their relationships. So it is hard to see the causality. Another way of distinguishing changes in loan supply and demand is to see movements of close substitutes for bank loans. For instance, it may be inferred that loan supply is falling if an amount of CP is growing while that of bank loans is falling.

Finally, it is hard to calculate how much effects are attributable to money channels and to lending channels. As mentioned before, monetary channels and lending channels are not exclusive mutually. They work at the same time. When monetary authority tightens money, an amount of money shrinks, which in turn raises interest rates and discourages final demands. This is a monetary channel. Lending channels add further effects on final demands through banks' behaviour. So it is difficult to find how much is due to lending channels and money channels. This is true, even if the authors use disaggregated data of the banking sector. If the Big banks are dealing with more firms that are very sensitive to interest rate than the cantonal and regional banks are, loans of the Big banks respond more to interest rate shocks than those of the cantonal and regional banks.

3. Reaction of firms against reaction of banks

To complete lending channels, I have to show that changes in bank loans affect firms' economic activity. If firms can access alternative financial source, such as CP market, changes in bank loans have no effects on firms' economic behaviour. So existence of lending channels depends on firms' accessibility to alternative financial markets. Below I discuss why some firms stick to bank loans rather than issuing bonds publicly.

First, information of firms is often imperfect for ultimate lenders. Information of some firms is so imperfect that they cannot finance their projects without being monitored by banks. In this case, those firms rely on loans combined with banks' monitoring. Bonds cannot be substitutes for bank loans, since bonds are sold without monitoring requirements. Second, suppose that firms borrow from banks and are monitored. Then being monitored by banks carries information on return and risk of those firms. In this case, bonds cannot be substitutes for bank loans, since bonds lack such information. Finally, since monitoring is costly, firms cannot switch between loans and bonds costlessly. Firms stick to banks, once they get into long-term relationships with the banks. Note that the recent rapid growth of the non-bank financial sector will mitigate lending channels, although the share of non-bank intermediation is still small in most countries.

Intuitively, small firms suffer from asymmetric information so severely that they need to be monitored by banks and can hardly issue CP and corporate bonds. Thus, lending channels work more effectively through small firms. Assume additionally that small banks transact more frequently with small firms. Then if small banks reduce loans, lending channels work more effectively. Thus, correlation of size of firms and banks can play an important role in monetary policy transmission. Note that the effectiveness is reduced, however, if large firms issue CP and lend money to small firms.

4. Econometric methods

Finally, I want to make comments and questions on the econometric method taken by the authors. The first thing I note is on stationarity of variables used in the VAR models. The authors present no results of stationarity tests at all. So I hardly evaluate the legitimacy of the specification of their models. Since I have no data in hand so as to test their models myself, I use the information given in the paper and express my feeling. The authors specify VAR models, using level data of real GDP, real loans, real deposits, and real cash and securities. These variables usually grow at a positive rate, however. For instance, in Graph 1, the real deposits of the Big banks grow at the rate of about 7% annually, those of the cantonal banks at about 3%, and those of the regional banks at about 2%. The real loans have similar trends as seen in Graph 2. Stationarity of the real cash and securities is difficult to see in Graph 3. It is reasonable, however, to guess that they grow with other balance sheet items, such as the real loans and deposits. Graph 4 shows that GDP of Switzerland grows at the rate of 1-2% annually.

The impulse responses in Graph 5 are against the consensus among monetary economists that monetary policy can affect economic activity in the short term, but not in the long run. A plausible picture is that real deposits and loans increase on the Switzerland's balanced growth path and that against interest rates shocks, paths of deposits and loans deviate from the balanced growth path for a while, but revert to the path in some time. Examining Graph 5, I have found that an interest rate shock (a change in monetary policy) can have permanent effects on deposits and loans of the Big banks. Although similar effects on deposits and loans of the cantonal and regional banks may diminish away, the share of the cantonal and regional banks is only 32% (= 25% and 7%) in the combined balance sheet of all the banks in Switzerland. Non-stationarity of the models, if any, causes serious problems in interpretation of the models. So I recommend to reconstruct the VAR models by using detrended data of real loans and deposits

References

Bernanke, Ben S. and Alan S. Blinder (1998): "Credit, money, and aggregate demand". *American Economic Review*, Papers and Proceedings, No. 78 (2), pp. 435-9.

Kashyap, Anil K. and Jeremy C. Stein (1994): "Monetary policy and bank lending", in *Monetary Policy*, N. Gregory Mankiw (ed.), the University of Chicago Press, pp. 221-56.

Kashyap, Anil K. and Jeremy C. Stein (1995): "The impact of monetary policy on bank balance sheets". *Carnegie-Rochester Conference Series on Public Policy*, 42, pp.151-95.