



## MONETARY POLICY TRANSMISSION AND BANK LENDING IN SOUTH KOREA AND POLICY IMPLICATIONS

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### ABSTRACT

*This paper tests the bank lending channel for South Korea based on a simultaneous-equation model consisting of the demand for and the supply of bank loans. The three-stage least squares method is employed in empirical work. The demand for bank loans is negatively associated with the lending rate and positively affected by real GDP and the corporate bond yield. The supply of bank loans has a positive relationship with the lending rate and real bank deposits and a negative relationship with the central bank policy rate, the KRW/USD exchange rate and the 10-year U.S. government bond yield. Therefore, this study finds evidence of a bank lending channel for South Korea. Expansionary monetary policy through a lower policy rate or open market purchase of government bonds to increase bank deposits/reserves would increase bank loan supply.*

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**Keywords:** Monetary policy transmission, Bank loans, Policy rate, Bank deposits, Exchange rate, World interest rate, 3SLS.

**JEL Classification:** E52, E51.

### Contribution/ Originality

This study contributes to the test of the bank lending channel for South Korea. Based on a simultaneous-equation model of demand and supply, this paper finds that bank deposits, the policy rate, the exchange rate and the U.S. interest rate play pivotal roles in determining bank loan supply.

### 1. INTRODUCTION

According to the bank lending channel, a change in monetary policy would affect bank loan supply. An expansionary monetary policy is expected to reduce the policy rate and the cost of borrowing by banks, increase bank deposits, and raise bank loan supply whereas a contractionary monetary policy is expected to increase the policy rate and the cost of borrowing by banks, reduce bank deposits, and lower bank loan supply.

A study of the bank lending channel for South Korea is important. During the Asian financial crisis in the 1990s, to defend the Korean won from substantial depreciation, the Bank of Korea engaged in monetary tightening, which caused the money market rate to rise from a low of 10.53% in 1996.Q1 to a high of 23.93% in 1998.Q1 and the lending rate to increase from a low of 8.77% in 1996.Q2 to a high of 17.28% in 1998.Q1. Such high interest rates reduced bank loans and credit available for firms and households. The high interest rates contributed to the decline of real GDP at the 2000 price from 140,272 billion won in 1996.Q4 to 111,372 billion won in 1998.Q1.

Due to the recent global financial crisis, the Bank of Korea lowered the policy rate from 5.25% in 2008.Q3 to 2.75% in 2013.Q1. The money market rate also dropped from 5.13% to 2.75% during the same period. Lower interest rates increased bank loans 80.88% from 20,068.4 billion won to 36,300.3 billion won during the same period.

This paper attempts to examine the bank lending channel for South Korea based on a simultaneous-equation model and has several major features. First, the demand for and the supply of bank loans are specified separately in order to identify bank loan supply. Second, major global variables are incorporated into the model to account for potential international capital flows. Third, the three-stage least squares method is employed in estimating the simultaneous-equation model to avoid potential simultaneity bias that may arise when a single-equation model is employed.

In the second section, review of literature will be analyzed. The theoretical model will be presented in the third section. A summary and conclusion will be made in the last section.

## 2. REVIEW OF LITERATURE

Whether the bank lending channel is valid remains inconclusive. [Bernanke and Blinder \(1988\)](#), [Bernanke and Blinder \(1992\)](#), [Gertler and Gilchrist \(1994\)](#), [Bernanke and Gertler \(1995\)](#), [Peek and Rosengren \(1995\)](#), [Kashyap \*et al.\* \(1993\)](#), [Kashyap and Stein \(1995; 2000\)](#), [Suzuki \(2004\)](#) and [Jimborean \(2006\)](#) supported the bank lending channel. [Vera \(2012\)](#) showed that the effect of the bank lending channel has declined over time. [Romer and Romer \(1989\)](#), [Ramsey \(1993\)](#), [Oliner and Rudebusch \(1995\)](#) and [Morris and Sellon \(1995\)](#) raised doubts about the view.

There have been several studies examining the bank lending channel for South Korea. [Cho and Kang \(1999\)](#) were among the first to test the bank lending channel for South Korea. They specified banking lending as a function of the adjusted reserve money and the relative rate of return on bank loans. Based on a sample during January 1994 – April 1998, they found that more money supply due to expansionary monetary policy increased bank loans during the period without a financial crisis whereas more money supply did not lead to more bank loans during the financial crisis because banks invested increased money supply in relatively safe and less risky assets such as government or public bonds.

Using a sample during January 1993 - May 1998 and applying the VAR model, [Kim \(1999\)](#) showed that in response to the Asian financial crisis, monetary tightening and strict bank capital regulation led to a significant decrease in the supply of bank credit instead of a decline in the

demand for loans. Hence, the banking lending channel played an important role in magnifying the effect of monetary tightening.

Using a sample of 20 Latin American and Asian countries including South Korea during 1989-2001, [Arena et al. \(2010\)](#) showed that foreign banks may have provided credit market stability because lending and deposits of foreign banks tended to be smoother during a financial crisis. The results also revealed that bank loans of foreign banks were less responsive to monetary condition changes in emerging countries.

[Olivero et al. \(2010\)](#) studied the bank lending channel using a sample of 10 Asian and 10 Latin American countries including South Korea during 1996-2006. They found that an increase in bank competition led to the weakening of monetary policy transmission via the banking lending channel. This was more evident for banks with low capitalization, small size and low liquidity.

### 3. THE MODEL

Extending [Bernanke and Blinder \(1988; 1992\)](#), [Cho and Kang \(1999\)](#), [Kim \(1999\)](#), [Suzuki \(2004\)](#), [Arena et al. \(2010\)](#), [Olivero et al. \(2010\)](#) and other studies, we can specify the demand for and the supply of bank loans for South Korea as:

$$D = F(LR, Y, BR) \tag{1}$$

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$$S = H(LR, DE, PR, EX, WR) \tag{2}$$

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where

D = demand for bank loans in South Korea,

S = supply of bank loans in South Korea,

LR = the lending rate,

Y = output,

BR = the interest rate on bonds,

DE = bank deposits,

PR = the policy rate,

EX = the KRW/USD exchange rate, and

WR = the world interest rate.

The policy rate is selected to represent a monetary policy tool ([Kashyap and Stein, 2000](#); [Kishan and Opiela, 2000](#); [Altunbas et al., 2002](#)). We expect that bank loan demand has a negative relationship with the lending rate and a positive relationship with output and the interest rate on bonds and that bank loan supply has a positive relationship with the lending rate and bank deposits and a negative relationship with the policy rate and the world interest rate.

The exchange rate is an important variable in studying monetary policy transmission mechanism ([Sims, 1992](#); [Peersman, 2004](#); [Suzuki, 2004](#); [Zanforlin, 2011](#)). The sign of the exchange rate coefficient in equation (2) is uncertain. As the won depreciates, there may be several possible effects on the supply of bank loans. When the Korean won depreciates, foreign investors

may be more likely to increase loanable funds to South Korea as it can exchange for more units of the won per unit of a foreign currency. A weaker won is expected to help exports, increase sales, result in more favorable financial positions, and increase banks' incentive to supply loans. As the won becomes weaker, collateralized values of firms decrease, and it is likely for investors to reduce the supply of loanable funds. Hence, the net impact is uncertain and will be determined by empirical work. These effects can be expressed as:

$$\partial S / \partial EX = \left( \frac{\partial S}{\partial W} \times \frac{\partial W}{\partial EX} \right) + \left( \frac{\partial S}{\partial E} \times \frac{\partial E}{\partial EX} \right) + \left( \frac{\partial S}{\partial C} \times \frac{\partial C}{\partial EX} \right) > or < 0, \quad (3)$$

Where W, E and C stand for the desire to exchange for the Korean won, exports, and collateral values.

#### 4. EMPIRICAL RESULTS

The data were collected from the *International Financial Statistics* published by the International Monetary Fund and the Bank of Korea. Bank loans are measured in billions of won. Real gross domestic product is selected to represent output and is measured in billions of won. The corporate bond yield is chosen to represent the interest rate on bonds. Bank deposits are measured in billions of won. The central bank policy rate is used as a monetary policy instrument. The exchange rate is measured as units of the Korean won per U.S. dollar (KRW/USD). The 10-year U.S. government bond yield is selected to represent the world interest rate. Bank loans and bank deposits are adjusted by the consumer price index and expressed in real terms. Except for interest rates, all other variables are expressed on a log scale. The sample ranges from 2001.Q4 to 2013.Q1 and has a total of 46 observations. The data for bank loans earlier than 2001.Q4 are not available.

Estimated coefficients, z values, and other related statistics are presented in Table 1. In real bank loan demand, 89.11% of the variation can be explained by the three right-hand side variables. All the coefficients are significant at the 1% level. If the lending rate rises 1 percentage point, the log of real bank loan demand will decline by 0.1317. A 1% increase in real gross domestic product will cause bank loan demand to rise by 1.6245%. A 1 percentage-point increase in the interest rate on corporate bonds will cause the log of real bank loan demand to rise by 0.0755.

In real bank loan supply, approximately 82.48% of the variation can be explained by the five right-hand side variables, and all the estimated coefficients are significant at 1% level. Real bank loan supply is positively affected by the lending rate and bank deposits and negatively associated with the policy rate, the KRW/USD exchange rate and the 10-year U.S. government bond yield. The estimated coefficient of 0.3591 for the lending rate suggests that the log of real bank loan supply is more sensitive to the lending rate than the log of real bank loan demand. A 1% increase in real bank deposits is expected to result in a 0.6894% rise in real bank loan supply. As the policy rate declines 1 percentage point, the log of real bank loan supply will rise by 0.2651. When the Korean won depreciates, real bank loan supply is expected to decrease. Hence, the negative effect of won depreciation dominates the positive impact.

**Table-1.** Estimated Regressions for Bank Loan Demand and Supply for South Korea

<b>Log (Demand for real bank loans):</b>		
	<b>Coefficient</b>	<b>Z statistic</b>
Lending rate	-0.1317	-3.15
Log(Real GDP)	1.6245	17.18
Corporate bond yield	0.0755	3.38
Intercept	-6.2395	-5.11
R-squared	0.8911	
Sample period	2001.Q4-2013.Q1	
Sample size	46	
<b>Log (Supply of real bank loans):</b>		
	<b>Coefficient</b>	<b>Z statistic</b>
Lending rate	0.3591	6.80
Log(Real bank deposits)	0.6894	2.72
Policy rate	-0.2651	-6.97
Log(KRW/USD exchange rate)	-1.8273	-8.29
10-year U.S. government bond yield	-0.1032	-2.97
Intercept	16.2272	3.88
R-squared	0.8248	
Sample period	2001.Q4-2013.Q1	
Sample size	46	

**Notes:** All the coefficients are significant at the 1% level.

When the money market rate is chosen to replace the policy rate, its coefficient of -0.2908 is significant at the 1% level. The coefficient of real bank deposits is positive and significant at the 10% level. Other results are similar. If the log of the nominal effective exchange rate is used to replace the log of the KRW/USD exchange rate, its coefficient of 1.0892 is significant at the 5% level. However, the negative coefficient of the 10-year U.S. government bond yield is insignificant at the 10% level. The value of R-squared also drops to 0.6035. To save space, these results are not printed here and will be made available upon request.

In Comparison, these studies did not cover the period of the recent global financial crisis beginning in 2008. The study by [Cho and Kang \(1999\)](#) did not distinguish between loan demand and loan supply. Although [Kim \(1999\)](#) separated loan demand and loan supply, he did not consider global factors such as the exchange rate and the foreign interest rate. In addition, this paper adopts a simultaneous-equation model consisting of bank loan demand and supply, incorporates global factors such as the exchange rate and the world interest rate, applies the more advanced three-stage least squares method, covers more recent periods including the global financial crisis, and yields statistical results that are consistent with the expected hypotheses.

## 5. SUMMARY AND CONCLUSIONS

This study has examined the demand for and the supply of bank loans for South Korea based on a simultaneous-equation model. The exchange rate and the world interest rate are incorporated into the model to capture potential international capital flows. The three-stage least squares method is employed in estimating regression parameters. A lower lending rate, more output, or a higher

interest rate on bonds would increase real bank loan demand. A higher lending rate, more bank deposits, a lower policy rate, appreciation of the won, or a lower 10-year U.S. government bond yield would increase real bank loan supply.

There are several policy implications. First, a simultaneous-equation model is more appropriate than a single-equation method because the supply of bank loans can be clearly identified. Second, expansionary monetary policy through a lower policy rate or open market purchases of government bonds is expected to increase bank loan supply. Although the coefficients of bank deposits and the policy rate have the expected sign and are both significant at the 1% level, the impact of a change in the policy rate is more directly measurable than the effect of a change in bank deposits because banks may have other avenues to raise funds and deposits in case of monetary tightening. Third, the recent upward trend of the KRW/USD exchange rate suggests that it would have a negative impact on bank loan supply.

## REFERENCES

- Altunbas, Y., O. Fazylov and P. Molyneux, 2002. Evidence on the bank lending channel in Europe. *Journal of Banking and Finance*, 26(11): 2093-2110.
- Arena, M., C. Einhart and F. Vázquez, 2010. The lending channel in emerging economics: Are foreign banks different? National Bureau of Economic Research, No. W12340.
- Bernanke, B.S. and A.S. Blinder, 1988. Credit, money, and aggregate demand. *American Economic Review*, 78: 435-439.
- Bernanke, B.S. and A.S. Blinder, 1992. The federal funds rate and the channels of monetary transmission. *American Economic Review*, 82(4): 901-921.
- Bernanke, B.S. and M. Gertler, 1995. Inside the black box: The credit channel of monetary policy transmission. *Journal of Economic Perspectives*, 9(4): 27-48.
- Cho, S.J. and J. Kang, 1999. The impact of monetary policy on bank lending behavior. *The Bank of Korea Economic Papers*, 2(1): 1-28.
- Gertler, M. and S. Gilchrist, 1994. Monetary policy, business cycles, and the behavior of small manufacturing firms. *Quarterly Journal of Economics*, 109(2): 309-340.
- Jimborean, R., 2006. Monetary policy transmission in transition economies: The bank lending channel. Mimeo.
- Kashyap, A.K. and J.C. Stein, 1995. The impact of monetary policy on bank balance sheet. *Carnegie-Rochester Conference Series on Public Policy*, pp: 151-195.
- Kashyap, A.K. and J.C. Stein, 2000. What do a million observations on banks say about the transmission of monetary policy? *American Economic Review*, 90(3): 407-448.
- Kashyap, A.K., J.C. Stein and D.W. Wilcox, 1993. Monetary policy and credit conditions: Evidence from the composition of external finance. *American Economic Review*, 83(1): 78-99.
- Kim, H.E., 1999. Was credit channel a key transmission mechanism following the recent financial crisis in the Republic of Korea. *World Bank Policy Research Working Paper No. 3003*.

- Kishan, R.P. and T.P. Opiela, 2000. Bank size, bank capital, and the bank lending channel. *Journal of Money, Credit and Banking*, 32(1): 121-141.
- Morris, C.S. and G.H. Sellon, 1995. Bank lending and monetary policy: Evidence on a credit channel. *Federal Reserve Bank of Kansas City Economic Review*, 80(2): 59-75.
- Oliner, S.D. and G.D. Rudebusch, 1995. Is there a bank lending channel for monetary policy? *Economic Review*, 2(Spring): 3-20.
- Olivero, M.P., Y. Li and B.N. Jeon, 2010. Competition in banking and the lending channel: Evidence from bank-level data in Asia and Latin America. *Journal of Banking & Finance*, 35(3): 560-571.
- Peek, J. and E.S. Rosengren, 1995. Is bank lending important for the transmission of monetary policy? An overview. *Federal Reserve Bank of Boston New England Economic Review*, November: 3-11.
- Peersman, G., 2004. The transmission of monetary policy in the euro area: Are the effects different across countries? *Oxford Bulletin of Economics and Statistics*, 66(3): 285-308.
- Ramsey, V.A., 1993. How important is the credit channel in the transmission of monetary policy?. NBER Working Paper No. 4285, National Bureau of Economic Research, Inc.
- Romer, C.D. and D.H. Romer, 1989. Does monetary policy matter? A new test in the spirit of friedman and schwartz. *NBER Macroeconomic Annual 1989*, 1989(4): 121-184.
- Sims, C.A., 1992. Interpreting the macroeconomic time series facts: The effects of monetary policy. *European Economic Review*, 36(5): 975-1000.
- Suzuki, T., 2004. Credit channel of monetary policy in Japan: Resolving the supply versus demand puzzle. *Applied Economics*, 36(21): 385-2396.
- Vera, D., 2012. How responsive are banks to monetary policy? *Applied Economics*, 44(18): 2335-2346.
- Zanforlin, L., 2011. Domestic lending when financial markets are integrated: Is it all for real? *Applied Economics Letters*, 18(16): 1517-1520.