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Monetary Policy in Transition:
The Case of Mongolia

Torsten Sløk

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Prepared by Torsten Sløk[1]

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Abstract

This paper analyzes monetary policy in transition. It examines the dynamics of monetary policy in Mongolia using granger-causality tests for monetary variables and inflation. The paper also analyzes money demand using data from 22 Mongolian regions during 1993-1998. The analyses confirm the key role of monetary policy in stabilization and reveal that even in a transition economy as rudimentary as Mongolia, a stable money demand and a predictable relationship between inflation and monetary variables do exist. Hence market-based monetary policy is effective. In addition, the analysis points to a difference between transition and industrial economies in the elasticity of money demand with respect to activity, reflecting the larger role for transactions demand for money.

I. INTRODUCTION

Until 1990 the Mongolian economy was based on a centrally planned model that had been adopted more than six decades earlier. Nearly all production and distribution activities were reserved for the state and concentrated in large monopolistic enterprises. Monetary policy was conducted by the single state bank and largely focussed on accommodating public sector credit. The central credit plan operated like a global directed credit scheme and interest rates were not a factor in the mobilization and allocation of resources or in managing aggregate demand.

This picture changed when Mongolia started its transition to a market economy and monetary policy has become more and more important since 1991. The monetary authorities have in the transition period adopted a pragmatic approach and stabilized inflation through a stable growth in the money supply and very high real interest rates. Furthermore, partly due to the large seasonal swings in the Mongolian economy, the monetary authorities have in some instances supported the exchange rate through intervention. This pragmatic approach does not fit clearly into the simple textbook model of one instrument, one target.

A precondition for monetary policy to be successful is a predictable and stable relationship between monetary variables and inflation. Below, this is analyzed for Mongolia in two econometric analyses. First, using granger causality tests is examined if the main monetary variables predict inflation (as well as the causality between the analyzed variables). Second, a money demand relation is estimated using a panel regression on regional data on money, activity, interest rates, and the exchange rate. The main conclusions are that even in a transition economy as rudimentary as Mongolia, such a precondition does exist and hence market based monetary policy is effective. In addition some of the key parameters – specifically the elasticity of money demand with respect to activity – appear to be significantly different than in industrial economies, reflecting the larger role for transactions demand for money.

Money demand is a key issue for economies in transition (Polak (1997)) and there are several studies of individual transition countries such as Albania (Kalra (1998)), Hungary (Nemenyi (1997)), Poland (Kokoszynski (1997)), Czech Republic (Hrncir (1997)), Slovakia (Makuch and Nemec (1997)), and Slovenia (Ross (1998)). These studies describe the different speeds of progress that have been applied in the Central and Eastern European countries and discuss the role monetary policy has had in the period of stabilization. Cross-country studies such as Hernandez-Cata (1999) and De Broeck and others (1997), study the relation between money, prices, and activity for a panel of transition countries. Most of these studies find a stable money demand relationship in transition countries using the same methods that are used when studying money demand in developed countries.

Mongolia's transition to a market economy has received only limited attention in the literature on transition countries and Mongolia has generally not been identified in cross-

country studies. Broader presentations of Mongolia's transition to a market economy can be found in Browne and others (1996), Kalra and Sløk (1999), and Goyal (1999).[2]

One simple measure of how transition is progressing in Mongolia relative to other transition economies is the level of real GDP in 1998 relative to what it was in 1989. Table 1 shows that using this measure Mongolia has been doing quite well.

Table 1. Development of real GDP in transition countries, 1989=100		
	1989	**1998**
Eastern Europe	100	93.4
CIS	100	54.0
Baltic States	100	71.4
Total above	100	64.5
Mongolia	100	93.1

Source: UN, Economic Survey for Europe, 1992, No. 2, Appendix Table B.1. Data for Mongolia are Fund Staff estimates.

Out of 27 transition countries only Poland, Slovenia, and Slovakia have been doing significantly better than Mongolia, and Czech Republic and Hungary have performed just as well as Mongolia. This simple measure has, however, limitations and does not say much about the level of institution-building and the role of policies in the individual transition countries. To analyze the role of policies and in particular the role of monetary policy in transition one has to take a closer look at the relationship between monetary variables and inflation and activity, and that is what is done in the following.

In Section 2 the role that monetary policy plays in transition is discussed. Section 3 focuses on the short-run dynamics of inflation and the variables of monetary policy, while Section 4 reports the money demand analysis using a panel of twenty-two regions in Mongolia. Section 5 contains the policy conclusions.

II. MONETARY POLICY IN TRANSITION

The key differences between monetary policy in a transition economy and monetary policy in a developed market economy are the effectiveness of financial markets and the inflation process.

Before market based monetary policy can work, there must be a market for money and foreign exchange. Specifically, it is important to have reserve requirements[3], refinance

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[2] For analyses of growth and disinflation in other transition economies see Havrylyshyn and Wolf (1999) and Cottarelli and Doyle (1999).

windows, government and central bank bills and bonds, credit allocation through banks or credit auctions, and a removal of credit ceilings and interest rate controls on commercial banks' deposit and lending rates.[4] The existence of an institutional framework for monetary policy is crucial to the way monetary policy functions, and if these instruments are lacking or malfunctioning it complicates the conduct and effectiveness of monetary policy. Most transition economies have gradually established an institutional framework and introduced instruments and financial markets that function in a similar manner - albeit on a smaller and less liquid scale - as in developed countries.[5]

The inflation process, however, is different in transition countries from that in more developed countries. Besides from the usual demand-pull and cost-push factors there are at least four additional ingredients that pose challenges to monetary policy. First, at the beginning of transition there is normally a substantial initial relative price adjustment when prices become market determined instead of being kept artificially high or low. Second, the initial adjustment in relative prices leads to a significant reallocation of resources. The resulting temporary drop in real activity generates less fiscal revenue, which, when combined with rigid expenditure patterns, increases the budget deficit and the domestic financing and that creates inflation. Hence an important element in controlling inflation in transition is to control the fiscal deficit. Third, downward rigidities in goods and labor markets combined with indexation of prices has in many transition countries generated permanent moderate inflation (in the range 15 – 40 percent per year) which has constituted a challenge to monetary policy.[6] Finally, privatization, institution-building, and the creation of competitive markets takes time in transition economies. Hence the speed with which competition and efficiency is introduced in the private sector is a critical ingredient in the inflation process in transition.

Mongolia enhanced the role of monetary policy in the economy in the early stages of transition. In May 1991 a two-tier banking system was developed replacing the previous central bank system. While directed credits were determined by the credit plan up to 1991, subsequently they were limited to priority sectors and oil imports until they were terminated in mid-1994. Bank-by-bank ceilings and interest rate controls on commercial bank deposit and lending rates were initially introduced but were all removed again. In August 1991 the central bank introduced reserve requirements at 20 percent on business deposits and 15

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[3] If financial markets are fully developed reserve requirements are not necessary to ensure well-functioning monetary policy, but in transition economies reserve requirements can be necessary.

[4] De Melo and Denizer (1997).

[5] However, most transition economies have experienced banking crisis during their transition and this can seriously complicate the use of monetary policy in transition.

[6] Estonia, Latvia, Moldova, and Poland are examples. The papers in Cottarelli and Szapary, eds. (1998) discuss the challenges of moderate inflation.

percent on household demand deposits and these have later been adjusted several times. In addition, the Bank of Mongolia introduced central bank bills in November 1993 which have been used frequently since and in March 1995 regular auction refinancing was introduced at market-determined rates. The degree of independence given to the central bank is surprisingly similar to that seen in many developed countries' central banks.[7] The Banking Law of Mongolia adopted in 1996 states that the two primary objectives of the Bank of Mongolia are to ensure price stability of the Mongolian togrog and to act as supervisor of the financial system. In sum, the institutions and the financial markets needed for monetary policy to be effective have to a large extent been created. But problems still remain in particular in the financial sector.

The Mongolian banking sector has over the transition period experienced major challenges including a high volume of non-performing loans. In terms of policy the two-tier system has functioned as one of the highest interest rate regimes in the world. The average monthly interest rate on loans from the Bank of Mongolia to commercial institutions has been very high and as a consequence the commercial banks charged economic entities and individuals monthly interest rates that ran as high as 17 pct. in 1993, 13.6 pct. in 1994, and 8.5 pct. in 1995.[8] With a relatively high currency ratio and a low money multiplier the policy of keeping a high real interest rate has been maintained throughout the transition period in order to maintain and restore confidence in the banking system.

Mongolia has been different from many other transition countries in four aspects. First, and most importantly, there has been a broad-based consensus in Mongolia on the need for a bold and comprehensive approach to reforms. Even with significant shifts in the governing coalitions and periods of political gridlock governments have pursued essentially the same set of objectives. Second, Mongolia has not – like many other transition countries – suffered from moderate inflation. Twelve-month inflation fell below 10 percent in the first half of 1998 (Figure 1) and has stayed low. Third, Mongolia has not experienced the large capital inflows often seen in the transition countries in Central and Eastern Europe; hence the challenges that such inflows constitute to the monetary authorities in many transition countries have been avoided. Fourth, the Mongolian economy has suffered significantly from the Asian crisis in 1997 and the Russian crisis in 1998. During this period authorities have focussed at the togrog/US dollar exchange rate and, as a consequence, the effective exchange rate (both nominal and real) appreciated significantly during 1997 and 1998. This

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[7] Even though the issue of a positive relationship between central bank independence and good inflation performance is controversial for transition economies, there seems to be evidence that such a relationship exists (see Loungani and Sheets (1997) and Lybek (1999)).

[8] Goyal (1999).

Figure 1. Mongolia: Consumer Prices, 1994-1999

Consumer Price Index

1995m12=100

12-month seasonally adjusted inflation
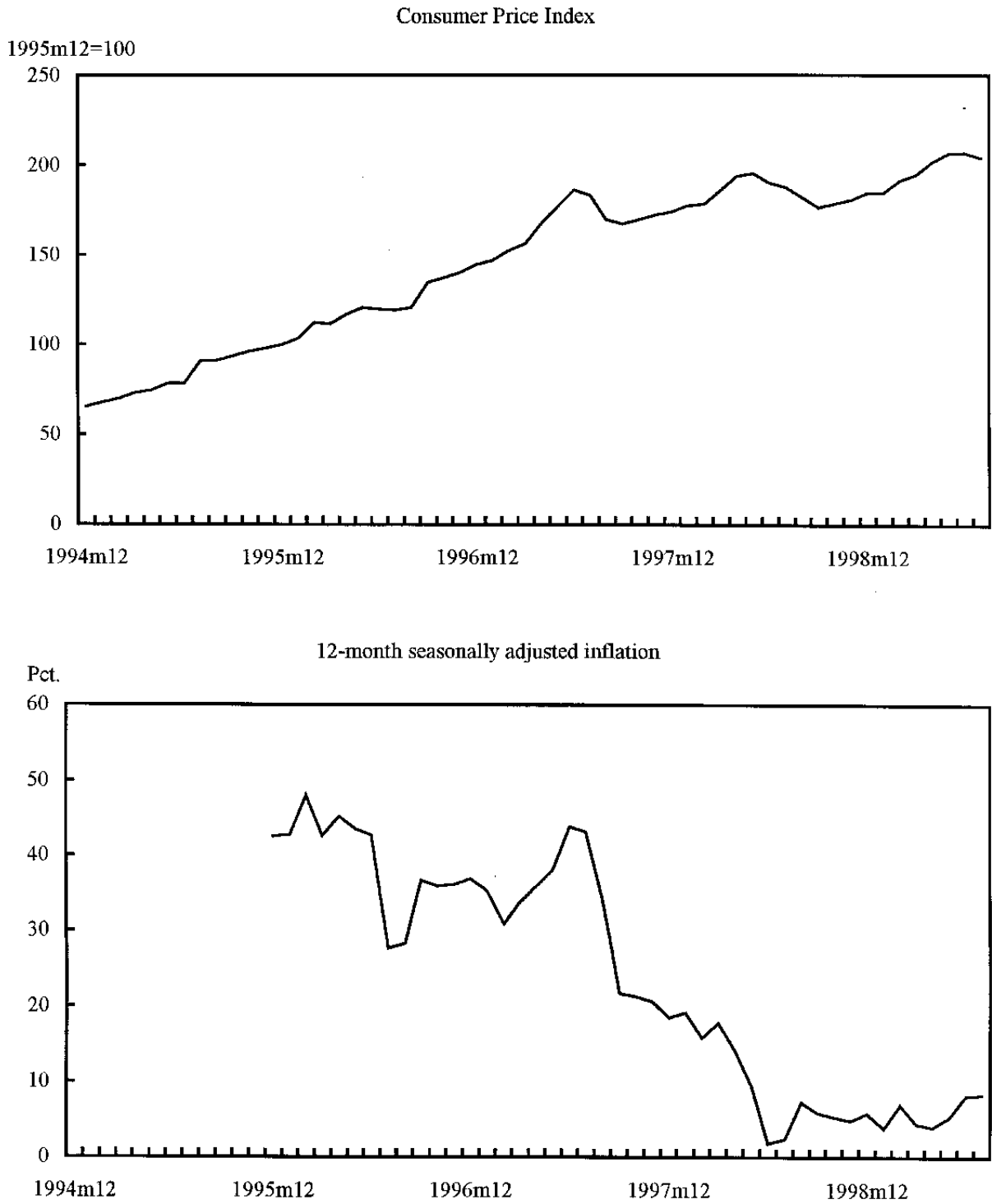
Source: Mongolian authorities.

appreciation has to some extent been instrumental in lowering inflation from the moderate range to the single-digits, although at some cost to output.

III. THE SHORT TERM DYNAMICS OF MONETARY POLICY IN TRANSITION

In this Section the inflation process and the short-term relationship between inflation and a number of variables will be analyzed using granger-causality tests. Granger-causality tests answer the question whether lagged values of a variable predict the future values of another variable. The exploratory nature of these tests is useful when, as in this case, there does not exist a well developed theory that captures the entire transition process. In this situation granger-causality tests allow the relationships underlying the transition process to be analyzed in an atheoretical manner, thereby providing an assessment of the dynamics of monetary policy in transition.[9]

The analyzed variables are the 12-month changes of: inflation, money supply, reserve money, exchange rate vis-à-vis the US dollar, and net credit to government (Figure 2). All series are monthly and come from the Mongolian authorities and are seasonally adjusted and cover the period December 1995 to June 1999. From Figure 2 it can be seen that the data in general does not seem to suffer from major structural breaks. The only exception is the change in level in net credit to government due to a one-off event from December 1996 to January 1997. The primary point of interest for the analysis is how the financial variables affect inflation in the short run.
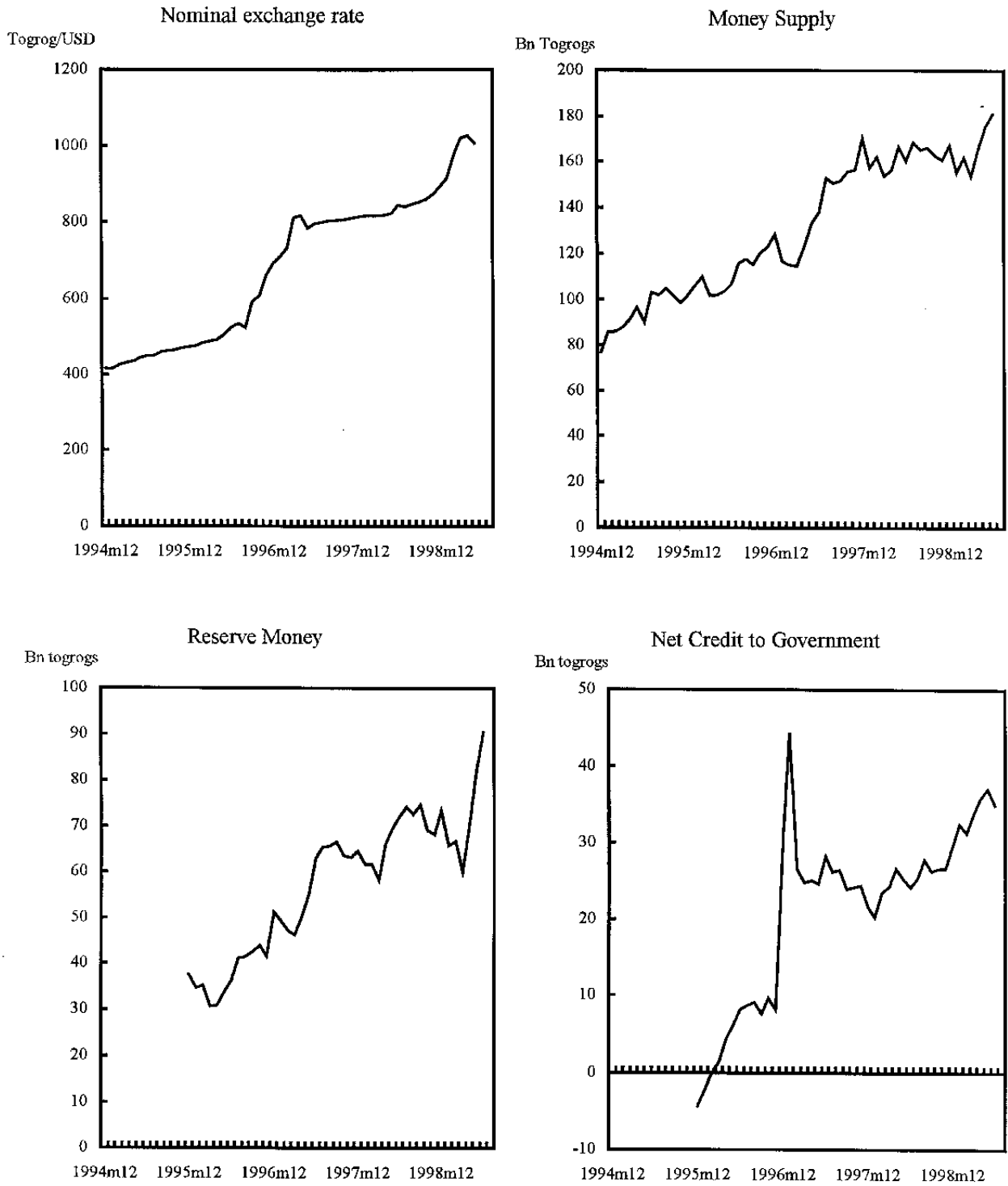
The method applied is to run granger-causality tests at successive lag lengths varying from 1 month to 6 months. The results from the exercise are shown in Diagram 1 which is an illustration of the changing relationship between the variables over time.

The first panel illustrates the very short run; namely a lag length of 1 or 2 months. At this lag length net credit to government plays a key role in the economy through the exchange rate. The exchange rate predicts the inflation rate which seems consistent with what one would expect. Furthermore, the exchange rate predicts money and reserve money which can be interpreted as a direct quantity effect; when the exchange rate depreciates it reflects an increase in the demand for foreign currency instead of Mongolian togrogs. In that sense a depreciation of the exchange rate can explain a drop in the demand for money.

The second panel shows the dynamics of the monetary sector for a lag length of 3 or 4 months. At this lag length the exchange rate now also has an effect on net credit to government. One explanation could be that if the exchange rate changes vis-à-vis the US dollar then there will be a distortion of the financing sources and that will lead to what could

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[9] This method has also been applied for Slovenia in Ross (1998). Ross concludes that inflation in the short run is determined by the exchange rate and growth in the monetary aggregates. In the following support is found for the same results using Mongolian data.

Figure 2. Mongolia: Monetary Indicators, 1994-1999

Nominal exchange rate

Togrog/USD

Money Supply

Bn Togrogs

Reserve Money

Bn togrogs

Net Credit to Government

Bn togrogs

Source: Mongolian authorities.

Diagram 1: Mongolia: The dynamics of monetary policy
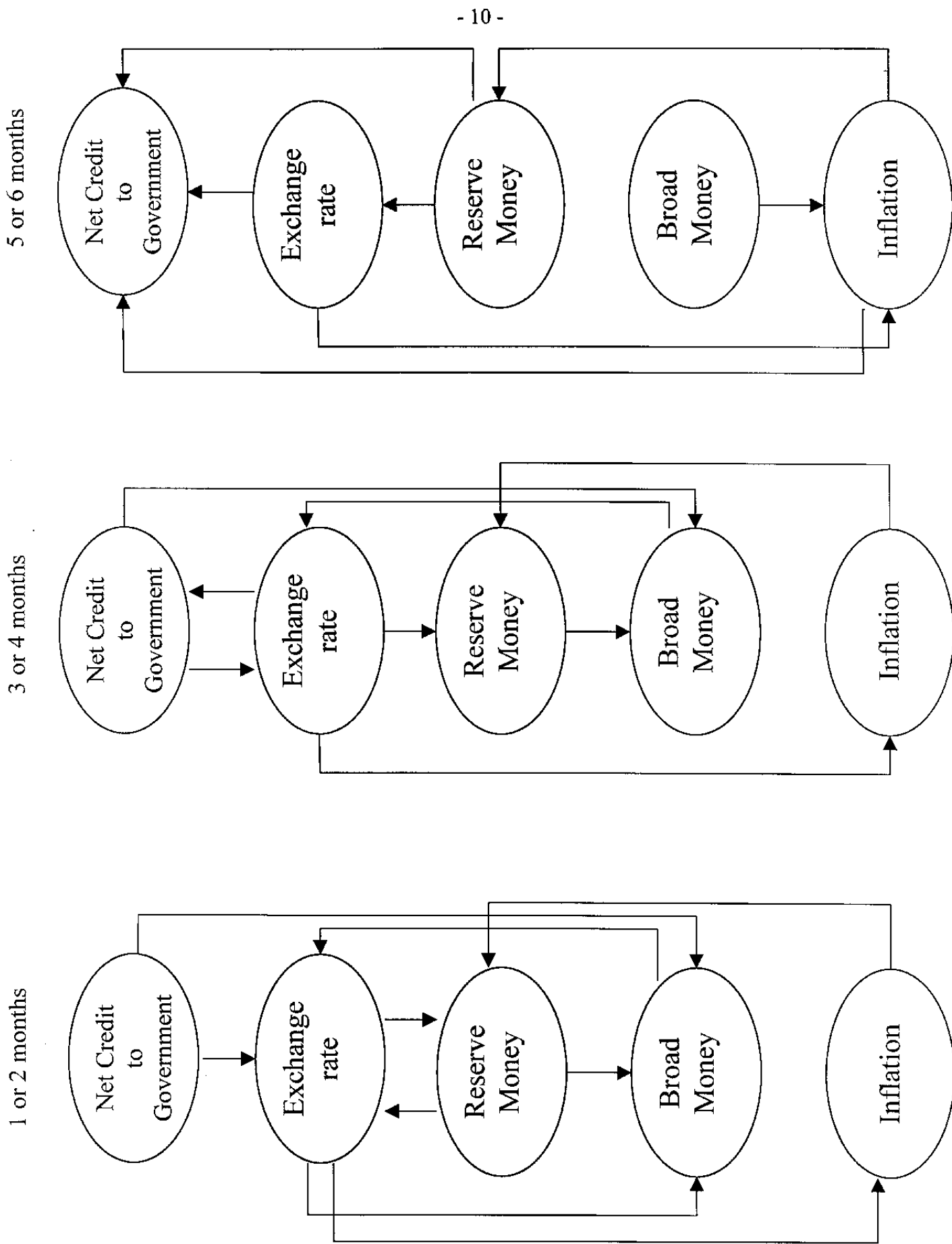
be denoted an endogenous change in net credit to government. Furthermore, it should also be noted that the exchange rate has stopped predicting the money supply after 3 or 4 months.

At lag lengths of 5 or 6 months inflation is still explained by the developments in the exchange rate. At this stage it is also predicted directly by the developments in the money supply. This can be interpreted as the direct quantity effect. In addition, at this lag length net credit to government has become an endogenous variable predicted by changes in the exchange rate, reserve money, and inflation.

One conclusion from this tentative analysis is that net credit to government plays a key role in transition. In the very short run net credit to government is exogenous and through the monetary variables it has an effect on inflation. In the longer term net credit to government becomes endogenous and a function of the other monetary variables. A second conclusion is that the exchange rate has a significant effect on inflation in the short run. At lag lengths between 1 and 4 inflation is only explained directly by the exchange rate. In the longer term (5 to 6 months) inflation is explained directly by both the exchange rate and the money supply. In other words if the exchange rate changes, agents in the economy immediately react by changing domestic prices. In the longer term inflation seems to be predicted also by the changes in the money supply which can be seen as a quantitative channel that affects the price level. Hence keeping a stable and predictable development of the exchange rate seems to be crucial in transition since movements in the exchange rate leads to changes in inflation at all horizons.

IV. MONEY DEMAND IN MONGOLIA

An essential element in conducting quantity based monetary policy is to have a stable money demand function. A significant relationship between money, activity, and interest rates enables policy-driven changes in monetary aggregates to have predictable influences on output, interest rate, and prices.[10]

For Mongolia there is currently no indicator for real activity at any higher frequency than annually. Hence it is not possible to carry out traditional time series money demand estimations. However, there exists data on deposits and activity on a regional basis and using this panel data set for the period 1993 to 1998 it is possible to estimate money demand across the regions.

The data set covers Mongolia's twenty-two regions and contains data on total individual bank deposits for each region and sales of industrial production for each region. In addition there exists national data on currency in circulation, M1, and the average loan rate at

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[10] A recent survey of the money demand literature can be found in Sriram (1999).

commercial banks, and the consumer price index for the Ulanbaataar area.[11] The data is from the Mongolian Statistical Yearbook 1997 and 1998.

At a theoretical level a strict interpretation of the classical Baumol-Tobin model of the transaction demand for money predicts an income elasticity of one-half.[12] However, time series studies often arrive at an elasticity of one and cross-sectional studies at an income elasticity higher than one. There are a number of papers analyzing money demand within countries using panel data (Mulligan and Sala-i-Martin (1992), Metzler, (1963), Feige and Swamy (1974), and Gandolfi and Lothian (1976), Fujiki and Mulligan (1996)). These studies all find that the income elasticity is significantly greater than one. Fujiki and Mulligan (1996) study money demand across regions in Japan and find income elasticities between 1.2 and 1.4. Mulligan and Sala-i-Martin (1992) estimate cross-sectional money demand for United States (excluding Alaska and Hawaii) and from their preferred money demand relationships they arrive at income elasticities between 1.3 and 1.5. Mulligan and Sala-i-Martin argue that the income elasticity is over one since the process of economic development is associated with a larger number of vertically integrated firms (using more complicated technologies with more varieties of inputs and interacting with a larger number of suppliers). When firms need money to transact with other firms, but not for internal transactions, a higher level of income will be associated with a more than proportionally higher level of money demand. To the extent this is correct, a lower income elasticity must be expected in transition economies since the level and complexity of transactions in banks and firms are much less sophisticated than in highly developed economies.

Subtracting national M1 from national currency in circulation gives overall deposits in the economy, which can be used to calculate a proxy for the money stock in each region. Specifically, the ratio of national money over deposits over the period 1993 to 1998 is multiplied on the regional deposit series to get a proxy for the regional money stock. With these variables at hand it is possible to carry out a pooled estimation of money demand across regions in Mongolia estimating an equation where log of real money (m) is explained by log of real sales (y), the real interest rate (R), and log of the real exchange rate vis-à-vis the US Dollar (i.e., an increase denotes a depreciation).

The estimated equation has the following form,

$$m_{it} = \alpha_1 + \alpha_2 y_{it} + \alpha_3 R_t + \alpha_4 e_t$$

Table 2 shows that the money demand elasticities in Mongolia are different from those found for developed countries.

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[11] Unfortunately no other CPI data is available and in the following it is assumed that the Ulanbaataar price level is the same as in every region or at least that it is uncorrelated with the level of income.

[12] See Baumol (1952) and Tobin (1956).

Table 2. Mongolia. Money demand estimation		
Dependent variable: m	Model	
	Common constant	**Fixed effect**
y	0.48 (10.98)	0.54 (6.86)
R	1.31 (2.89)	1.21 (4.29)
e	-0.37 (1.29)	-0.38 (2.39)
Constant	0.15 (0.44)	
R^2	0.54	0.88
F-statistic	51.78	408.50
Prob(F-stat)	0.00	0.00
S.E.	0.80	0.44
Number of observations	132	132
Hausman Specification test		0.13 (0.94)

Note: Values in parentheses are t-statistics, except for the Hausman test where it is the p-value of the $\chi^2(1)$ test.

The coefficient on income in the estimations is around one-half. This relatively low value stands in contrast to the estimates between 1.2 and 1.5 found in the cross-sectional studies for US and Japan. As discussed above, a lower coefficient than that which is found for developed countries could indicate that the level of economic development is important for this elasticity. In addition, the income variable for Mongolia is probably a better indicator of transactions in the economy as imagined in Tobin's original model than the income variable in developed countries. In other words a transition economy is characterized by a larger transaction demand and hence less flows of funds between accounts which explains the smaller elasticity.

This low elasticity also has an important policy implication. In a simple IS-LM framework, a low income elasticity implies that the slope of the LM curve is flatter, so changes to the IS curve (such as through fiscal policy) have large effects on activity. If transition countries are characterized by a flat LM curve then fiscal policy will have a bigger effect on real activity than on real interest rates. In an environment characterized by unstable fiscal policies, this can lead to greater macroeconomic instability.

There is currently no long term interest rate available for Mongolia and the interest rate used here is the average loan rate at commercial banks. The positive sign on the interest rate has also been found for several other transition countries in time-series studies (e.g. Kalra (1998)), and it can be seen as an illustration of the general policy in transition economies of providing incentives for households to use the formal banking system for savings. Even in periods with banking crises Mongolian authorities have maintained a high real interest rate in order to continue to attract deposits to the formal banking system. The positive sign also indicates that as financial markets develop it will be necessary to follow closely the influence interest rates have on money and hence also price stability.

The coefficient on the real exchange rate is significant with a negative sign which illustrates that a depreciation in the real exchange rate leads to a drop in real money demand. This is not surprising since a depreciation is associated with selling of domestic currency and hence a fall in money demand.

When a time trend is included in the model to capture the trend in the stabilization process that Mongolia is undergoing these years (not reported here for sake of brevity), this change has little influence on the significance and the size of the other coefficients.

In sum, there exists a relationship between money and activity in Mongolia which leads to two policy conclusions. First, if there is a stable relationship between money and activity, money can be used as a guide for conducting monetary policy in Mongolia. Second, the monetary authorities have used money as an instrument to target inflation and since there is a significant money demand relationship this can be interpreted as having been a successful strategy.

V. ROBUSTNESS TESTS

In order to check the estimated money demand relationships a number of sensitivity tests have been carried out.

First, a Hausman test has been carried out for the fixed effects versus the random effects model and it gives no indications of problems with the specification of the model.

Second, in Mulligan and Sala-i-Martin (1992) money is only a function of income and estimating the same relationship on the Mongolian data does not change the fact that the income elasticity is around one-half.

Third, Mulligan and Sala-I-Martin's study of the US has been criticized for the fact that some regions specialize in providing banking services to out-of-state residents without them living, spending, or earning income in that region (Mankiw 1992). To test if the same situation is present in Mongolia, the individual regions have been removed one by one to check if the coefficients change as a consequence of that. Figure 3 to 6 show the coefficients and the R^2 from such 'excluding regressions'. The overall picture is that there are no regions that seem to change the coefficients significantly. In particular as seen in Figure 3 the income elasticity exhibits a very stable pattern close to one-half. The coefficient to the interest rate which only varies across time seems to be a bit more volatile, perhaps indicating the fact that some regions are more developed with respect to banking systems than others. The exchange rate also displays a stable pattern and that is also the case with R^2 for the regressions except in the

Figure 3. Coefficient on income when
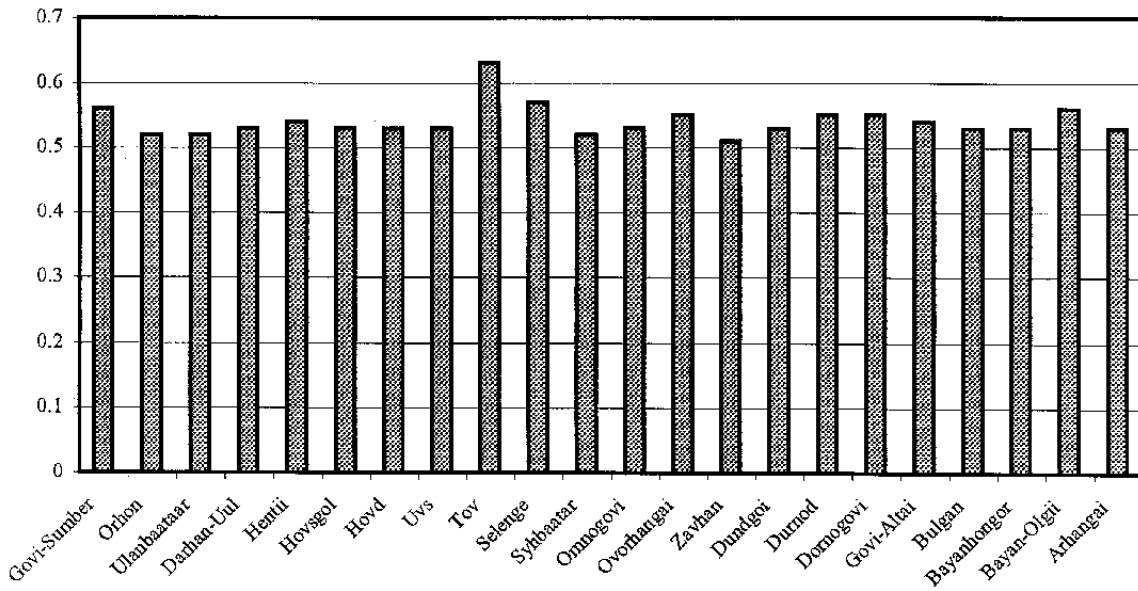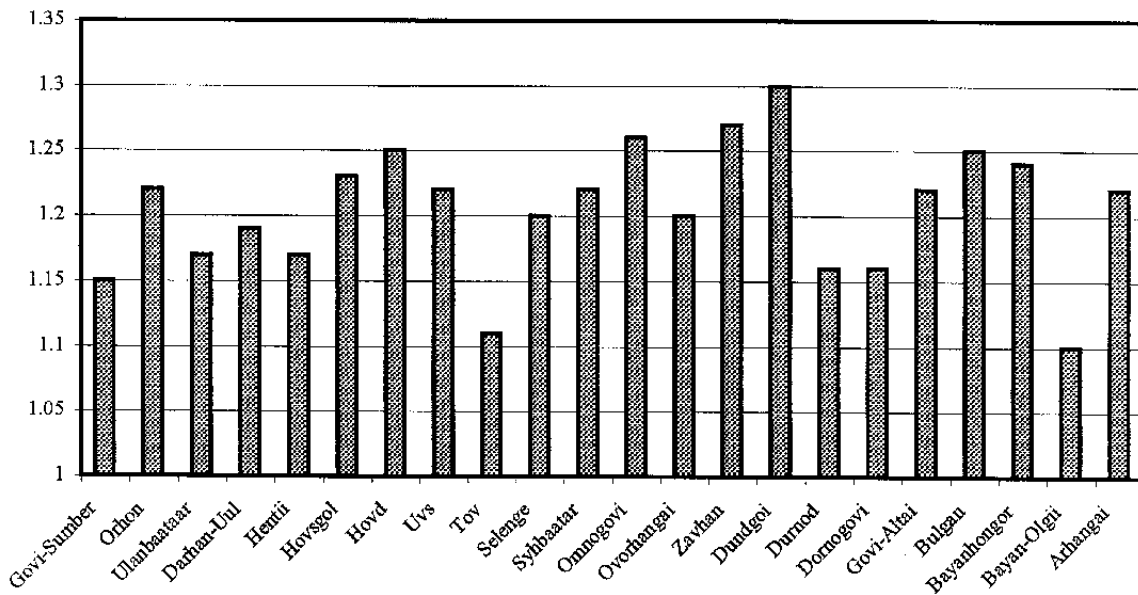excluding regions one-by-one

Figure 4. Coefficient on interest rate when
excluding regions one-by-one

Source: Fund staff estimates.

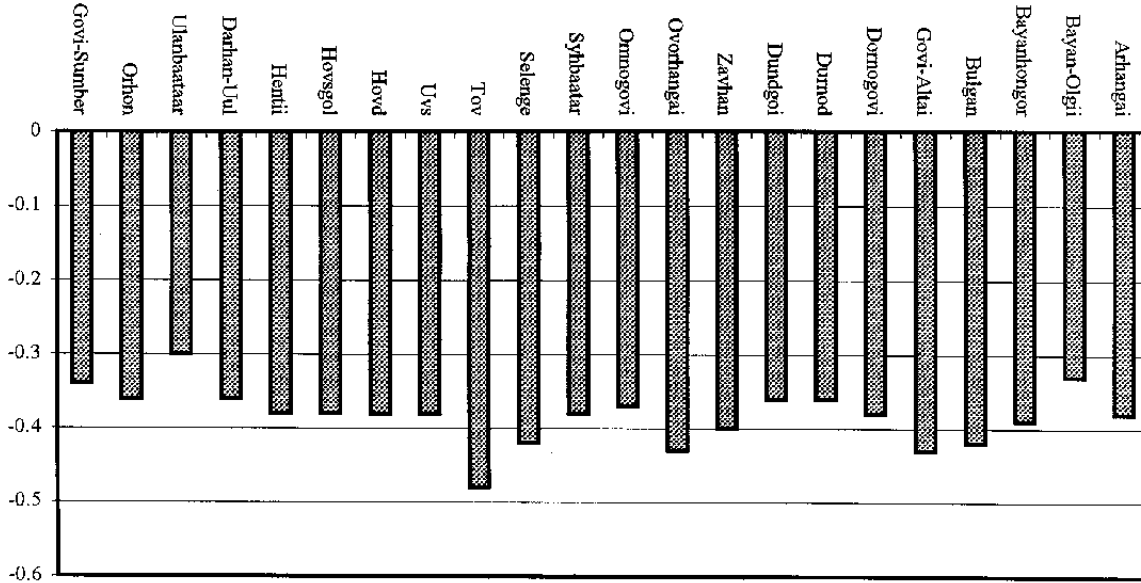Figure 5. Coefficient on exchange rate when
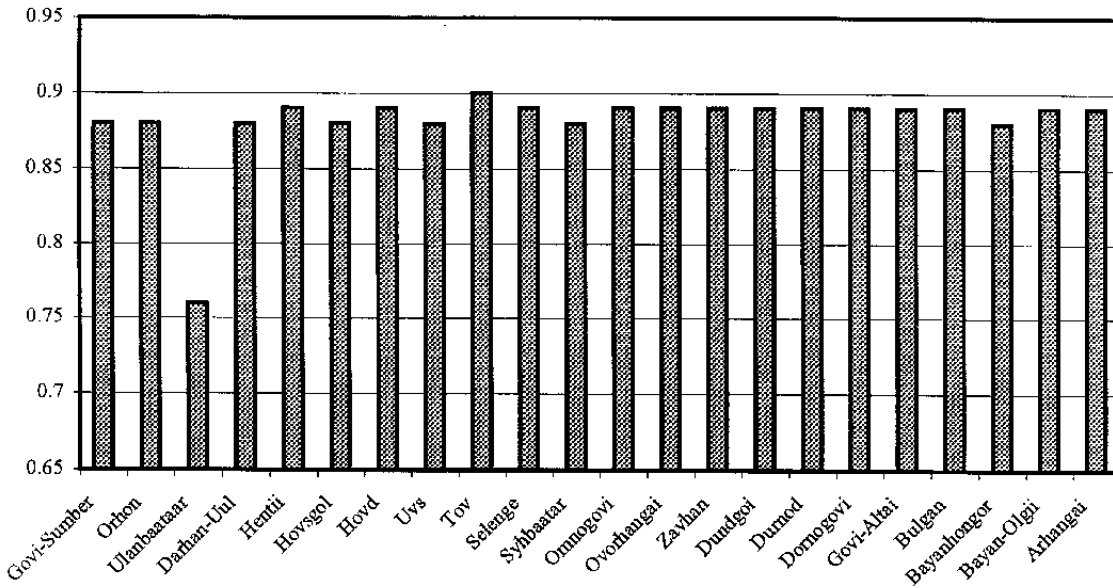excluding regions one-by-one

Figure 6. R-squared when
excluding regions one-by-one

Source: Fund staff estimates.

case where the exclusion of the Ulanbaataar observations from the data yields a relatively lower explanation of the equation.

Fourth, estimating the equations in Table 2 using demand deposits as the left-hand side variable does not change the elasticities to income (estimations not shown). This is not surprising since the relationship between regional demand deposits and the regional money stock variable is a constant that only changes slightly over the analyzed years.

Fifth, adding inflation to the estimation in Table 2 gives a significant and positive coefficient to the inflation variable in the money demand equation and does not change the result that the income elasticity is close to one-half.

Sixth, using the nominal interest rate instead of the real, the income elasticity is still close to one-half, except in the case with fixed effects and a trend where it falls to around one-quarter.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

This paper has tried to map the dynamic relationship between inflation and a number of monetary variables. First, net credit to government plays a significant role in the short run indicating the important role of fiscal policy in transition. Second, the results of the granger-causality tests were consistent with the results found in Ross (1998) for Slovenia; in the short run inflation is explained by movements in the exchange rate and in broad money.

Furthermore, a money demand relationship was found across a panel of regions. This indicates, first that money can be used as a guide for monetary policy in Mongolia. Second, it mirrors the policy of a relatively controlled expansion of the money supply that the Mongolian authorities have pursued in order to stabilize inflation.

The policy conclusions are that even in a transition economy as rudimentary as Mongolia, a stable money demand and a predictable relationship between inflation and monetary variables do exist and hence market based monetary policy is effective. It is, however, necessary that the authorities continue with structural reforms in particular in the financial and public sector. The transition to a market-economy is a complex process where it takes time for the economy to build new institutions and get used to these institutions. In the process of transition, institution-building is clearly important but it is also important that the economy is stabilized so that there is a framework for the new institutions to work within. The analysis in this paper suggests that the Mongolian authorities have been successful in reaching this target.

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