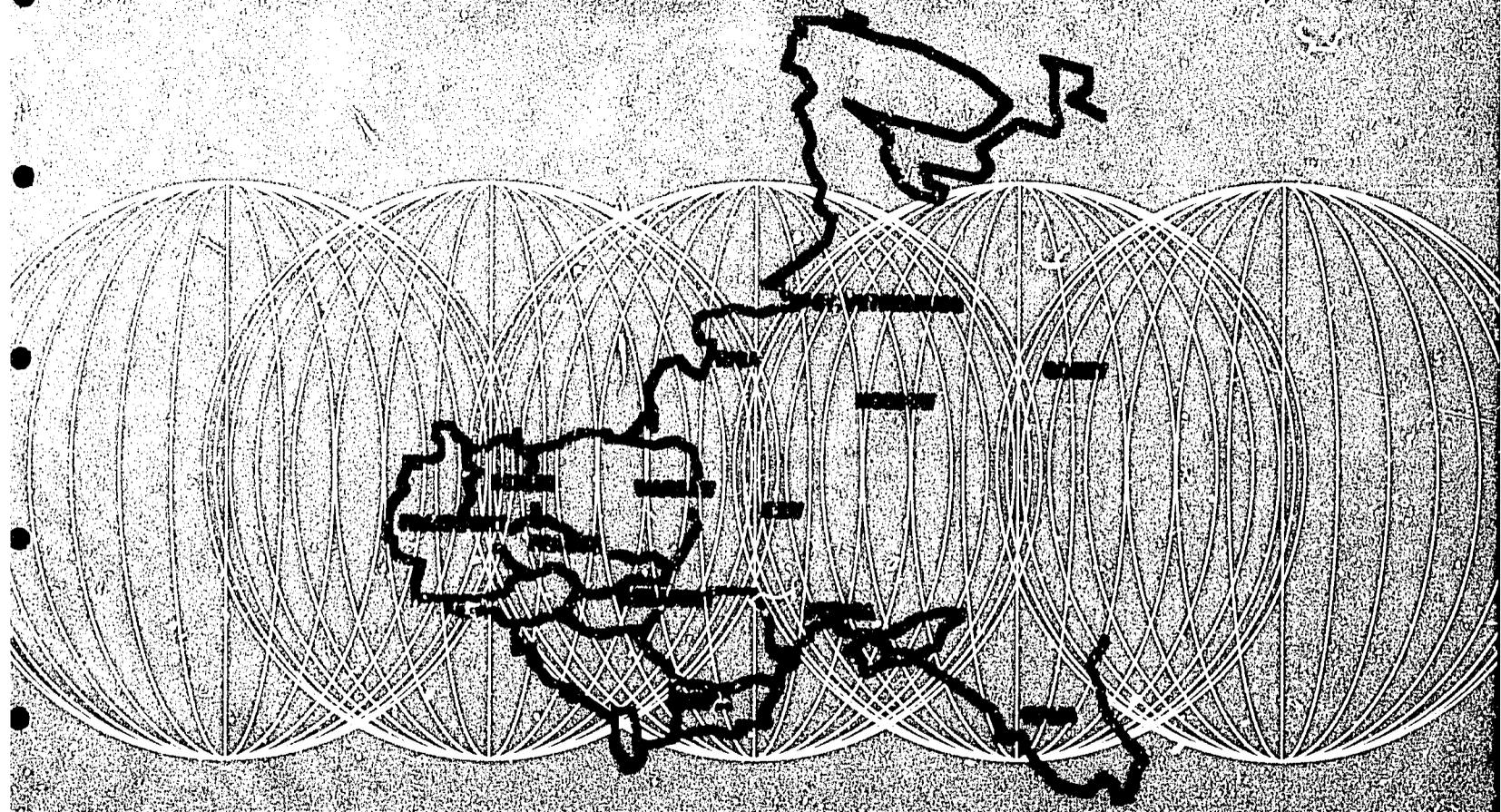
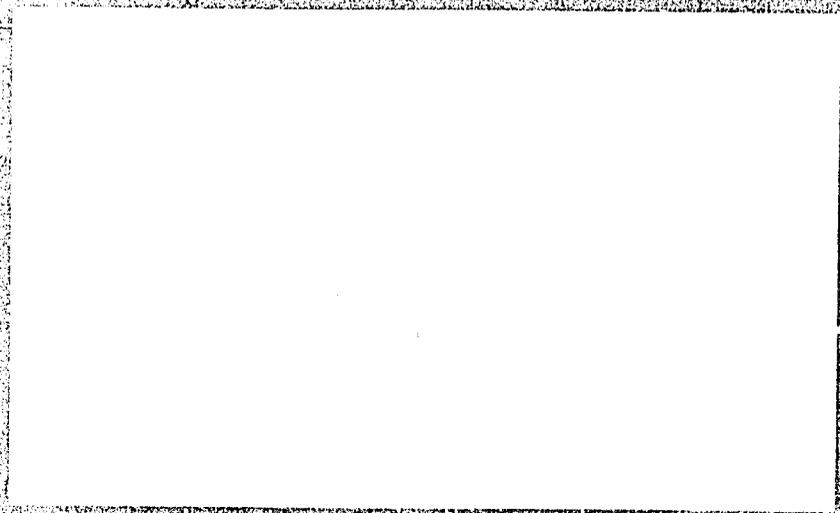


PN-ABP-205 82566

AN INTERNATIONAL ACTIVITIES PROJECT

FROM PLANNING TO MARKETS

HOUSING IN EASTERN EUROPE



THE URBAN INSTITUTE
Prepared for the Office of Housing and Urban Programs (USAID)

PN-ABP-205

**PRODUCT DESCRIPTION FOR THE
DEFERRED ADJUSTABLE INSTRUMENT
FOR RUSSIA**

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Project 6306-05
March 1993

Prepared for

Shelter Sector Reform Project, Russian Federation/City of Moscow
Project 110-0008

U.S. Agency for International Development, PRE/H/NIS
Contract No. CCS-0008-C-00-2055-00, Task Order No. 5

ABSTRACT

This paper details the characteristics of a new housing credit instrument for use in Russia. The Deferred Adjustable Instrument for Russia (DAIR) is affordable for households and ensures lenders an adequate return on their investment.

The DAIR uses two interest rates: (1) The "contract rate" to calculate what the borrower owes. This rate is set with a fixed spread above the interbank lending rate. Thus the contract rate changes as the interbank lending rate changes. (2) A separate, lower rate to calculate what he pays each month (the "payment rate"). This rate is set at an amount slightly higher than the contract interest rate's spread over the interbank rate.

The DAIR does not fully insulate lenders from increases in their servicing expenses. The faster the DAIR's outstanding loan balance declines in real terms, the larger the difference between servicing costs and payments designed to cover them. However, the faster the outstanding loan balance declines in real terms, the easier it will be for borrowers to prepay their balance. The bank can reduce losses from servicing expenses by aggressively promoting prepayment.

For most of the life of a DAIR, a significant portion of interest is capitalized. Setting up a capitalized interest reserve account will allow banks to avoid taxation on interest until it is due to be received.

PRODUCT DESCRIPTION FOR THE DEFERRED ADJUSTABLE INSTRUMENT FOR RUSSIA

Introduction

This paper details the characteristics of a new housing credit instrument for use in Russia. The Deferred Adjustable Instrument for Russia (DAIR) is affordable for households and ensures lenders an adequate return on their investment. For the purposes of this analysis, an affordable credit is defined as a loan:

- For which initial payments are approximately equal to payments on relatively low-interest, fixed rate credits of equal size; and
- Which provides a reasonable guarantee that repayments will remain below 30 percent of household income over the life of the loan.

An adequate return is defined as a return that exceeds the lender's opportunity cost of issuing the credit. In the current Russian context (March 1993), the return the lender would receive on a series of loans made in the interbank market is used as a proxy for this opportunity cost. The DAIR's initial rate is set several points higher than the interbank lending rate (to cover the risks faced by the bank in extending the loan and loan servicing costs). This spread over the interbank rate remains constant over time. Thus, the rate on the loan is changed as the interbank lending rate changes, and the DAIR lender receives a return that is a fixed spread above the interbank lending rate.

Many mortgages in the U.S. are priced similarly. These loans' interest rates fluctuate based on a fixed spread above the Eleventh District Cost of Funds Index (COFI). (The COFI is the average cost of funds for a group of U.S. banks.) Banks determine the spread they charge over the COFI based on the likely future relationship between the COFI and a measure of their opportunity cost of making the loan (often the rate of return on a Treasury bond of equal duration). Banks are able to do this because the likely future relationship between the COFI and the treasury bond rate can be predicted with relative accuracy.

In Russia, where the future relationship between a bank's cost of funds and its opportunity cost of lending is very difficult to measure, banks can greatly reduce their risk by pricing directly from their opportunity cost—the strategy employed for pricing the DAIR.

While measuring profitability based on income in excess of opportunity costs is the norm for Western businesses, some international mortgage instruments use different standards for establishing profitability. The Price Level Adjusted Mortgage (PLAM), for example, prices loans as a spread over inflation. This pricing strategy is successful in countries that have high and/or variable inflation and banking industries that earn a relatively constant return above inflation. For these banks, the

PLAM will provide a return that matches the return they receive on the rest of their asset portfolio. In contrast, banks in Russia are currently earning returns far below the level of inflation. Therefore, choosing a PLAM-type of lending instrument would impose a profitability standard (positive real return greater than inflation) that is unreasonably high when no other banking asset is performing at this level.

Thus, the DAIR ensures banks a return on housing credits in line with the return they receive on other assets. By pricing directly off a variable measure of the banks' opportunity cost of lending, banks avoid the difficulty of determining a fixed spread that will approximate this opportunity cost over time.

Mechanics of the DAIR

The DAIR is one of a family of credit instruments that promotes affordability by allowing payments to start at a relatively low level and increase over time. In economic environments with high inflation, standard fixed or variable rate mortgages require lenders to charge high nominal interest rates on loans in order to maintain a positive real return. This high nominal interest rates leads to high initial loan repayments (in nominal and real terms). However, as time passes the real value of the loan payment is eroded by the continuing inflation—the real repayment of the loan is "tilted" towards the beginning of the loan term.¹

Loans with increasing nominal payments allow borrowers to make lower payments in the early years of the loan term when their incomes are relatively low in nominal terms. To ensure that the lender receives an adequate profit, payments increase over time. However, because inflation is high in Russia, payments increasing in nominal terms will remain affordable to households (whose incomes are likely to move at least partially in line with inflation) in real terms. An example of the mechanics of DAIR amortization is summarized in Annex 1 of this report.

The DAIR uses two interest rates:

- One to calculate what the borrower owes each month (the "contract rate"). This rate is set with a fixed spread above the interbank lending rate. Thus the contract rate changes as the interbank lending rate changes.
- A separate, lower rate to calculate what he pays each month (the "payment rate"). This rate is set at an amount slightly higher than the contract interest rate's spread over the interbank rate.

¹ See Jeffrey P. Telgarsky and Katharine Mark (1991), "Alternative Mortgage Instruments in High-Inflation Economies," *Housing Finance International* 6, 1(September): 27-46, for a discussion of these problems and the use of alternative mortgage instruments.

For example, if the interbank rate is 6.5 percent *per month*, the contract interest rate might be 7.0 percent per month. Thus, the contract rate's spread over the interbank rate would be 0.5 percentage points per month, and the payment rate would be slightly above this 0.5 percent spread—for example, 0.8 percent per month.

Initial DAIR repayments are about the same size as payments made on relatively low-interest, fixed rate mortgages. (In this analysis, a 15-year, 10 percent loan is used.) The first payment the borrower would make in the example above is the amount that would have to be paid each month to fully pay off the initial loan balance over the full term of the loan at a 0.8 percent monthly payment interest rate.² This is equivalent to the size of the first payment made on a fixed rate mortgage with the same loan term and a 0.8 percent monthly interest rate.³

The difference between the interest the borrower owes each month (based on the contract rate) and the lower amount the borrower pays (based on the payment rate) is added to the outstanding loan balance. For the example above, the interest the borrower owes in the first month of a 15 year, Rb. 8 million loan with a 7.0 percent contract rate would be Rb. 560,000. The payment in the first month would be the amount the borrower would have to pay each month to fully pay off the Rb. 8 million loan balance over the full 15 year term of the loan at a 0.8 percent monthly payment interest rate. This amount is about Rb. 84,000. Thus, at the end of the first month, the loan balance would increase by about Rb. 476,000.

Since the outstanding loan balance is increasing, every three months payments are increased to an amount sufficient to pay off the new outstanding balance at the monthly payment interest rate over the remaining term of the loan. As detailed below, payments increase at a rate slightly less than the interbank lending rate.

The contract interest rate determines the bank's return because it is the rate that determines interest accrual. This contract interest rate is always a fixed amount above the interbank rate; the bank is guaranteed a return above that which it would receive on the interbank market. In the example above, the interbank rate was 6.5

² The formula to calculate this payment is:

$$\text{Payment} = \text{Principal} \left[\frac{\text{Rate}}{1 - (1 - \text{Rate})^{-\text{Term}}} \right]$$

where Principal is the amount of the loan;
Rate is the monthly payment interest rate of the loan;
Term is the term of the loan in months.

³ When compounded monthly, a 0.8 percent monthly interest rate is equivalent to a 10 percent yearly interest rate.

percent per month, and the contract rate was 7.0 percent per month.

The payment rate is set above the contract rate's spread over the interbank rate. In the example above, the payment rate is 0.8 percent per month and the contract rate is 0.5 percent higher per month than the interbank rate. Therefore, each payment the borrower makes pays off all the interest that accrues because of the spread and some of the interest attributable to the interbank rate. In the example above, of the total payment made based on the 0.8 percent payment interest rate, 0.5 percent interest pays off the spread of the contract rate over the interbank rate and the remaining interest pays off 0.3 percent of the 6.5 percent monthly interbank interest rate.

The difference between what the borrower owes and what he pays is added to the loan balance, and this difference is less than the interbank lending rate. For the example above, the borrower owes interest of 7.0 percent per month (the contract rate), and pays interest of 0.8 percent per month (the payment rate). The difference (6.2 percent interest) is less than the interest owed because of the interbank interest rate (which is 6.5 percent). Therefore, the loan balance increases by 6.2 percent, which is less than the interbank interest rate.

Since payments are continually adjusted based on the outstanding loan balance, they also will increase at a rate slower than the interbank rate. For the example described above, if the interbank rate remained at 6.5 percent per month, payments would increase by about 6.2 percent per month. Given that inflation this year (1993) is likely to be more than 25 percent per month, a 6.2 percent monthly increase in payments should be very affordable. Simulations detailed in Annex 2 of this report show that even if household income significantly lags inflation, a DAIR underwritten with a 30 percent payment-to-income ratio will have an actual payment-to-income ratio that never exceeds 24 percent, and which declines to under 5 percent by the fifteenth month of repayment.

The loan always closes on time because payments are increased every three months to an amount high enough to repay the loan outstanding at that time in the remaining term.

Issues

This section reviews three issues associated with the DAIR:

- Default reserves;
- Servicing costs; and
- Taxation.

Default Reserves. Reserves required to counter default losses will increase at roughly the same rate as the payments that build these reserves. In contrast, servicing costs will increase faster than the payments that cover these expenses (see below).

The DAIR provides the lender a return above that which it would receive on a similar series of interbank loans made over the same period. The difference between the DAIR contract interest rate and the interbank rate should be high enough to provide reserves against default. The reserve required to protect a lender from default losses on the DAIR is a approximately fixed percent of outstanding DAIR loan balances. As the DAIR's outstanding loan balances increase over the initial years of loan repayment, the reserves required will increase. Payments to cover this reserve are also a fixed percent of the outstanding loan balance, and will increase at the same rate.

Servicing Costs. Servicing costs are based on the total number of outstanding loans, and are independent of loan size. These costs will increase roughly in line with inflation. For each loan, payments to cover servicing costs are a fixed percent of the outstanding loan balance, and will therefore increase at the same rate as the nominal loan size. However, the loan balance will increase at a rate slightly below the interbank lending rate—which is far slower than the inflation rate. Therefore, for each loan, servicing expenses are likely to increase much faster than the payments that cover them.

Fixed rate mortgages price for servicing costs in a similar way, and have outstanding balances that decline in nominal terms over the entire life of the loan. For these fixed rate loans, this problem of servicing payments not covering servicing expenses would be even more severe in the current Russian economic climate. Thus, though the DAIR also faces this problem, it represents a lessening of the risk faced by banks.

To counter this decline in the ratio of servicing payments to servicing costs, banks should encourage borrowers to prepay loans with relatively small real outstanding loan balances. Given that inflation in Russia is likely to be much higher than the interbank lending rate for the next several years, the real value of DAIR loans should decline relatively rapidly, and borrowers should be encouraged to prepay their loans after only a few years.

Taxation. For most of the life of a DAIR, payments received are smaller than interest accrued, and the difference between the interest owed and the payment is capitalized. Banks issuing the DAIR must avoid paying taxes on interest revenues until they are due to be received. An accounting system can be set up that allows banks to avoid taxation on capitalized interest by creating a capitalized interest

reserve account. An example illustrating this system is detailed in Annex 3.

Conclusion

The Deferred Adjustable Instrument for Russia (DAIR) is affordable for households and insures lenders an adequate return on their investment. It is priced similarly to many Western mortgages in that it provides lenders a return in excess of their opportunity cost of lending.

The DAIR does not fully insulate lenders from increases in their servicing expenses. The faster the DAIR's outstanding loan balance declines in real terms, the larger the difference between servicing costs and payments designed to cover them. However, the faster the outstanding loan balance declines in real terms, the easier it will be for borrowers to prepay their balance. The bank can reduce losses from servicing expenses by aggressively promoting prepayment.

For most of the life of a DAIR, a significant portion of interest is capitalized. Setting up a capitalized interest reserve account will allow banks to avoid taxation on interest until it is due to be received.

ANNEX 1
EXAMPLE OF DAIR MECHANICS

Table 1.1		
Summary of Deferred Adjustable Instrument for Russia (DAIR)		
	Monthly	Annually
Affordability		
Initial monthly household income (Rb millions)	0.3	3.4
Initial share of income to housing (%)	30.0	30.0
Payment rate (%)	0.8	10.0
Loan term (months/years)	180.0	15.0
Loan amount (Rb millions)	8.0	8.0
Contract Interest Rate		
Initial interbank lending rate (%)	6.50	113
Interest rate spread over interbank rate (%)	0.39	4.8
Initial contract interest rate (%)	7.00	125.1
Results		
Maximum payment-to-income ratio (%)		24.2
Discounted value of payments (as percent of interbank loan)		139.1

Table 1.2
DAIR Amortization

Month /Year	Contract Rate	Rubles (millions)			Payment/ Income (percent)	Real Loan Balance (percent of initial loan)
		Interest Owed	Payment Owed	Post Payment Loan Balance		
Mo. 1	7.00	0.560	0.084	8.5	24.2	84
2	7.22	0.612	0.089	9.0	20.8	71
3	7.45	0.670	0.095	9.6	17.9	60
4	7.67	0.734	0.101	10.2	15.6	51
5	7.90	0.806	0.108	10.9	13.6	44
6	8.12	0.886	0.116	11.7	11.9	38
7	8.35	0.974	0.124	12.5	10.5	33
8	8.57	1.073	0.134	13.5	9.3	28
9	8.79	1.184	0.144	14.5	8.2	25
10	9.02	1.308	0.156	15.7	7.4	22
11	9.24	1.447	0.169	16.9	6.6	19
12	9.47	1.604	0.183	18.4	6.0	17
Yr. 2	10.66	5.064	0.532	52.1	1.9	5
3	11.69	17.428	1.738	164.7	0.7	2
4	12.51	64.453	6.297	573.2	0.3	1
5	13.14	251.243	24.699	2,139.2	0.2	0
6	13.34	985.640	101.689	8,270.9	0.1	0
7	13.38	3,824.467	424.458	31,993.9	0.1	0
8	13.34	14,572.271	1,774.296	122,026.6	0.1	0
9	11.09	41,017.692	6,700.676	404,042.3	0.1	0
10	7.51	66,667.676	18,427.686	935,616.2	0.1	0
11	6.22	94,489.446	37,553.900	1,575,218.1	0.1	0
12	5.17	111,801.152	67,742.167	2,207,190.3	0.1	0
13	4.55	114,039.148	110,858.924	2,506,870.9	0.1	0
14	3.95	82,864.685	170,636.655	2,011,466.2	0.1	0
15	3.30	8,475.862	259,039.505	6,426.6	0.1	0

ANNEX 2

PERFORMANCE OF ALTERNATIVE HOUSING CREDIT INSTRUMENTS

Introduction

This annex analyzes a subsidized fixed rate mortgage (Subsidized FRM), an unsubsidized, higher interest fixed rate mortgage (Market FRM), and a Deferred Adjustable Instrument for Russia (DAIR) in terms of their profitability for the bank, the income borrowers require to purchase a house, and the long-term affordability of their payments. In addition, the annex will explore the impact on Sberbank of alternative government housing credit subsidy programs.

Assumptions

This annex examines bank profitability and borrower affordability for the three credit instruments described above assuming the following:

- Houses cost Rb. 1.0 million;
- Families can afford to devote up to 30 percent of their income to loan payments;
- Downpayments range from 20 to 40 percent of house value;
- Loans are made for a 15-year term;
- Inflation is 1,500 percent in the first year of loan repayment, and that it declines slowly thereafter, reaching 200 percent by year 10 of repayment. From year 10 to year 15, inflation declines to 40 percent;
- Wages increase by 80 percent of inflation in the first year, 85 percent in the second, 90 percent in the third, 95 percent in the fourth, and in line with inflation in alter years;
- The interbank lending rate is 128 percent in the first year, and increases slowly thereafter such that by year 9 it is slightly above the inflation rate; thereafter, it remains slightly above the inflation rate.

Table 2.1 summarizes these assumptions.

For the subsidized FRM, we assume that the interest rate the borrower pays is fixed at 8 percent and the government pays a 12 percent rate directly to the bank, yielding a total 20 percent interest rate to the bank. For the market rate FRM, we assume that the interest rate is set at 90 percent and is paid entirely by the borrower. For the DAIR, we assume that the contract interest rate will remain about 10 percentage points above the interbank lending rate.

Table 2.1 Inflation, Wage, and Interbank Lending Assumptions			
Years of Loan Amortization	Inflation (percent)	Wage Growth (percent)	Interbank Interest Rate (percent)
1	1,500	1,200	128
2	1,000	850	188
3	900	810	223
4	800	760	262
5	700	700	294
6	600	600	321
7	500	500	329
8	400	400	330
9	300	300	329
10	200	200	230
11	100	100	120
12	80	80	95
13	60	60	73
14	50	50	62
15	40	40	51

Results

This section reviews the performance of the three credit instruments. Table 2.2 below summarizes these findings.

Required Initial Income. If a house costs approximately Rb. 10 million, and a family can afford a 30 percent downpayment, they will require Rb. 7 million loan to purchase a unit. If the family can devote 30 percent of its income to payments, and takes out a 15-year loan, it will require an annual income of Rb. 2.7 million to purchase a house under the subsidized FRM, Rb. 2.1 million if they take out a market rate FRM, and Rb. 2.9 million if they take out a DAIR. Thus, the subsidized fixed

rate credit is the most affordable option, but the DAIR requires an income only about 8 percent larger. The market rate mortgage requires families to have an income about 800 percent larger than the subsidized mortgage and the DAIR.

If the family can save only a 20 percent downpayment, it will require a loan of Rb. 8 million. Under these conditions the subsidized FRM requires an income of Rb. 3.1 million, the market FRM requires an income of 24 million, and the DAIR requires an income of Rb. 3.4 million. Thus, reducing the required downpayment by one-third results in an increase in required income of about 15 percent for all three credit instruments.

If the family can save a 40 percent downpayment, or if the government provides a downpayment subsidy that when combined with savings results in a 40 percent downpayment, the family will require a loan of Rb. 6 million. In this case, the subsidized FRM requires an income of Rb. 2.3 million, the market FRM requires an income of 18 million, and the DAIR requires an income of Rb. 2.5 million. Thus, increasing the downpayment by one-third results in a about a 15 percent decline in required borrower income for all three mortgages.

Affordability Over Time. Both the subsidized and market rate fixed rate loans have very rapidly declining payment to income ratios. Both loans have constant payments. In contrast, inflation is very high during the repayment period and wages are increasing slower than inflation but still at a rapid rate. If the loans are originated at a 30 percent payment to income ratio, the subsidized FRM's payments never account for more than 23 percent of income, and the market rate credit's payment never accounts for more than 18 percent of income. For both loans, payments account for less than 5 percent of income after the first 9 months of repayments. The DAIR's payments increase over time, but at a rate considerably slower than inflation and wage growth. Underwriting at a 30 percent payment to income ratio, the DAIR's actual ratio never exceeds 24 percent, and is less than 5 percent after the first 15 months of repayment. In short, for all three loans, inflation-driven nominal wage growth sharply reduces the risk of the borrower defaulting on the loan.

Profitability. On average, the subsidized, fixed rate loan earns a return only about 17 percent as large as the return the bank would earn on a series of loans made in the interbank market over the same period. The unsubsidized fixed rate loan has a return only about 60 percent as large as a series of interbank loans. The DAIR's return is equal to 141 percent of the interbank loans' return. Furthermore, the relationship between the return on the two fixed rate credits and the return on interbank credits will vary depending upon actual movements in the interbank market interest rate. For example, if the interbank rate was significantly higher than the future rates projected above, the fixed rate credits' returns would be an even smaller percent of the interbank return. In contrast, the relationship between the

DAIR's return and the interbank return is relatively constant because the DAIR interest rate fluctuates with the interbank interest rate. Given that the bank's cost of funds will virtually always remain below the interbank lending rate, the DAIR guarantees the bank a return higher than its cost of funds. The return on the two fixed rate instruments may or may not be above the bank's cost of funds.

	Down- payment (percent of unit cost)	Required Loan Size (Rb. millions)	Planned Payment- to- Income	Required Income (Rb. thousands)	Maximum Payment- to- Income	Return (percent of interbank rate*
Subsidized FRM**	30	7.0	30	2,726	23	17
Market FRM***	30	7.0	30	21,001	18	60
Base Case DAIR	30	7.0	30	2,935	24	141
High Downpayment DAIR	40	6.0	30	2,516	24	141
Low Downpayment DAIR	20	8.0	30	3,355	24	141
<p>* Size of return compared to size of return on a series of loans made over an equal period in the interbank lending market</p> <p>** Fixed rate, equal payment credit with an interest rate of 8 percent to the borrower and 12 percent to the government</p> <p>*** Fixed rate, equal payment credit with an interest rate of 90 percent</p>						

Subsidy Issues

Currently Sberbank receives a 20 percent interest rate on its housing credits. Borrowers pay an 8 percent interest rate, and the government pays the interest of the remaining 12 percentage points of the rate. This program is funded annually. The government could discontinue the subsidy at any time leaving Sberbank with only an 8 percent return on these assets. To decrease Sberbank's vulnerability to annual

state funding, the government could take one of two actions:

- It could set aside sufficient funds in a special account payable only to Sberbank when each loan is originated to fully fund the subsidy over the life of the credit. The actual expenditure of these funds would occur over time, so the budget expenditure and credit emission each year is limited.
- Alternatively, the government could give the borrower a downpayment subsidy equal to the value of the interest rate subsidy over the life of the loan. A downpayment subsidy would be much easier for the borrower to understand.

The interest rate subsidy increases housing affordability by allowing borrowers to take out a larger loan than they could afford without the subsidy; the downpayment subsidy increases affordability by reducing the required loan size. If the same affordability is implied by both subsidies, families will prefer the one that reduces the size of their required debt.

Conclusion and Recommendations

The subsidized fixed rate loan and the DAIR allow borrowers with approximately equal incomes to take out a loan large enough to purchase a Rb. 10 million unit. The unsubsidized FRM requires an income almost 800 percent as large. Payments under all three credits are initially set at 30 percent of income, and decline very rapidly over time when compared to income. Payments under all three loans never account for more than 24 percent of income. The DAIR provides the bank with a return equivalent to 141 percent of the return it could receive on the interbank market. The Market FRM provides a return only 60 percent as high as the interbank return, and the subsidized FRM provides a return less than one-fifth the size of the interbank return. The DAIR's return will fluctuate depending on the interbank rate, but will always remain above the bank's cost of funds. The relationship between the returns on the two FRMs and the bank's cost of funds depends on how the bank's cost of funds changes over time.

Thus, the DAIR is recommended for adoption by Sberbank because it does the best job of balancing issues of profitability and affordability. It yields the bank a healthy profit, allows borrowers with reasonable incomes to afford a unit, and does not result in unacceptably high payment to income ratios over the course of loan repayment. In contrast, the subsidized fixed rate loan yields a very poor return for the bank, and market FRM yields a relatively poor return and requires an extremely high borrower income. If the government wishes to continue subsidizing housing credits, both Sberbank and borrowers would benefit from a switch from an interest rate subsidy to a downpayment subsidy program.

If the DAIR is adopted immediately, it is realistic for Sberbank to begin issuing these loans by June 1993.

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ANNEX 3 DAIR ACCOUNTING

For most of the life of a DAIR, payments received are smaller than interest accrued, and the difference between the interest owed and the payment is capitalized. Banks issuing the DAIR must avoid paying taxes on interest revenues until they are received. An accounting system can be set up that allows banks to avoid taxation on capitalized interest by creating a capitalized interest reserve account. The following example (with Table 3.1) illustrates this system.

For the purposes of this example we assume that a family takes out a Rb. 10 million loan with a 15 year term, an initial contract interest rate of 7 percent per month and a payment rate of 0.8 percent per month. Under these assumptions, the interest the borrower owes in the first month of repayment is Rb. 700,000 and the first payment the borrower owes is Rb. 105,000.

- (1) *Loan Issued.* The cash account is credited Rb. 10,000 and the loan balance account is debited Rb. 10,000.
- (2) *Interest Accrual.* At the end of the first month and each month thereafter, interest accrues. Interest is applied in arrears based on the outstanding loan balance at the beginning of the month, and the contract interest rate set at the beginning of the month.

For this example, interest of Rb. 700,000 accrues in the first month. The principal account is debited, and the interest valuation reserve account is credited.

- (3) *Interest Receivable.* At the end of the first month and each month thereafter, the borrower makes a payment. The computer calculates the first payment based on the loan size, the term of the loan, and the payment interest rate. The next two payments are the same size as the first.

Payments receivable are applied first to interest and then to principal. The accrued interest receivable account is debited and the interest income account is credited for the expected payment up to but not exceeding the balance of the interest valuation reserve account. Because this constitutes a repayment of some of the interest capitalized in step 2 above, the loan principal account is credited and the valuation account is debited for this same amount.

For this example, the borrower's first payment is Rb. 105,000. Because this amount is less than the balance in the interest valuation reserve account, this entire amount would be debited to accrued interest receivable, credited to interest income, credited to the loan principal

account and debited to the valuation account.

- (4) *Payments.* A payment is received at the end of the month. Payments are applied first to interest and then to principal. The cash account is debited for the full amount. The accrued interest receivable account is credited for an amount up to the outstanding balance of that account. If the payment exceeds the accrued interest receivable balance then the loan principal account is credited for the excess of payment over interest receivable, and the valuation reserve account is debited by the excess up to the amount in the valuation account. The interest income account is credited up to the amount in the valuation reserve account.

In this example, the cash account is debited Rb. 105,000 and the accrued interest receivable account is credited Rb. 105,000.

ASSETS						LIABILITIES/EQUITY			
Cash (Rb. '000)		Loan Principal (Rb. '000)		Accrued Interest Receivable (Rb. '000)		Capitalized Interest Valuation Reserves (Rb. '000)		Interest Income (Rb. '000)	
Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit
	10,000 ¹	10,000 ¹							
		700 ²					700 ²		
			105 ³	105 ³		105 ³			105 ³
105 ⁴					105 ⁴				

By structuring the accounting using the five t-accounts as described above, the bank will not record interest revenues as profit until they are due to be received.