CONSUMPTION SMOOTHING IN RUSSIA: EVIDENCE FROM THE RLMS

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Abstract

Since the onset of the economic transition, households in Russia have experienced unprecedented declines in their standard of living. Employment decreased by 14% from 75 million in 1990 to 64 million in September 1998, while GDP fell simultaneously by more than 40%. This paper concerns the risk-coping actions that households have adopted, in the absence of an effective social safety net, to buffer their consumption from these shocks.

Using annual household panel data from a longitudinal monitoring survey from 1994 to 1998, the paper addresses two main questions: (1) to what extent are households able to smooth their consumption, in the face of income shocks, across time?; and (2) what strategies do households adopt to accomplish this smoothing? Answers to these questions can be highly valuable in designing effective social safety net systems for transitional economies.
Introduction

Since the onset of the economic transition, households in Russia have experienced unprecedented declines in their standard of living. Employment decreased by 14% from 75 million in 1990 to 64 million in September 1998, while GDP fell simultaneously by more than 40% (World Bank, 1999). Many workers have been forced to take administrative leave, while open unemployment has surged. In addition, Russian enterprises and federal as well as regional governments have repeatedly failed to pay fully large segments of their employees. In the face of such adverse economic circumstances, and with an ineffective social safety net system, households may adopt a portfolio of risk-coping actions that minimize the effect of these shocks on their consumption.

Households for example, may use their savings (Paxson, 1992), take loans from the formal financial sector to carry them through difficult times (Udry, 1994), sell assets (Deaton, 1993), or send their children to work instead of school in order to supplement income (Jacoby and Skoufias, 1997). These actions enable households to spread the effects of income shocks through time. In addition, households may enter into risk-sharing arrangements that include all formal and informal arrangements that spread the effects of income shocks across households at any one point in time. Households in a community, for example, may informally agree to insure each other or provide state contingent transfers and remittances to friends and neighbors (Rosenzweig, 1988; Besley, 1995; Morduch, 1999). Additional strategies include the management of income risk through adjustments in labor supply, such as multiple job holding, and engaging in other informal economic activities (Morduch, 1995; Foley, 1997; Kochar, 1988; Stillman, 2000; Desai and Idson, 1998).

Although there is a considerable literature on consumption smoothing in developing countries, there is little evidence on the extent to which the combination of formal and informal components of a risk-coping strategy is at all successful at protecting household consumption from idiosyncratic shocks in economies during the process of economic transition. Especially for Russia, the evidence that exists is indirect and circumstantial at best. Informal support networks, for example, were an important resource
for individuals and households in the former Soviet Union and Eastern Europe for accessing goods and services (Sik, 1994) during the socialist era. Such networks may have strengthened after the onset of the economic transition. Also, during the early stages of transition, private transfers between households in Russia have been found to be large and persistent (Cox, Eser, and Jimenez, 1997). Russian households have also been quite flexible at self-insuring their consumption in response to the phenomena of increasing wage arrears and unemployment (Desai and Idson, 1998). However, it is not known whether these strategies in combination were successful at protecting household consumption. The incidence of wage arrears, for example, is found to lead to increased poverty when poverty is measured in terms of income and not consumption (Desai and Idson, 1998). But to the extent that risk-coping strategies are even partially effective, then fluctuations in income need not necessarily lead to fluctuations in household consumption (Mace, 1991; Cochrane, 1991; Townsend, 1994).

In this study I use annual household panel data from rounds V through VIII (1994-1996 and 1998) of the Russian Longitudinal Monitoring Survey collected by the Carolina Population Center to examine the extent to which households manage to insure their consumption from wage and employment shocks and fluctuations in their real income. Two main questions are addressed. The first concerns the extent to which households are able to smooth their food consumption and nonfood consumption across time. Evidence that households are unable to insure themselves against idiosyncratic income shocks allows for better targeting of programs. Such information is critical to the design of social safety net systems in transitional economies. The second relates to the different strategies households adopt in order to smooth their consumption. In particular, is consumption smoothing achieved primarily through cross-sectional risk pooling institutions, credit markets that spread the effects of income shocks through time, or by adjustments in labor supply and occupation? Understanding the specific strategies that households adopt to buffer income fluctuations is critical in evaluating the costs and benefits of policy interventions. If monetary and/or in-kind transfers play a central role, then temporary poverty relief programs may be counteracted by reductions in private transfers.
The structure of the paper is as follows. The first section discusses in detail the data set and the construction of the key variables used in the analysis. The next presents the basic model of consumption insurance and its main implications about the effects of idiosyncratic income shocks on consumption. This is followed by an empirical analysis, a discussion of the results, and a conclusion.

Data

The data set used in this study is from phase two of the Russian Longitudinal Monitoring Survey (RLMS) for the years 1994-1996 and 1998 (rounds V-VIII). The RLMS is a household-based representative survey of Russia collected by the Population Center at the University of North Carolina.1 The survey is designed as a repeated sample of each household dwelling. This means that survey returns to the same dwelling sampled in the previous year. Consequently, all households that move are lost from one round to another.2

The RLMS survey contains information on the geographical location of the household (region, size of town, village), the age, sex, and education level of each household member, as well as details on employment status. Other variables include detailed information on household income by source (e.g. salary, pension, unemployment benefits, child allowances, etc.), as well as detailed information on the food and non-food expenditures of the household.

I focus on the sample of households that were surveyed in round V and were present in at least one more round of the survey.3 Thus households that move or change dwelling after round VI, or VII, or

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1 The project description at www.cpc.unc.edu/rlms provides complete information about the RLMS survey and its sampling procedure.
2 Heeringa (1997) provides additional information on attrition in RLMS and discusses its overall representativeness.
3 I have used the household identifying variable named “aid” that allows one to track households present in round V till round VIII.
move after round V and return to the same dwelling in later rounds are included in my sample. New households that move in the dwellings surveyed in round V are excluded from my sample.4

The variables used in all of my regressions are aggregated at the household level. The main variables used include the value of food consumed, the value of non-food expenditures, income, net transfers and net borrowing by the household, the incidence of wage arrears and unemployment in the household, and variables characterizing the coping strategies of households to income shocks. The construction of each of these variables is discussed in more detail below.

The value of food consumed consists of the sum of expenditures on dairy, meat, fish, potatoes, alcohol, bread, eggs, fats and oils, fruits, sugar, vegetables and other foods, as well as the value of food eaten out and the value of food consumed and produced at home. The main items included in nonfood consumption include: tobacco, clothing, fuel (including automobile, wood and gas); services and recreation; rent and utilities; and other payments such as tuition and insurance (excluding loans). Expenditures on durables and other luxury items are excluded. As with food, the value of total nonfood consumption (purchased and home-produced) is expressed in June 1992 prices by dividing by the consumer price index constructed and used by the RLMS. In addition, both consumption measures were expressed in per capita terms by dividing by family size.

The variables used to identify the various shocks experienced by households are constructed from questions contained in the household questionnaire and the questionnaire for adult members. In the latter questionnaire, for individuals who replied that they were either at work or on paid or unpaid leave, information was collected on whether an individual is owed salary from the primary job, whether an individual is engaged in a secondary job paying wages and whether an individual is engaged in informal economic activities. Limiting the sample of individuals to adults between 16 and 65 years of age, 1 aggregated the individual responses at the household level.

4 In the RLMS if the previous occupants of a sample dwelling are lost to follow-up, the new occupants are invited to join the sample. New or replacement households entering and staying in the remaining survey rounds are given a
Household gross income (cash plus value of in-kind) is constructed as the sum of salary, rent, interest income, pension income, child allowances, maternal benefits, family and other benefits, net income from sales of farm products (i.e. subtracting farm related expenses) and other income. Income from unemployment insurance or transfers received from friends and relatives and money borrowed were excluded from total income.

The main variables constructed to examine how households respond to shocks are the net transfer and net borrowing status of the household and binary variables signifying whether any household member with a primary wage job has a second job paying wages, whether any household member is engaged in any informal economic activities, whether the household sold any assets during the last three months, whether the household sold any poultry in the last 30 days and whether the household is currently cultivating land. Net transfers received by the household are constructed as the difference between money received from relatives and other organizations and money given to friends and relatives. Net borrowing is constructed as the sum of funds borrowed (from banks and friends), withdrawals from savings and money received as repayment of past loans minus funds given as loans, funds deposited in own savings accounts and purchases of bonds and stocks.

Households observed for only one round and households with missing or negative observations in total consumption, or food or non-food consumption or total income were excluded from the analysis. In addition, I have excluded from my sample households with a head (male or female) who is retired or very young. This is done because these households are less interesting, but mainly because the variables used to identify household shocks are derived from questions related to employment status and salary. These procedures led to a total of 8,045 observations from an unbalanced sample of 2,328 households observed for at least two and at most four rounds. Table 1, at the end of the paper, provides the number of observations in each of the samples and the mean values of the key variables used in the analysis.

different identifying variable.
Clearly, households experienced a significant decline in their real income accompanied by reduced consumption over time across urban and rural areas. Mean consumption per capita is generally higher than income per capita (16% higher in round V, 32% in round VI, and 18% and 14% in rounds VII and VIII, respectively). These differences suggest that one should be cautious towards the use of income, rather than consumption, as a measure of a household’s welfare and poverty status. The fraction of households with an adult member who is owed salaries from his/her primary job increases from 50% in round V to 61% in round VIII. Moreover, the incidence of wage arrears is higher among households in rural areas than in urban areas. The fraction of households with at least one member on forced leave is very low (less than 1% in any given round). There is also a steady increase in the fraction of households with at least one unemployed adult (using the Bureau of Labor Statistics definition) from round to round. The fraction of households with at least one unemployed member peaks in round VIII, most likely as a result of the August 17, 1998 crisis.

The model

The theoretical model guiding much of the empirical analysis is based on the consumer’s optimization problem in the context of a complete market for state contingent commodities. The assumption of a complete market for state contingent commodities may be considered as a simple approximation to all the formal and informal arrangements across space and over time that households can enter into in order to protect themselves from risk. With this in mind, households are assumed to purchase state contingent commodities so as to maximize

\[ U^h = \sum_{s=1}^{S} \sum_{\tau=t}^{T} \pi_s \omega_t (c^h) \]

\[ (1) \]

5 The names of the variables in each round of the questionnaire are: pjowed, adpxjb, engrea, stlast3mo, slpou30d, and landnow.
where the $h$ superscripts refer to a household, and where it is assumed that the probabilities of the states are the same for all households. Since a unit of consumption in state $s$ at time $t$ can be bought in period 1 for $p_{st}(1+r)^{-t}$, the lifetime budget constraint of household $h$ is

$$
\sum_{s=1}^{S} \sum_{t=1}^{T} p_{st} c_{st}^h (1+r)^{-t} = A_t^h + \sum_{s=1}^{S} \sum_{t=1}^{T} p_{st} y_{st}^h (1+r)^{-t},
$$

(2)

where $y_{st}^h$ is labor income in period $t$ and state $s$, the contingent claim to which has a value in the first period of $p_{st} y_{st}^h (1+r)^{-t}$. Thus the existence of the market in contingent claims allows the problem to be written as the maximization of expected utility subject to an expected value budget constraint. The first order optimization condition for (1) subject to (2) is

$$
\lambda_t (c_{st}^h) = \nu_t (c_{st}^h) = \theta^h \left( \frac{1+\delta}{1+r} \right)^t P_{st} \pi_s = \theta^h \mu_t,
$$

(3)

where $\mu' = \left( \frac{1+\delta}{1+r} \right)^t \frac{P_{st}}{\pi_s}$, $\lambda_t (c_{st}^h)$ is the marginal utility of consumption in period $t$, $\delta$ is the rate of time preference and $\theta$ is the Lagrange multiplier for household $h$. Thus the main implication is that the marginal utility of consumption has a two-factor structure, consisting of a household-specific component $\theta^h$ and a time-specific component $\mu_t$.

Given a specific functional form for the utility function such as an isoelastic utility function

$$
\nu(c_t) = \frac{1}{1-\rho} c_t^{-\rho} f(z_t) \text{ where } f(z_t) \text{ is a function allowing for the influence of time-varying taste factors,}
$$

equation (3) may be expressed, after logarithmic transformation, as

$$
\ln c_t^h = -\rho^{-1} \left( \ln \theta^h - \ln f(z_t) + \ln \mu_t \right).
$$

By taking first-differences over time, the above equation yields

$$
\Delta \ln c_t^h = -\rho^{-1} \left( -\Delta f(z_t) + \Delta \ln \mu_t \right),
$$

(4)
which implies that the growth rate in household consumption between time \( t-1 \) and \( t \) is only a function of the growth rate in aggregate shocks as captured by the term \( -\rho^{-1}\left(-\Delta f(z_t) + \Delta \ln \mu_t\right) \). A more common interpretation of this equation is that the null hypothesis of a complete set of markets in state contingent commodities implies a set of over-identifying restrictions. Once aggregate or uninsured shocks are accounted for, idiosyncratic changes to household income or other idiosyncratic shocks should have no predictive power in explaining the household-specific consumption growth rate (Cochrane (1991); Mace (1991); Townsend (1994, 1995)6.

**Empirical analysis**

The empirical analysis is based on estimating various forms of equation (4). The extreme version of the insurance model outlined above implies that changes in household-specific income and other idiosyncratic shocks should not affect the growth rate of the consumption of the household as long as aggregate consumption within the insurance group is controlled. For the purposes of the empirical analysis an insurance group is defined to consist of the set of households within a given community.7 Generally, insurance arrangements are easier to organize and implement in small or closely-knit communities than in larger groups, where the moral hazard, incentive and information difficulties are more severe.8 For this reason, I also conduct the analysis separately for urban and rural communities. There are 156 communities covered in the 4 rounds of the survey, 115 rural and 41 are urban. The average number of households surveyed within rural communities is between 11 and 13, depending on the survey round, whereas the average number of households surveyed within urban communities is between 50 and 66.

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6 As Alderman and Paxson (1992) argue, empirical evidence that idiosyncratic income changes do not have a significant effect on household consumption growth may also be consistent with the permanent income hypothesis, especially if aggregate shocks to income are largely permanent and idiosyncratic shocks are transitory. I do not attempt to distinguish empirically between the implications of complete risk-sharing and the permanent income hypotheses (e.g. see Jacoby and Skoufias, 1998).

7 The variable *site* is used to identify a community in the RLMS.

8 This, however, did not prevent some of the authors from using as an insurance group the whole country (e.g. Mace, 1991; Cochrane, 1991)
Consumption, wage arrears, and employment shocks

I begin my investigation by checking whether consumption is insured against specific wage and employment shocks as predicted by the model of complete insurance. For this purpose I estimate regressions of the form:

\[ \Delta \ln c_{hv} = \sum_{nv} \delta_n (D_{nv}) + \beta \text{Shock}_{hv} + \gamma X_{hv} + \Delta \varepsilon_{hv} \]  

where \( \Delta \ln c_{hv} \) denotes the first difference in log consumption or the growth rate in total consumption per capita of household \( h \), in community \( v \), in period \( t \) (i.e., between round \( t \) and round \( t-1 \)), and \( D_{nv} \) denotes a set of binary variables for each community and survey round (round and community interaction terms) and is included to control for the presence of aggregate (or covariate) shocks common to all households in the community within any given round. It should be noted that in this regression the inclusion of these binary variables is equivalent to expressing the dependent and all independent variables as deviations from their respective round-specific community mean.

The variable \text{Shock} is a binary variable denoting the incidence of a household idiosyncratic shock between round \( t \) and round \( t-1 \). In this manner, one is able to identify whether the incidence of the shock for the first time has a significant negative impact on the growth rate of household consumption from round to round. Specifically, in the case of wage arrears, the shock variable takes the value of 1 if the following three conditions are satisfied (equals 0 otherwise): (i) one (or more) working household member reports that he/she is owed wages in the current round; (ii) none of household members was owed any wages from their primary job in round \( t-1 \); and (iii) no household member received payments in-kind in lieu of wages. Thus the shock variable regarding wage arrears signifies whether the household is a new entrant in the pool of households that were already owed wages from their primary job.

\footnote{I have also estimated a linear model and obtained the same results qualitatively.}
\footnote{Given the log specification used here, it should also be noted that the community-round interaction dummy variables also control for differences in the inflation rate from round to round across communities.}
(ii), modified appropriately, are also applied to construct the binary variables signifying whether any household member is on forced leave or unemployed.

The vector $X$ consists of variables controlling for household taste shifters, $\alpha, \beta,$ and $\gamma$ are parameters to be estimated, and $\Delta \varepsilon_{h}$ is a household-specific error term, capturing changes in the unobservable components of household preferences. The vector $X$ is the change in family size between round $t$ and $t-1$, and a binary variable indicating whether the household is headed by a female. Under the null hypothesis of complete insurance, $\beta=0$, since idiosyncratic shocks should have no role in explaining household specific consumption growth rates.

In Table 2 I report estimates of the coefficients associated with three different shock variables. Each coefficient was estimated by running a separate regression with each of the shock variables included one at a time in the regression. Given that formal and informal insurance arrangements may be more or less effective in different regions of the country, equation (5) is also estimated separately for the sample of households in urban areas and for the sample of households in rural areas covered by the RLMS survey. In all cases the standard errors of the estimated coefficients were corrected for unknown forms of heteroskedasticity in the error term of the regressions using the formula of White (1980).

Panel A in Table 2 presents the estimated coefficients of the idiosyncratic shocks on the growth rate of monthly per capita food consumption, while panel B contains the respective coefficients for the growth rate of non-food consumption. In the full sample of households, without making any distinction between urban and rural areas, and at the conventional five percent level of significance, idiosyncratic shocks appear to have no significant role on the growth rate of food consumption per capita. This suggests that households are able to insulate their food consumption from shocks such as delayed wage payments, forced leave or loss of employment, as implied by the extreme version of the consumption insurance hypothesis.

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11 I classify as working those individuals who replied that they were either on paid or unpaid leave.
Dividing the sample into urban and rural areas does not provide any stronger ground for changing the previous inference. Wage arrears now appear to have a negative and significant impact on the growth rate of food consumption in urban areas but not rural areas. However, as with the full sample, forced leave and unemployment do not affect significantly the growth rate of food consumption in either urban or rural areas. The impact of the same shocks on the growth rate of non-food expenditures is a bit less definite. Using the full sample, it appears that households with members on forced leave are the only ones that experience a drop in non-food expenditures that is significant at the conventional five percent level of significance. Wage arrears and unemployment also have a significantly negative effect on non-food expenditures but at the seven and six percent level of significance, respectively. The p-values of the impact of the same variables on nonfood expenditure also become higher when the sample is split, making it more difficult to derive any firm conclusions. Overall it seems that these shocks are more likely to have a significant effect on non-food expenditures than food expenditures, which suggests that one of the ways by which households are able to insulate their consumption of food from these shocks is by adjusting their non-food expenditures.

Income shocks and family risk-coping strategies

Having examined the direct effect of specific shocks on household consumption, I next investigate the ways in which households attempt to protect their consumption. The empirical approach used to analyze household responses is similar in spirit to that used for consumption. I construct a number of binary variables, signifying yes or no responses to questions or actions, and examine whether the incidence of these shocks is associated with increased likelihood of these actions. Given the potential role of unobserved household heterogeneity in determining how households respond to shocks, and the qualitative nature of the dependent variables, I use a fixed effects logit model (Chamberlain, 1980) that allows me to

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12 The full set of regression estimates is available from the author upon request.
account for the role of household-specific time-invariant observed and unobserved factors. Specifically, the model is specified as

$$\Pr ob(Y_n = 1) = \frac{\exp(\mu_i + \beta S_n + \gamma X_n)}{1 - \exp(\mu_i + \beta S_n + \gamma X_n)},$$

(6)

where the variable $Y$ is used to denote any one of the following: (i) household has a member with a second paying job; (ii) household has a member involved in informal economic activities; (iii) household reports positive net transfers (transfers in-transfers out) received; (iv) household reports positive net debt (borrowing-lending), (v) household reports that it sold assets in the last 12 months; (vi) (vii) household reports that it sold poultry in the last 30 days, and (viii) household reports that it has cultivated land in the last 12 months (as well as cultivating land at the time of the interview). The term $\mu_i$ summarizes all household-specific time-invariant observed and unobserved factors. Given that the household’s unobserved marginal utility of wealth (MaCurdy, 1981) is a key component of $\mu$, it is necessary to adopt the fixed effects specification that allows for correlation between household-specific time-invariant components and included regressors. $S$ is a variable denoting the incidence of an income-related shock and $X$ is a vector of other time-varying household characteristics, such as the age and gender composition of the household, the round of the survey and whether the household is headed by a female.

I run separate fixed effect logit models on the full sample of households, one for each of the eight dependent variables I am able to construct from the RLMS survey. The fixed-effects logit model maximizes a conditional log likelihood function that ultimately drops from the estimation sample households whose value of the dependent variable $Y$ remains unchanged across survey rounds (Chamberlain, 1980). This feature of the model did not permit application of the method separately for urban and rural areas, since the respective samples would be become prohibitively small.

As with the earlier regressions, the focus of my investigation is on whether the incidence of a shock increases the likelihood that the dependent variable $Y$ equals 1. The estimated coefficients of the three shock variables are reported in Table 3. Households with accumulated wage arrears are significantly
more likely to have one (or more) member(s) working in a second job, or engaged in informal economic activities. These results are similar to those reported by Desai and Idson (1998). Also, households with owed wages arrears seem to rely more on debt as a means of insuring their consumption and the production of their own food through cultivation of land. Transfers from other family members or households do not appear to have a significant role in buffering consumption from wage arrears.

Table 4 also reveals that the nature of the income shock entails fairly different family adaptations to the shock. For example, households with unemployed members rely on both transfers and borrowing, as well as the selling of assets as a means of buffering their consumption. It is crucial to note, however, that the partial reliance of households with unemployed members on private transfers raises the possibility that social safety net programs such as unemployment benefits may simply crowd out private transfers, thereby leading to a weaker impact on household welfare.

Overall the results reveal that there is no single strategy that is used most frequently by households. Households seem to complement their self-insurance strategies, consisting of adjustments in labor supply, selling assets and cultivating land, with informal risk-sharing strategies that spread risk over time and households. Thus, in certain instances credit markets are used to complement income transfers and selling of assets for insurance, while in other cases credit seems to act as a substitute for the absence of insurance through transfers. However, it should be kept in mind that whatever the exact composition of a family’s insurance strategy, the estimates presented in Table 3 combined with the direct impact of employment shocks on consumption presented in Table 2, imply that households are at best able to insure their food consumption but not their non-food expenditures.

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13 It should be noted, however, that Desai and Idson (1988) did not take into account the role of household fixed effects.
Consumption and household income

The preceding regressions examined whether households are insured against specific shocks such as delays in wage payments and unemployment. A stronger test for the hypothesis of complete risk-sharing is whether the growth rate of household food consumption is independent of the growth rate of household income (after controlling for aggregate or uninsured shocks). This is a stronger test since the growth of household income as a regressor takes into consideration not just one but all of the shocks experienced by the household between rounds. For this purpose, I estimate regression (7) below by replacing the shock binary variable with the growth rate in household income between round t and t-1:

$$\Delta \ln c_{ht} = \sum_{n} \delta_n(D_n) + \beta \Delta \ln y_{ht} + \gamma X_{ht} + \Delta \varepsilon_{ht}.$$  

As before, under the null hypothesis of complete insurance idiosyncratic changes in household income should have no role in explaining household specific consumption growth rates, i.e. $\beta = 0$. The estimates of equation (6) for food and non-food consumption are presented in Table 4. (columns 1 and 2, respectively). The highly significant coefficients of $\beta$ reveal that neither food nor non-food consumption are completely insured from income shocks. In the full sample of households, a 10 percent drop in real income is accompanied by a 1.47 percent drop in household food consumption, and an almost identical (1.50 percent) decrease in nonfood expenditures. Moreover, the rejection of the hypothesis of complete insurance is not overturned when the regressions are done separately for urban rural areas.

The OLS estimates discussed so far may be biased due to measurement error in the income variable and imputation errors in the calculation of the food consumption of households. By itself, measurement error in the income variable gives rise to "attenuation bias" that biases coefficients towards zero. Given that the income coefficients are significantly different from zero in the majority of cases one can be reasonably confident that the hypothesis of complete insurance is justifiably rejected and that the significant income coefficients in columns 1-2 provide a lower bound estimate of the true elasticity of consumptive to idiosyncratic income.
However, it is possible that imputation errors in the construction of the food consumption variable may bias the income coefficients upwards (Deaton, 1997). This is especially the case for households in rural areas. For many of these households a significant share of income and consumption is accounted for by food that is produced and consumed by the household and neither sold nor bought in the market. As mentioned earlier, for the food produced at home, a value is imputed using the national median price for the specific food item produced and the figure is included in consumption. Errors in this imputation procedure may be positively correlated with measurement errors in the income variable, and for positive coefficients, this upward bias may work in the opposite direction to the standard downward attenuation bias produced by the measurement errors in the income variable alone (Deaton, 1997). Given that the net effect cannot be signed in advance it is prudent to make an effort to control for these sources of bias in the estimates.

Columns 3-4 of Table 4 present the income coefficient estimates using instrumental variables for the changes in household income. The list of instruments used includes the three shock variables discussed earlier identifying whether any household member was owed any wages, was on forced leave or was unemployed between round $t$ and $t-1$. In addition, the list of variables used in the first stage regressions included the set of binary variables summarizing community/round effects, whether the household head is a female, the age and age squared of the household head, and the change in the number of family members between rounds $t$ and $t-1$. In all cases the F-statistics from the null hypothesis that the identifying instrument do not jointly explain household income changes revealed that these variables play a significant role in explaining household income changes.

The instrumental variable (IV) estimates presented in Table 4 reveal some substantial differences from the results obtained from the OLS estimates. The coefficients of income changes on food consumption are generally higher, suggesting that the concerns about measurement and imputation errors may have some foundation. Compared to the OLS coefficients, the coefficient of the instrumented income growth variable is higher in both the food and nonfood regression equations. After instrumenting,
the elasticity of nonfood expenditures to income changes increases significantly, as does the elasticity of food expenditures. The lower coefficient of income in column 3 (0.209) compared to column 4 (0.491), suggests that the consumption of food is relatively better protected from income changes than non-food. These results also hold when the regressions are run separately for urban and rural areas. In fact, in the rural areas where the concerns about imputation errors may be most justified, it turns out that food consumption is completely insured from income changes. Thus in accordance with the earlier results of Table 2, adjustment in non-food consumption expenditures appears to act as a means of partially insuring ex-post the consumption of food from the effects of income changes.

Partial consumption insurance

The estimates so far provide strong evidence against the extreme hypothesis of complete insurance in household consumption from income risk. In order to investigate whether partial insurance and risk-sharing are in fact taking place among households within the same community, I also estimate an alternative version of equation (7). The equation

$$
\Delta \ln c_{h_{v}} = \alpha + \beta \Delta \ln y_{h_{v}} + \gamma \Delta \left( \ln y_{v} \right) + \delta X_{h_{v}} + \Delta \varepsilon_{h_{v}}
$$

allows the growth rate in household consumption to be determined by the growth rate in household income as well as the growth rate in average community income denoted by $\Delta \left( \ln y_{v} \right)$. In a purely autarkic world, the growth rate in the average community income should have no impact on the growth rate of consumption of any one household. Evidence that the growth rate in average community income has a significant role in the growth rate of household consumption (i.e., $\gamma \neq 0$) is consistent with the hypothesis that some risk sharing is taking place within communities.

The estimated coefficients of the growth rate in average community income (i.e. of the parameter $\gamma$) are reported in Table 5. The estimates provide strong evidence in favor of partial insurance and community risk sharing in food consumption in both urban and rural areas. Thus changes in the growth rate of average community income seem to have a positive and significant role in the growth rate of food
consumption of individual households. In contrast to food consumption, no evidence of risk-sharing within communities is found with respect to non-food expenditures. Thus the available options for insuring nonfood consumption are limited in comparison to those for food consumption.

Concluding remarks

In this paper I use data from a panel of households in Russia observed for four rounds in 1994-96 and 1998 to examine the extent to which households, through formal and/or informal arrangements, are able to insure their consumption from specific economic shocks and fluctuations in their real income. The empirical analysis reveals that food consumption, in both urban and rural areas, is quite well insured from specific shocks such as delayed wage payments, forced leave, or unemployment. In contrast, nonfood expenditures are affected by such shocks. When consumption changes are correlated with income changes that capture the impact of all and not just some of the shocks experienced by households, it is found that food consumption is completely insured from idiosyncratic income changes in smaller rural communities where the problems of information asymmetry, enforcement and moral hazard are less severe, but only partially insured in urban areas.

The paper also sheds light on some of the risk-coping strategies of households. It is demonstrated that households complement their insurance strategy, of borrowing, adjusting their labor supply, selling assets and cultivating land, with informal risk-sharing arrangements with households in their community. It is also shown that such risk-sharing arrangements are in effect for food consumption but not for nonfood expenditures

The results of this study suggest that there are considerable benefits from public actions that improve the safety net system in Russia. Although, credit markets and private informal mechanisms do provide some partial insurance from idiosyncratic fluctuations in household income, this insurance is inadequate. Informal insurance and risk-sharing arrangements among households can only offer complete or partial protection from shocks that are specific to a household and do not simultaneously affect their
neighbors or other members of an insurance community. Shocks that are common to all the members of an insurance community can still have devastating effects. A well-designed and well-targeted safety net system can be very effective at minimizing household exposure to risk, even though it might displace some of the informal insurance mechanisms currently in operation.

The results of this study also have significant implications for the design of policy interventions and an effective social safety net system. The objective of relief and income transfer programs is to prevent household welfare from deteriorating drastically as a result of the shock experienced. Typically, however, the targeting of such programs is based on indicators that identify whether households were hit by specific type of shocks. Little consideration is given to the possibility that households may differ in their ability to insure their consumption or that certain components of consumption, such as food, may be better insured than others. An improved targeting of the social safety net system in Russia would be better served by taking into consideration these factors and devoting efforts to identify households that are unable to insure their food consumption.
References


World Bank (1999): “Russia’s Social Sector Malaise: Key Reform Priorities as a Response to the Present Crisis,” Human Development Sector Unit, Europe and Central Asia Region. (March).
### Table 1

#### Means of Key variables

<table>
<thead>
<tr>
<th>Number of Households</th>
<th>Monthly Per Capita:</th>
<th>Any Adult (16-65 yr old) Member is:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Cons. (per cap. per month in June 1992 rubles)</td>
<td>Food Cons</td>
</tr>
<tr>
<td><strong>ALL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Round V</td>
<td>2,328</td>
<td>3,534</td>
</tr>
<tr>
<td>Round VI</td>
<td>2,175</td>
<td>2,975</td>
</tr>
<tr>
<td>Round VII</td>
<td>1,919</td>
<td>2,678</td>
</tr>
<tr>
<td>Round VIII</td>
<td>1,623</td>
<td>1,916</td>
</tr>
</tbody>
</table>

|                  |                      |                      |                |                |                |                     |                |                |
| **Rural Sample**  |                     |                      |                |                |                |                     |                |                |
| Round V           | 707                  | 3068                 | 2,305          | 763           | 2,563          | 60.82               | 0.99            | 12.31          |
| Round VI          | 663                  | 2658                 | 1,883          | 775           | 2,061          | 60.94               | 0.90            | 9.05           |
| Round VII         | 614                  | 2100                 | 1,412          | 687           | 1,576          | 70.20               | 0.16            | 10.91          |
| Round VIII        | 540                  | 1646                 | 1,134          | 513           | 1,541          | 63.15               | 0.74            | 13.33          |

|                  |                      |                      |                |                |                |                     |                |                |
| **Urban Sample**  |                     |                      |                |                |                |                     |                |                |
| Round V          | 1,621                | 3,737                | 2,584          | 1,154         | 3,252          | 45.22               | 0.74            | 11.10          |
| Round VI         | 1,512                | 3,115                | 1,883          | 1,127         | 2,339          | 42.99               | 0.60            | 11.64          |
| Round VII        | 1,305                | 2,950                | 1,691          | 1,259         | 2,597          | 56.70               | 0.54            | 13.56          |
| Round VIII       | 1,083                | 2,050                | 1,200          | 860           | 1,748          | 59.56               | 0.92            | 15.51          |

<table>
<thead>
<tr>
<th>Number of Households</th>
<th>Net Transfers (per cap. per month) (June 1992 rubles)</th>
<th>Net Debt (per cap. per month) (June 1992 rubles)</th>
<th>Sold Assets last3m? (%)</th>
<th>Sold Poultry last30d? (%)</th>
<th>Cultivating land now? (%)</th>
<th>Any Household member:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Has second job? (%)</td>
</tr>
<tr>
<td><strong>ALL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Round V</td>
<td>2,328</td>
<td>60</td>
<td>294</td>
<td>9.58</td>
<td>2.19</td>
<td>65.94</td>
</tr>
<tr>
<td>Round VI</td>
<td>2,175</td>
<td>38</td>
<td>318</td>
<td>6.67</td>
<td>1.89</td>
<td>66.57</td>
</tr>
<tr>
<td>Round VII</td>
<td>1,919</td>
<td>50</td>
<td>337</td>
<td>4.85</td>
<td>2.45</td>
<td>68.89</td>
</tr>
<tr>
<td>Round VIII</td>
<td>1,623</td>
<td>27</td>
<td>149</td>
<td>3.64</td>
<td>3.27</td>
<td>70.92</td>
</tr>
</tbody>
</table>

|                  |                                                      |                                               |                         |                           |                           |                        |                        |                        |
| **Rural Sample**  |                                                      |                                               |                         |                           |                           |                        |                        |                        |
| Round V           | 707                                                  | -68                                           | 286                     | 6.08                      | 6.51                      | 88.12                  | 3.96                   | 9.48                     |
| Round VI          | 663                                                  | 37                                            | 356                     | 3.77                      | 5.73                      | 91.55                  | 4.52                   | 8.14                     |
| Round VII         | 614                                                  | 45                                            | 165                     | 3.58                      | 7.49                      | 90.72                  | 2.77                   | 4.4                      |
| Round VIII        | 540                                                  | -26                                           | 5                       | 1.85                      | 9.81                      | 91.67                  | 4.07                   | 5.93                     |

|                  |                                                      |                                               |                         |                           |                           |                        |                        |                        |
| **Urban Sample**  |                                                      |                                               |                         |                           |                           |                        |                        |                        |
| Round V          | 1,621                                                | 116                                           | 297                     | 11.10                     | 0.31                      | 56.26                  | 8.2                    | 12.28                   |
| Round VI         | 1,512                                                | 39                                            | 301                     | 7.94                      | 0.20                      | 55.62                  | 7.34                   | 8.27                    |
| Round VII        | 1,305                                                | 51                                            | 418                     | 5.44                      | 0.08                      | 58.62                  | 7.66                   | 9.81                    |
| Round VIII       | 1,083                                                | 53                                            | 221                     | 4.52                      | 0.00                      | 60.57                  | 7.02                   | 8.49                    |
Table 2
The Impact of Idiosyncratic Shocks on Household Consumption

Dependent Variable: Round to Round Change in:

(a): ln(Monthly Food Consumption per cap)

<table>
<thead>
<tr>
<th></th>
<th>Wage Arrears</th>
<th>Forced Leave</th>
<th>Unemployment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>t-value</td>
<td>p-value</td>
</tr>
<tr>
<td>Full Sample</td>
<td>-0.046</td>
<td>-1.46</td>
<td>0.143</td>
</tr>
<tr>
<td>Urban Settlements</td>
<td>-0.061</td>
<td>-1.77</td>
<td>0.076</td>
</tr>
<tr>
<td>Rural Settlements</td>
<td>0.014</td>
<td>0.20</td>
<td>0.845</td>
</tr>
</tbody>
</table>

(b): ln(Monthly Nonfood Expenditures per cap)

<table>
<thead>
<tr>
<th></th>
<th>Wage Arrears</th>
<th>Forced Leave</th>
<th>Unemployment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>t-value</td>
<td>p-value</td>
</tr>
<tr>
<td>Full Sample</td>
<td>-0.098</td>
<td>-1.99</td>
<td>0.046</td>
</tr>
<tr>
<td>Urban Settlements</td>
<td>-0.085</td>
<td>-1.64</td>
<td>0.101</td>
</tr>
<tr>
<td>Rural Settlements</td>
<td>-0.153</td>
<td>-1.17</td>
<td>0.242</td>
</tr>
</tbody>
</table>

Notes:
1-- Additional regressors included but not reported: A constant term, change in family size between round t and round t-1, and a full set of community and round interaction dummy variables.
2-- The t-values reported are based on standard errors that are corrected for unknown forms of heteroskedasticity (White, 1980).
Table 3
Fixed Effect Logit Estimates of Household Responses to Idiosyncratic Income

<table>
<thead>
<tr>
<th>Dependnet (1=yes, Owed in Primary)</th>
<th>Income</th>
<th>Forced</th>
<th>Unemployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get a 2nd Job</td>
<td>Coeff.</td>
<td>z-value</td>
<td>Coeff.</td>
</tr>
<tr>
<td></td>
<td>0.456</td>
<td>2.93</td>
<td>0.609</td>
</tr>
<tr>
<td>Informal</td>
<td>0.453</td>
<td>3.42</td>
<td>-0.544</td>
</tr>
<tr>
<td>Receive</td>
<td>0.066</td>
<td>0.68</td>
<td>0.045</td>
</tr>
<tr>
<td>Borrow</td>
<td>0.282</td>
<td>3.53</td>
<td>0.305</td>
</tr>
<tr>
<td>Sold Assets last 12</td>
<td>0.069</td>
<td>0.43</td>
<td>-0.950</td>
</tr>
<tr>
<td>Sold Poultry last 30</td>
<td>0.045</td>
<td>0.16</td>
<td>n.a.</td>
</tr>
<tr>
<td>Cultivating Land</td>
<td>0.146</td>
<td>1.14</td>
<td>-0.034</td>
</tr>
<tr>
<td>Cultivated land last 12</td>
<td>0.432</td>
<td>3.27</td>
<td>0.088</td>
</tr>
</tbody>
</table>

Notes:
1-- Additional regressors included but not reported: A constant term, binary variables describing the age/gender of the household in each round, the round of the survey, and whether the household is headed by
Table 4

The Impact of Idiosyncratic Changes in the Log of Household Income on Consumption

Dependent Variable: Round to Round Change in:

<table>
<thead>
<tr>
<th></th>
<th>OLS Estimates</th>
<th>IV Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>In(Food Cons)</td>
<td>In(Non-Food Exp)</td>
</tr>
<tr>
<td></td>
<td>Coeff. t-value</td>
<td>Coeff. t-value</td>
</tr>
<tr>
<td>Full Sample</td>
<td>0.147 8.51</td>
<td>0.150 8.24</td>
</tr>
<tr>
<td>Urban Settlements</td>
<td>0.125 6.57</td>
<td>0.156 7.36</td>
</tr>
<tr>
<td>Rural Settlements</td>
<td>0.210 8.02</td>
<td>0.139 3.84</td>
</tr>
</tbody>
</table>

Notes:
1. Additional regressors included but not reported: A constant term, change in family size between round t and round t-1, and a full set of community and round interaction dummy variables.
2. The t-values reported are based on standard errors that are corrected for unknown forms of heteroskedasticity (White, 1980).
3. See text for details on the variables used as instruments.
Table 5

Evidence on Partial Risk Insurance
The Effect of Mean Community/Round Income

Dependent Variable: Round to Round Change in

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln(FOod Cons)</td>
<td>ln(Non-Food Cons)</td>
</tr>
<tr>
<td></td>
<td>Coeff.</td>
<td>t-value</td>
</tr>
<tr>
<td>Full Sample</td>
<td>0.267</td>
<td>7.46</td>
</tr>
<tr>
<td>Urban Settlements</td>
<td>0.322</td>
<td>6.55</td>
</tr>
<tr>
<td>Rural Settlements</td>
<td>0.193</td>
<td>4.02</td>
</tr>
</tbody>
</table>

Notes:
1—Additional regressors included but not reported: See text for details
2—The t-values reported are based on standard errors that are corrected for unknown forms of heteroskedasticity (White, 1980).