

Poverty and Consumption Smoothing in Russia

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A large, white, stylized logo consisting of two interlocking 'G' shapes, one above the other, set against a dark, textured background.

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Poverty and Consumption Smoothing in Russia

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Abstract

This paper investigates to what extent Russian households have been able to protect their consumption against income shocks during the transition and whether the ability to smooth consumption is related to poverty. We use the cross-section and panel dimensions of the Russian Longitudinal Monitoring Survey (RLMS) from 1994 to 2004. Empirical analyses of such panels have often been based on differenced data in order to eliminate individual household effects. In this study household expenditures are modeled using an Error Correction Mechanism (ECM) which better exploits the information in the level data. The model makes an explicit distinction between short and long run dynamics of consumption. Generalized Method of Moment (GMM) estimates of the short run income elasticity are significantly positive and less than unity. In other words, we find that households can (only) partially protect themselves against income shocks. Furthermore, income shocks have smaller effects on food consumption than on non-food expenditures. We present some evidence that the population is not homogeneous in terms of consumption smoothing ability and that a low smoothing ability is not necessarily associated with a high poverty risk. For instance households with pensioners, who have a relatively low poverty risk, have a high smoothing ability ; but rural households, who have a high poverty risk, also manage to smooth food expenditures quite well, most likely because of own food production opportunities. Nevertheless, the ability of households to smooth non-food expenditures tends to increase as their average expenditures rise above the poverty line. These exploratory results suggest that development and social protection policies not only play a role in terms of poverty reduction but also influence households' abilities to deal with income shocks.

Keywords: poverty, consumption smoothing, error correction model, Russia

1 Introduction¹

During the last decade, the Russian Federation experienced that the transition from a central planned economy to a capitalist economy is full of bumps, potholes and off the road experiences. For the Russian people, the transition process involved a surge in uncertainty (World Bank, 1999). Unemployment was essentially an unknown phenomenon in pre-transition Russia. The closing down or privatization of the large public industrial and agricultural companies resulted in mass unemployment and decreased job security. Those still having a job faced wage payment arrears and forced unpaid leave arrangements. The cutting down of subsidies on food and energy resulted in an increase in the cost of living. Additionally, in order to make a living in this new market economy, other skills and abilities were required.

The transition phase has required all the resourcefulness of the Russian people in order to make ends meet. Participatory poverty studies in transition economies reveal that the inhabitants of these countries experienced and disliked the surge in uncertainty that accompanied the transition phase (among others World Bank, 1999). Microeconomic theory shows that uncertainty about future income and consumption flows reduces the expected satisfaction that risk averse individuals can derive from it. In this respect, people's ability to respond to uncertainty and to deal with shocks reflects an important aspect of intertemporal well-being. In contrast, widely used poverty statistics merely describe the level of welfare enjoyed by individuals at a particular point in time. The ability of consumption smoothing and the level of welfare each reflect relevant but different dimension of welfare. This paper investigates the extent to which Russian households have been able to protect their consumption against income shocks during the transition period and how this ability of consumption smoothing is reflected in terms of consumption poverty statistics. The comparison of poverty and ability of consumption smoothing constitutes a contribution to welfare and poverty literature as it enhances our understanding of the relation between a welfare outcome and dynamics in the welfare generating process.

We use data from the Russia Longitudinal Monitoring Survey (RLMS) from 1994 to 2004. The cross-section component of the RLMS is used to obtain poverty estimates that are representative for the Russian population. We use the panel dimension of the RLMS to investigate poverty dynamics and to estimate the overall ability of household consumption smoothing. This study is the first to explicitly incorporate short and long run dynamics in the ability of consumption smoothing; households' income and expenditure flows are modeled using an Error Correction Model (ECM) which better exploits the information in the data. The Generalized Method of Moment (GMM) estimates show that the short run income elasticity, our indicator for the ability of consumption smoothing, is positive. In other words, households can partially protect themselves against income shocks. Another interesting finding is that food expenditures are smoother than non-food expenditures; the income elasticity of food expenditures is considerably lower than that of non-food expenditures suggesting that income shocks have a smaller impact on food consumption. There is

¹Part of this paper is based on a joint econometric exercise undertaken by the Britta Augsburg, Dion Bongaerts, Ron Jongen, Ewa Slowinska and the authors. They deserve credit, as their contributions to the model specification and estimation process have been important in shaping sections 4 and 5 of this paper. We would also like to thank our colleague Sybrand Schim van der Loeff for his suggestions with respect to the model specification in this paper.

also heterogeneity in consumption smoothing abilities; the partial estimations suggest that the abilities of consumption smoothing vary according to household characteristics. Moreover, low abilities of consumption smoothing are not always associated with high poverty risk. For instance, we find that rural households, who have a high poverty risk, manage to smooth food expenditures quite well, most likely because of enhanced food production opportunities. But households with pensioners, who have a lower poverty risk, have higher consumption smoothing abilities. Another finding is that non-food expenditure smoothing abilities increase as household's average expenditures with respect to the poverty line are rising. The chronic poor, however, have the highest non-food smoothing ability but the lowest food smoothing ability. These exploratory results already indicate that there is a potential role for developmental and social protection policies to influence households' abilities to deal with risks.

This paper is organized as follows; section 2 describes the RLMS data and the main variables used. Section 3 reports the main developments of the Russian economy followed by the results from our poverty analysis. In section 4, we discuss the relevance and theoretical background of consumption smoothing and specifies the dynamic model used to measure the ability of consumption smoothing. The estimation strategy is discussed in section 5. Section 6 reports the results from our exploratory analyses of heterogeneity in households' consumption smoothing abilities and relates these results to differences found in poverty risk. Section 7 concludes.

2 Data description

This study uses data from the Russia Longitudinal Monitoring Survey (RLMS). The RLMS is a household-based survey that is designed by an interdisciplinary group of Russian and American social scientists with the objective of measuring the economic well-being of households and individuals in Russia. The survey has been designed as a repeated sample of each household dwelling, meaning that the sampled dwelling place is revisited every survey round. From 1997 on, attempts were made to follow moved households. The data have been collected since 1992.² For each round, information is collected on individual, household and community levels on a wide range of variables such as expenditures, income, assets, land use, employment, education and health. The RLMS can be used for (repeated) cross-section as well as panel analyses.

In this paper we use data from the second phase of the RLMS project for the years 1994-2004 (there were no surveys in 1997 and 1999). We selected those households that were observed in at least one round and had no missing observations on any of the variables. For the poverty analysis in section 3, we use predominantly the cross-section dimension of the RLMS. Because of the missing surveys in 1997 and 1999, the time intervals between surveys are not equally spaced which is a complicating factor for the dynamic panel analysis in this paper. To solve this problem we selected those households that were observed for at least 3 consecutive two year periods (i.e. 1994, 1996, 1998, 2000, 2002 and

²The data are publicly available and can be obtained through anonymous FTP server from the RLMS website. Detailed information on the RLMS project is provided on the following website: <http://www.cpc.unc.edu/projects/rlms/home.html>.

2004). Households that had missing observations on any of the variables were dropped. The sample includes so-called offspring households; these are households that are created when a household split up into two households and both households remain in the RLMS sample. Whenever this happened, from that round on, one household kept the original identification code while the offspring household received a new identification code. However, for the previous rounds both households shared an identical past. We treated offspring households as new households.³

We have included the following variables: food-, non-food-, and total expenditures, total household income, number of household members divided over 6 age categories (children 0-6, children 7-18, male aged 19-60, female aged 19-55, male aged 60 and above and female aged 55 and above) and categorical variables providing information on the household's location such as rural, urban, semi-urban, region and community.

The poverty analysis is performed using the nominal poverty lines constructed by the RLMS. These are based on regional age-gender specific food-baskets that are valued at regional prices. These absolute poverty lines were calculated for each household and are adjusted for the demographic composition of the household. As welfare indicator we use total nominal household expenditures and its construction is primarily based on the constructed expenditure categories provided by the RLMS. Total food consumption is obtained by adding the expenditures on dairy, meat, fish, potatoes, alcohol, bread, eggs, fats and oils, fruits, sugar, vegetables, other foodstuffs, the value of food eaten outdoors and the value of food consumed and produced at home. Total non-food consumption is obtained by summing expenditure items such as tobacco, clothing, fuel, services, durables, luxury items, recreation, rent⁴, utilities and other payments such as tuition and insurance (excluding loans)⁵. The value of total consumption is expressed in June 1992 prices by dividing the current price of expenditures by the regional consumer price index. The welfare indicator slightly differs from the RLMS total household expenditure variable as we excluded savings and expenditures on bonds from the aggregation because these flows reflect investments in the stock of assets and as such do not contribute to current consumption.^{6 7}

For analyzing the ability of consumption smoothing we have composed real household expenditures the same way as for the poverty analysis. Household income consists of cash income as well as the monetary value of in-kind income. The income variable is also expressed in constant prices and is constructed by summing income from salary, rent, interest receipts, pension benefits, child allowances, maternity benefits, family and other benefits, gross income from sales of farm products and other income. We excluded the income from unemployment insurance, insurance benefits, property or jewelry sales, transfers received from friends and relatives and money borrowed because these sources of

³The annex provides a table comparing household characteristics in the cross-section with those of the panel. More information about sample attrition of the RLMS can be found on the RLMS website in a document written by Heeringa and Arbor (1997).

⁴This expenditure category does not include any imputations for the rent of house owners.

⁵Although income and expenditures are expressed in monthly values, the reference period in the questionnaire for the various expenditure and income categories varied from a week for items such as food, a quarter of a year for durables to a year for the harvest from home produced foodstuffs.

⁶Due to limitations in the data the welfare indicator does not include values for the consumption of public goods or for house ownership while consumption of these goods clearly contributes to the level of household welfare.

⁷From round 9 on, the expenditure section of household questionnaire has been adjusted resulting in more detailed questions for expenditures in health and other services. This change lead to an increase in reported expenditures in these categories. For time consistency reasons, the poverty rates reported in this paper are calculated excluding these new categories. Poverty estimates using the expenditures aggregate including these categories yield lower poverty rates but this does not seem to have a large impact on the relative poverty risks of groups in the poverty profile.

Table 1: Per capita average of income and expenditures (monthly, real 1992 Rubles)

Round	Year	# of households	Expenditures			Total income
			Food	Nonfood	Total	
5	1994	3,586	2,485	1,263	3,747	2,736
6	1995	3,441	2,124	1,165	3,287	2,159
7	1996	3,234	1,753	1,194	2,946	2,060
8	1998	3,108	1,312	843	2,154	1,596
9	2000	3,015	1,401	1,139	2,539	1,907
10	2001	3,137	1,505	1,355	2,859	2,300
11	2002	3,132	1,514	1,435	2,948	2,582
12	2003	3,102	1,505	1,723	3,227	2,758
13	2004	3,052	1,496	1,766	3,262	2,941

Source data: RLMS cross-sections

income are likely to reflect ex post adjustments to income shocks.

Data inspection showed that a small number of households did not have positive values for the expenditure and income variables. We have excluded households for which income, food or total expenditures were not positive. Table 1 provides the average per capita values of the key variables in each round for the cross-section dimension of the survey. Expenditures are systematically above income for two reasons. Firstly, as explained above we have excluded a number of income categories because they are likely to reflect ex post shock adjustments. However, even when these categories would be included a (smaller) discrepancy would remain. Another reason for this gap between income and expenditures suggested in the literature is that households have a tendency to underreport income from informal and semi-formal activities (among others Ravallion, 1994; Deaton, 1997; Atkinson *et al.*, 1995). Other alternative explanations such as dissaving or memory failure cannot convincingly explain the discrepancy over time. Dissaving can of course explain why some households maintain expenditures above their income, but the data here suggest that the gap is a general phenomenon which would imply that the whole society would be dissaving during the transition. Additionally, in difficult times (1996 and 1998) where one would expect higher levels of dissaving, the gap between income and expenditures is reduced. Similarly, because survey methodology often relies on respondents' memory for the collection of income and expenditures (and the RLMS is no exception) such data suffer from underreporting, particularly because respondents forget to report sporadic expenses or income. But this type of memory failure applies to both income and expenditures.

3 Russia in transition

The first stage of the transition from a centrally planned economy to a market economy was characterized by a sustained fall in production in all sectors of the economy that lasted until the mid-nineties. Table 2 reports a number

Table 2: Macro-economic indicators

	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03
GDP growth (%)	-12.6	-4.1	-3.6	1.4	-5.3	6.4	10.0	5.1	4.7	7.4
GDP deflator (1997=100)	24.4	59.6	86.9	100	119	204	281	328	379	434
C.P.I. (2000=100)	6.9	20.6	30.4	34.9	44.6	82.8	100	121	141	160
Unemployment (%)	8.1	9.5	9.7	11.8	13.3	12.6	9.8	8.9	8.6	n.a.
Employment (%)										
Agriculture	16.1	15.7	15.3	12.2	11.5	11.8	n.a.	n.a.	n.a.	n.a.
Industry	35.9	34.0	32.5	30.0	29.4	29.4	n.a.	n.a.	n.a.	n.a.
Services	47.7	50.0	52.2	57.8	59.1	58.8	n.a.	n.a.	n.a.	n.a.
* Not available (n.a.)										
Source: World Development Indicators (2005)										

of macroeconomic indicators which reflect this trend. Annual GDP growth has been negative during the first years of transition. Both the GDP deflator and the consumer price index show evidence of high and increasing inflation rates. This trend was accompanied by a development of rising inequality and poverty (Milanovic, 1998; World Bank 1995, 1998; Commander *et al*, 1999). In 1997 the Russian economy was showing some hesitant signs of recovery that were swiftly followed by the financial and economic crisis of 1998; a default on domestic and foreign debts was announced followed by a gulf of bankruptcies in the banking sector, a devaluation of the ruble and a collapse of the stock market (Brown, 1999; Buchs, 1999; Sapit, 1999 and Slay, 1999). From 1999 on, a period of sustained recovery followed, reaching positive GDP growth rates with a peak of 10% in 2000. The sustained increase of unemployment rates from 1994 to 1999 mainly reflects the process of structural change in the Russian economy but also the impact of the economic crisis (in 1998 and 1999). Other indicators for the structural changes in the economy during the transition phase are the employment shares in different sectors of the economy; we can see a large decrease in employment in the industrial sector, a somewhat more modest decrease in agricultural sector employment and a large increase in service employment.⁸

The impact of the transition phase on the Russian population can also be expressed in terms of poverty. We have calculated the aggregate poverty indices and poverty profiles using the Foster Greer Thorbecke class of decomposable poverty indices (1984).⁹

$$FGT = 1/n \left[\sum_{c_i \leq z} \left[\frac{z - c_i}{z} \right]^\alpha \right] \quad (1)$$

where n is the total number of households, q is the number of poor, z is the poverty line and c_i is the welfare indicator of an individual household i . If $\alpha = 0$, then equation 1 represents the headcount index which simply displays the

⁸During the transition many industrial and agricultural state monopolies were privatized, restructured or shut down, in all cases leading to a reduction in the employment in these sectors.

⁹We have also performed the same poverty analyses using the RLMS constructed total income variable as a welfare indicator. The poverty indices and poverty profile decompositions show similar trends and poverty prone groups. Since income figures tend to be lower than expenditures, the estimated poverty levels and poverty gaps are higher when using income as a welfare indicator. We interpret this discrepancy to be the result from a tendency of households to underreport income.

Table 3: Aggregate poverty indices

	1994	1995	1996	1998	2000	2001	2002	2003	2004
Headcount (%)	11.9	19.0	22.2	34.3	23.3	16.7	14.4	11.5	12.3
Poverty gap	3.8	6.3	8.2	12.7	8.0	5.7	4.8	3.6	3.8
Poverty severity	1.9	3.1	4.5	6.7	3.9	2.8	2.5	1.8	1.8

Source data: RLMS cross-sections

percentage of households living below the poverty line. Taking $\alpha = 1$ results in the poverty gap index; this index measures the mean proportionate expenditure shortfall over the total population. The poverty severity index is calculated by squaring the expenditure shortfalls before aggregation (setting $\alpha = 2$), thus putting a higher weight on larger shortfalls. In order to be representative for the Russian population, these poverty indices are calculated using the yearly adjusted household post-stratification weights computed by the RLMS. These weights attempt to match certain demographic characteristics of the sample to those observed in the 1989 census. The household-level weights adjust according to household size and urban-rural residence. Table 3 reports the development of the aggregate poverty indices; all indices show an increase from 1994 to a peak in 1998, followed by a sustained fall. The headcount index shows that the percentage of poor individuals nearly triples from 11.9% in 1994 to 34.3% in 1998.¹⁰ The average expenditure shortfall rose to a peak of 12.7% in 1998, decreasing until 3.6% in 2003. The poverty severity index reveals that, in addition to an increase in the number of poor individuals and the average poverty shortfall, poverty also became more severe in the sense that individuals were experiencing larger shortfalls during the crisis. In 2004 there was a small increase in poverty to 12.3%.

The poverty profile reported in table 4 shows the headcount indices calculated for subgroups of the Russian population.¹¹ The trends observed in the aggregate poverty indices are also reflected for these subgroups. The first decomposition is according to the type of dwelling space. Individuals living in rural areas are disproportionately more often poor than those living in urban areas while at the same time it is clear that especially the people living in urban and semi-urban areas suffered from the crisis. The urban headcount index tripled from 1994 to 1998 while the rural headcount doubled. However, urban individuals seemed to recover faster from the crisis. In absolute terms there are more poor urban people households, as individuals from rural areas comprise about 27% of the Russian population.

Individuals living in larger households typically have higher than average poverty rates than those in smaller sized households. Households with children are more likely to live in poverty than households with no children, and the higher the number of children, the higher the poverty headcount. It seems however that this situation changes for 2002 and 2003; in these years only individuals living in households with more than 2 children have above average poverty risk. For the households including elderly household members (age ≥ 55 for women and age ≥ 60 for men) the results are somewhat mixed; individuals living in households with more than one elderly household member clearly fall less

¹⁰The dramatic trend in poverty indicators appears even more exacerbated because there were no RLMS surveys in 1997 and 1999 and the 1998 survey was performed in November/December, when the impact of the August financial crisis was transmitted to the Russian population.

¹¹Albeit not reported here, we also calculated poverty gap and poverty severity indices for different household characteristics. These indices also show higher values when the poverty headcount rates are high.

Table 4: Poverty profile based on headcount index

	1994	1995	1996	1998	2000	2001	2002	2003	2004
Overall	11.9	19.0	22.2	34.3	23.3	16.7	14.4	11.5	12.3
Settlement type									
Urban	10.8	17.3	17.8	33.3	20.9	14.3	10.8	7.9	8.0
Semi-urban	13.2	16.0	26.2	34.9	19.4	8.7	16.0	13.6	25.9
Rural	14.7	24.1	32.3	36.4	29.8	24.6	22.6	18.9	18.5
Household size									
1	16.9	19.2	18.4	30.9	16.0	14.3	12.2	11.0	9.9
2	10.5	14.1	18.4	28.8	20.0	14.9	12.9	10.7	10.2
3	11.0	20.5	21.2	35.5	21.6	16.1	15.2	11.9	10.8
4	10.8	18.2	23.7	37.6	25.7	15.4	11.2	10.1	11.9
5	12.4	24.0	24.0	35.9	25.7	19.4	13.6	11.5	16.2
≥6	17.7	21.2	29.8	33.1	31.0	26.0	28.8	18.0	20.9
Number of children									
0	11.9	15.5	18.1	31.4	19.6	16.1	14.2	11.0	11.1
1	9.7	19.3	21.3	32.0	21.7	15.5	12.3	10.8	11.3
2	11.2	20.7	26.1	40.4	29.0	18.2	13.0	10.2	12.9
>2	23.9	28.8	34.7	39.8	35.5	23.9	32.0	25.2	27.3
Number of pensioners									
0	11.8	19.9	24.1	36.8	24.1	17.1	14.6	11.2	12.2
1	13.6	21.2	21.3	36.3	26.4	16.5	15.1	13.6	14.9
>1	9.4	11.6	16.6	21.8	15.5	15.7	12.2	9.3	8.5
Household type									
Single adult	16.4	16.8	17.5	33.3	20.0	15.7	14.3	11.3	11.5
Single pensioner	15.1	18.6	15.5	28.4	13.4	11.6	10.2	9.2	7.6
Adult couple no kids	7.6	12.7	19.1	32.9	17.8	15.9	13.7	13.5	8.7
Elderly couple (≥1 pensioner)	10.3	11.2	14.4	22.4	16.2	12.7	8.7	8.7	8.6
Single adult & kids (<18)	15.2	22.6	27.3	42.8	33.2	19.8	20.3	11.3	16.9
Adult couple & kids (<18)	10.0	18.5	22.7	35.7	22.0	14.5	10.2	8.2	8.1
Triple generations household	10.9	22.2	20.8	33.2	25.8	19.1	17.4	14.9	14.5
Other households with pensioners	13.4	16.2	21.6	34.5	26.2	17.2	15.1	11.7	14.4
Other	12.8	21.9	23.3	36.7	24.9	18.3	16.3	12.3	14.6
Source data: RLMS cross-sections									

Table 5: Poverty dynamics

1994-2004 (two year intervals)	
By: Average poverty ratio	
$\leq PL$	8.1
$> PL \leq 1.5PL$	15.8
$>1.5PL \leq 2PL$	17.0
$>2 PL \leq 2.5PL$	16.9
$\geq 2.5PL$	42.2
By: Chronic poverty groups	
Always poor	2.1
Sometimes poor & average expenditures below poverty line	6.0
Sometimes poor & average expenditures above poverty line	40.6
Never poor	51.1
Source data: RLMS panel (measured at 2 year intervals from 1994 to 2004)	

often into poverty than those in households without elderly but individuals living in households including one elderly person seem to have an above average poverty risk. However, when decomposing according to specific household types it can be seen that households comprised only of elderly couples and elderly singles have lower poverty risk. The household types show that single adults, usually females, are also particularly vulnerable to poverty.

Insights into longitudinal aspects of poverty in Russia can be gained using the panel dimension of the RLMS.¹² An interesting indicator in this respect is the average ratio of household's total expenditures over its respective poverty line. This poverty ratio shows the distance of the average living standard of the household relative to the poverty line; a value below 1 indicates that a household, *on average*, lived in poverty during the transition period and vice versa for an average above 1. Of the RLMS panel, 8% of the households had a ratio below 1, 16% a ratio between 1 and 1.5, 17.% between 1.5 and 2, 17% for the range 2 and 2.5, and 42% of the households had poverty ratios well above the poverty line (>2.5). This shows that quite a number of households were living in the vicinity of this absolute poverty line during the transition period. From a slightly different perspective, 2% of the RLMS households were always poor during the observed period, 6% was sometimes poor and had on average expenditures below the poverty line. 41% of the households had on average above poverty line expenditures but still experienced poverty at least once. Only 51% of the households did not experience poverty during the transition period. The first two groups are also often labeled as 'chronic poor' while the third group is called 'occasional poor'.

4 Consumption Smoothing

So far we have seen that the transition experience in Russia involved a multitude of shocks resulting from the restructuring of the economy thereby shaping a highly uncertain environment for Russian households. In addition to these

¹²The panel comprises those households that were observed for at least 3 consecutive two year periods (i.e. 1994, 1996, 1998, 2000, 2002 and 2004).

aggregate shocks, households are also facing a wide range of idiosyncratic risks and shocks such as illness, disability or death of a household member, job loss, payment arrears, unpaid leave but also crop failure or loss of assets. The trends revealed by our poverty analysis show dramatic changes in the levels of economic well being of the Russian population and that the poverty impact differs between groups. Using the RLMS panel, we also found that as much as 49% of the households experienced one or several poverty spells in the period 1994-2004. Participatory poverty studies in transition economies found that households perceived and did not like the surge in uncertainty that accompanied the transition period (among others World Bank, 1999). Microeconomic theory suggests that uncertainty about future income and consumption flows reduces the expected satisfaction that risk averse individuals can derive from it. In this respect, people's ability to respond to uncertainty and to deal with shocks reflects an important aspect of intertemporal well-being.

Households can (and do) respond to these risks and shocks through saving, borrowing, adjusting labor supply, cultivating land and selling assets¹³. Skoufias (2003) classifies such strategies as self-insurance. However, households can also rely on other people through informal, private or government risk sharing or private market insurance schemes offered by financial institutions (Deaton, 1997; Fafchamps and Lund, 2003). The possibilities for coping with shocks are partly determined by households' assets (de Neubourg and Weigand, 2000; de Neubourg and Notten, 2005). These "haves" can be examined in a broad context: households have assets in the form of human capital (skills, experience), physical capital (land, house), social capital (friends, family, acquaintances) and financial capital (cash holdings, savings). In addition, the household environment partly determines the possibilities of what households can do with these "haves". For example, if banks do not provide loans to households or the household lacks sufficient financial collateral to obtain one, households are effectively constrained in their access to financial services. Households might however, obtain credit through other channels, such as social networks (through family members, neighbors or acquaintances) or informal money lenders. Given such differences in households' assets and environment, it is very likely that households are not able to smooth their consumption to the same extent.

This paper investigates the extent to which households are able to protect their consumption against income shocks, mainly because shocks have an impact on the household through the process of income generation. Shocks such as illness, disability or the death of a household member have a direct impact when they involve a household member that actively participates in household's income generating activities. However, even when such shocks affect non-active families there might be an indirect impact on household's income through adjustments in the internal household task division. Active members might reduce labour supply so that they have more time for caring activities or household tasks. Job loss, wage payment arrears and involuntary unpaid leave also affect household income. Note, however, that the impact of income shocks such as labour supply adjustments in the household (i.e. other household

¹³We decided to take the household as our unit of analysis because this is typically the level at which resources are shared and individuals jointly take decisions about income generation, (household) production and consumption. Obviously any analysis of consumption smoothing has to keep the social-demographic composition of the household into account. Note that we thus implicitly assume that resources are equally shared within the household.

members take up extra income generating activities as a response to the job loss of a member) need not be fully reflected in changes in income. This process of income smoothing is one of the strategies that households can follow to maintain stability in consumption (Morduch, 1995)¹⁴. Extremes in climate (i.e. drought, floods) or diseases leading to crop failure also affect household income in the sense that fewer home produced products can be sold or consumed. Inflation or price adjustments for goods directly impact the real value of consumption that can be attained, particularly if income is not or only partly adjusted for price increases. By using real values for income and expenditures one can measure the impact of such shocks.

In the Microeconomic literature there are a number of approaches which model consumption decisions in order to explain reasons for consumption smoothing (for an overview see for instance Deaton, 1992 and Deaton and Muellbauer, 1980). One approach is to approximate consumption smoothing by modeling households' insurance decisions using an Arrow-Debreu economy (Arrow; 1953, Debreu, 1959). In this economy uncertainty exists because there are different possible states of the world that can prevail in the future. The concept 'state of the world' is analogous to the range of weather types that can occur; just as there can be rain, sunshine or snow, the economy can find itself in an upturn, slump or crisis. Each state of the world yields different opportunities for different consumers resulting in different income distributions over states. As a result, opportunities for risk sharing between risk averse consumers arise. Risk sharing can take place through trading state contingent claims on a complete 'Arrow securities' market. This implies that, for each state of the world and time period, there exists an asset that will pay out if that state occurs and does not pay in any other state of the world. Under this framework, perfect consumption insurance against idiosyncratic risks is possible; for every state of the world consumers can buy a different security. Albeit very abstract, this market for state contingent claims could be considered as a simple approximation to the wide range of formal and informal insurance arrangements across space and over time that households can enter into to protect them from risk (Deaton 1992 and 1997). This model has been used for quite a number of empirical studies (among others Mace (1991); Cochrane (1991); Altonji *et al* (1992) and Skoufias (2003).

Townsend (1994) also developed a risk sharing model within a general equilibrium framework which allows for the evaluation of the joint impact of all insurance arrangements within a village economy. In Townsend's model there is uncertainty but there is no such thing as a market for state contingent claims nor is there any modeling of risk-sharing markets or institutions; the assumption that individuals are risk averse provides sufficient rationale for risk-pooling. Thus the theory does not take into account how this risk-sharing takes place. The solution to the intertemporal choice model suggests that in a Pareto optimal allocation all variation in consumption across households is related to variation in aggregate, village level, consumption (controlling for the household demographic composition).

However, there are also models where intertemporal consumption smoothing is achieved through savings and credit markets (Deaton, 1992). The basic model draws upon the work of Friedman's permanent income theory of consumption

¹⁴Unfortunately, due to limitations in the RLMS data we are unable to estimate the relevance of income smoothing for Russian households.

(1957) which predicts that consumption is determined by the value of lifetime resources. The main feature of this model is the permanent income hypothesis: consumption is the annuity value of the sum of expected human and financial resources i.e. the consumer plans to die with no assets. The model implies that the rational and risk averse consumers prefer stable consumption and use financial markets to achieve this stability. Therefore anticipated changes in income should not affect consumption. Only unanticipated shocks influence consumption and the impact depends on the nature of the shock; if a shock is temporary, consumption will only change a little but if the shock is permanent the change in consumption can be considerable. In the basic permanent income model future income flows are certain implying that the only savings motive is consumption smoothing over the life cycle. Deaton (1997) shows that when income flows are uncertain there exists also precautionary savings motive. Intertemporal choice models use utility functions $f(x)$ that are continuously differentiable, where $f'(x) > 0$ and $f''(x) < 0$ additionally provide information about 'prudence' of the consumer. "Prudence is meant to suggest the propensity to prepare and forearm oneself in the face of uncertainty" (Kimball, 1990, p. 54) The degree of prudence is reflected in the third derivative of the utility function; if $f'''(x) > 0$ (i.e. when the marginal utility function is convex) a consumer who is confronted with an increase in uncertainty of future consumption will reduce current consumption and increase saving.

All of the theoretical models discussed above describe perfectly functioning institutions: whatever the instruments available for consumption smoothing (whether through insurance markets, credit and savings markets or informal risk sharing), the main idea behind these models is that risk averse consumers prefer, and therefore make arrangements to obtain, stable consumption. Empirical tests of consumption smoothing following from these theoretical models are very similar: in one way or another they envisage the estimation of the income elasticity of consumption¹⁵. The value of this parameter constitutes a test of the functioning of these markets or the presence of uninsurable risks. In the basic life cycle model used by Friedman a positive income elasticity implies the presence of unanticipated shocks which induce consumers to make adjustments in their life-time consumption plans. In the Arrow-Debreu economy a positive income elasticity implies the incompleteness of the market for state contingent assets so that when a household is confronted with a shock it must adjust its consumption accordingly. For the risk sharing model used by Townsend a positive parameter also means that the insurance institutions cannot provide full insurance¹⁶.

Consequently, the micro-economic literature is useful in the sense that it provides various models that give a rationale for consumption smoothing as well as the ways in which economic agents can smooth their consumption. However, given that the empirical tests of the models discussed above are very similar, it does not make much sense to choose one these models to be an abstract representation for the Russian federation. The empirical test will not provide conclusive evidence in favor (or against) the theoretical model. Additionally, in reality households use a combination of various market and non market institutions, a point that is certainly valid for Russia, where market institutions are

¹⁵The empirical models are estimated using various estimation strategies and include of course a range of control variables for demographic composition of households, regional diversity and time. For more information about the models we refer to the references mentioned in this section.

¹⁶For instance, institutions in risk sharing communities are unable to insure against co-variant shocks. When the community is hit by such a shock households will have to adjust their consumption.

being developed. Thus if the test suggests that households cannot fully smooth their consumption, it does not help us in finding out which institution fails. As the focus in this paper is on the overall ability of households to deal with income shocks, we decided to follow an empirical approach.

Our contribution to the literature is that our model explicitly takes short and long run dynamics of the process of consumption smoothing into account. We investigate the ability of households to protect their consumption against income shocks using a dynamic panel analysis. Firstly, the economic, social and geographic diversity encountered in the Russian Federation makes it relevant to take (un)observed heterogeneity between households into account. Secondly, differences in the pre-shock level of household resources also influence the ability of households to protect themselves against income risks. And thirdly, short run consumption smoothing abilities may differ from long term consumption smoothing abilities. We therefore propose the following random effects panel model,

$$\Delta c_{i,t} = \alpha_0 + \alpha_1 c_{i,t-1} + \beta_1 \Delta y_{i,t} + \beta_2 y_{i,t-1} + \sum_{j=1}^6 \gamma_j x_{j,i,t} + \sum_{k=1}^K \delta_k D_k + v_i + \epsilon_{i,t} \quad (2)$$

where, in addition to the change in expenditures and income, the lag of income $y_{i,t-1}$ and expenditures $c_{i,t-1}$ for household i are included. All income and expenditure variables are expressed in natural logarithms. Further, $x_{j,i,t}$ denotes the number of household members in the j^{th} age category¹⁷, D_k represents a set of binary variables specifying each community separately by survey round, v_i is a random individual effect and $\epsilon_{i,t}$ is the error term. β_1 is the short-run income elasticity of consumption and provides information about the question whether households are able to protect their income from short term fluctuations in their income.

The model specified in equation 2 above is an error correction model (ECM), which distinguishes between short and long term dynamics in household expenditures and income. The effect of changes in household composition is assumed to be practically immediate. Assuming $\alpha_1 \neq 0$, the error correction representation of the model can be written as

$$\Delta c_{i,t} = \alpha_0 + \beta_1 \Delta y_{i,t} + \alpha_1 (c_{i,t-1} - (\frac{-\beta_2}{\alpha_1}) y_{i,t-1}) + \sum_{j=1}^6 \gamma_j x_{j,i,t} + \sum_{k=1}^K \delta_k D_k + v_i + \epsilon_{i,t} \quad (3)$$

The ECM reflects the idea of an intertemporal budget constraint; as the stock of wealth is limited, consumption can diverge from income for some time (i.e. due to an income shock). However, at some point, resources are depleted and consumption levels will have to adjust to (new) income levels. In equation 3, α_1 is the so-called equilibrium correction coefficient, which compensates for the short term overshooting or undershooting of consumption ($\alpha_1 < 0$); in case of a complete correction this parameter will have a value of -1. $(\frac{-\beta_2}{\alpha_1})$ is the long term income elasticity of consumption; it is likely that the value of this parameter is higher than that of its short term counterpart because it is more difficult to

¹⁷The demographic characteristics of household members are summarized in 6 variables, where each variable represents the number of household members in a particular age-gender category. These categories are children below age of 6, children aged between 6 and under 18, adult males, adult females, post-working age males (60 and above) and post working-age females (55 and above). The post-working categories are in accordance to the legal retirement age in Russia.

smooth consumption over a longer period (assets or savings can be depleted, friends and family will stop assisting at some time). The application of an advanced panel model to measure consumption smoothing, and particularly the error correction interpretation of our model, constitute a contribution to the literature on consumption smoothing in various aspects. First, in comparison to the models used in the literature our model explicitly takes dynamics in consumption and income patterns and unobserved heterogeneity into account (Townsend, 1994; Ravallion and Chaudhuri, 1994; Deaton 1992 and 1997, Skoufias, 2003). Secondly, the error correction interpretation of our model is innovative in this application because it incorporates the idea that households are able to smooth consumption but in the long term income and expenditures should balance.

5 Model estimation and specification

In the model outlined in equation 2, $c_{i,t-k}$ for any k is correlated with the unobserved household fixed effect, v_i . In order to obtain consistent estimates for this model a number of subsequent steps need to be taken. Firstly, rewrite equation 2 in levels.

$$c_{i,t} = (1 + \alpha_1)c_{i,t-1} + \beta_1 y_{i,t} + (\beta_2 - \beta_1)y_{i,t-1} + \sum_{j=1}^6 \gamma_j x_{j,i,t} + \sum_{k=1}^K \delta_k D_k + v_i + \epsilon_{i,t}. \quad (4)$$

This model can be estimated using the Generalized Method of Moments (GMM) estimator. The GMM estimator yields consistent and more efficient estimators than other linear method of moments estimators (Arellano and Bond, 1991; Wooldridge, 2001; Greene, 2003).¹⁸ The efficiency increase results from the use of additional instruments (i.e. more instruments than needed for model identification) which become available when using the orthogonality conditions that exist between lagged values of the dependent variable, consumption, and the disturbances $\epsilon_{i,t}$. Taking differences of equation 4 removes the household unobserved effects, v_i :

$$\Delta c_{i,t} = (1 + \alpha_1)\Delta c_{i,t-1} + \beta_1 \Delta y_{i,t} + (\beta_2 - \beta_1)\Delta y_{i,t-1} + \sum_{j=1}^6 \gamma_j \Delta x_{j,i,t} + \sum_{k=1}^K \delta_k \Delta D_k + \Delta \epsilon_{i,t} \quad (5)$$

The disturbance $\Delta \epsilon_{i,t}$ follows an MA(1) meaning that the model is subject to first-order autocorrelation, though presumably not to any higher order of autocorrelation. In this model $\Delta c_{i,t-1}$ is still correlated with $\Delta \epsilon_{i,t}$. However, $c_{i,t-2}$ is a valid instrument for $\Delta c_{i,t-1}$, for it is in principle not correlated with $\Delta \epsilon_{i,t}$, and negatively correlated with $\Delta c_{i,t-1}$. At the number of time periods in the panel increases, more lags can be added as instruments.¹⁹

¹⁸Using an instrumental variable estimator is a consistent, albeit less efficient method.

¹⁹We have estimated this empirical model for the overall panel as well as for a number of subsamples using the Stata 9.0 software package. For the GMM estimator (level GMM) we have used the user-written program 'xtabond2' instead of Stata's 'xtabond' because 'xtabond2' provides more possibilities for the definition of the instrument matrix. 'xtabond2' is written by David Roodman, Center for Global Development, Washington, DC.

It is also important to consider the influence of possible measurement error in the income and expenditure variables on the model estimation. As with all household surveys, measurement error is inevitably present in the RLMS data. Different types of measurement error arise because of inconsistencies in the respondents' memories, deliberate under-reporting of income, but also errors in for instance the imputations for home production. Our expenditure variable includes the value of home production consumed and our income variable includes the total value of home production consumed and sold. Deaton (1997) explains that in this type of specification, measurement error caused by imputations in home production can generate an upward bias when the coefficient is positive. One way to deal with this problem is by using the following instruments for income and lagged consumption: income minus revenues from home production and expenditures minus the value of home production consumed. We found evidence for this type of measurement error in the RLMS data and therefore used these instruments in our estimations.²⁰

The aim of our analysis is exploratory; we estimate model 5 not only for the overall sample but also for a selection of socio-economic groups in Russia.²¹ These partial analyses allows us to gain insights in whether there are differences in consumption smoothing abilities between these subgroups. Furthermore we can examine whether there is a relationship between the degree of poverty risk for these socio-economic groups and their abilities of consumption smoothing. We estimate model 5 for the following decompositions settlement type, household size, number of children, number of pensioners, household type and according to poverty characteristics (chronic poverty and average poverty ratio). Table 6 reports the results of the main parameters and specification tests as well as the size of the samples in terms of number of observations for the estimation of the overall sample and the decomposition per settlement area. Tables 10 and 11 in the appendix reports the results of the specification tests for all decompositions and the estimated parameters of the error correction model (the error correction term (α_1), short term income elasticity (β_1) and long term income elasticity ($-\beta_2/\alpha_1$)). The demographic variables and time-community dummies that have been included as control variables in the estimations are not reported in the tables.

β_1 is the short run income elasticity of expenditures; thus a 10% decrease in income will only result in a 1.6% decrease in overall expenditures. This parameter can also be interpreted as an indicator for the short run ability of consumption smoothing: when it is close to zero, households are able to protect themselves against income shocks; when it is close to one, households do not (or are not capable) of consumption smoothing. A value between zero and one indicates partial consumption smoothing. β_1 is significant on a 1% level for the overall sample and for most of the subsamples; we can thus reject the null-hypothesis of perfect consumption smoothing. As the short term elasticities also differ significantly from one (not shown here), our results therefore provide evidence of partial consumption smoothing (this is in line with the empirical literature see for instance Townsend (1994), Skoufias(2003)). The other parameters of the

²⁰To test whether this type of measurement error is present in the RLMS data we estimated a simplified version of our model (excluding the lagged levels) using a 2SLS estimator with and without the instruments for income and expenditures. The estimated coefficients of the model using the instruments are indeed lower than those in the other model.

²¹We use the two step GMM estimator which includes a finite-sample correction to the two-step covariance matrix derived by Windmeijer (2005). This can make two step robust more efficient than the one step robust estimator. However, for some partial estimations this correction could not be estimated (matrix not positive definite). In these cases we have used the results from the robust one step GMM estimator.

Table 6: Results overall and partial estimations for total expenditures

	$1 + \alpha_1$	β_1	$\beta_2 - \beta_1$	Hansen (P-value)	AR(1) (P-value)	AR(2) (P-value)	# of obs
Overall	0.059***	0.160***	0.014	0.647	0.000	0.101	9,187
By: Settlement type							
Urban	0.080***	0.159***	0.014	0.321	0.000	0.043	5,742
Semi-urban	0.151	0.179**	-0.423	0.000	0.150	0.505	576
Rural	-0.004	0.150***	0.019	0.355	0.000	0.844	2,869

* 10%, ** 5% and *** 1% significance level.
Source data: RLMS panel (measured at 2 year intervals from 1994 to 2004)
Two step GMM estimator including standard errors estimated with Windmeijer Finite Sample Correction (2000).
Control variables included in estimation: changes in demographic composition and time-community dummies
(at level of primary sampling unit).

error correction model are not estimated directly but are reported in the appendix (tables 10 and 11). Although the parameters for lagged consumption ($1 + \alpha_1$) and lagged income ($\beta_2 - \beta_1$) are only significant for some subsamples, the parameters of interest, α_1 and $-\beta_2/\alpha_1$, differ significantly from zero.²² The value of α_1 , the error-correction coefficient, is expected to be negative because of the need to compensate for under- and over-consumption in previous periods. A value of $\alpha_1 = -1$ indicates immediate adjustment to disequilibrium. Table 10 shows that the estimated error correction parameters are close to minus one. $-\beta_2/\alpha_1$ represents the long term income elasticity of consumption; in line with our expectations we find that the estimated long term income elasticities are higher than their short term counterparts indicating that it is harder to smooth consumption over a longer period.²³

We also performed a number of tests to evaluate the validity of the model specification. First, a consistent GMM estimator requires that there is no second-order autocorrelation, thus that $E(\Delta\epsilon_{i,t} \times \Delta\epsilon_{i,t-2}) = 0$.²⁴ It is also important to check whether the residuals actually display first-order autocorrelation or whether they follow a random walk. The test statistics for the estimated subsamples reported in table 6, 10 and 11 confirm that these assumptions on the model are acceptable in most cases.²⁵ The Hansen test evaluates the validity of the over-identifying restrictions used in the GMM estimator. A failure to reject the null-hypothesis indicates that there is no violation of the zero correlation assumption between additional instruments and the error term. The null-hypothesis is rejected for the overall sample as well as for most of partial estimations.^{26 27}

²²The standard error of the long term elasticity ($-\beta_2/\alpha_1$) is estimated using the delta method. The standard error of the error correction term (α_1) can easily be obtained by testing the hypothesis that $(1 + \alpha_1) = 1$ which is mathematically equivalent to testing that $\alpha_1 = 0$.

²³Note that the size of the estimated parameters is sensitive to the choice of time period; including more or fewer survey rounds will change the estimates. It also cannot be excluded that these results may, to some degree, suffer from attenuation bias caused by uncontrolled heterogeneity or other measurement error.

²⁴Testing this condition requires a number of time periods $T \geq 5$ (see for instance Baltagi, 2001).

²⁵The AR(1) test only finds no evidence of first order autocorrelation for the two household types (Single adult and kids and the triple generations household). The AR(2) test fails to reject the zero second order correlation at a 1% level for the Adult couple with no kids and at a 5% level for the urban subsample.

²⁶Only for the semi-urban subsample and for households with two or more pensioners the null hypothesis cannot be rejected.

²⁷Not reported here are the results of the Hausman model specification test (1978) that provides information on how the income variables should be treated, i.e., as predetermined or endogenous. The Hausman test is a test of endogeneity based upon a direct comparison of coefficient values. The test indicated that income can be treated as exogenous.

6 Interpretation and discussion

In this paper we focus on the short-term ability of households to smooth consumption during the transition period. We are interested in this ability as it reflects an important dimension of welfare, namely the capacity of households to maintain their standard of living in an uncertain environment. We are also interested in finding out whether consumption smoothing abilities are related to poverty risk; do households with a higher poverty risk also have more difficulties with consumption smoothing or not? From the development literature we know that poor households have fewer assets and are more likely to face borrowing constraints (Bardhan and Udry; 1999, Deaton; 1997). But such households might make use of other consumption smoothing strategies such as risk sharing arrangements. By comparing the results of the poverty analysis in section 3 with the short run smoothing abilities of household estimated in the partial analyses in section 5 we want to get some preliminary insights into the relationship between poverty risk and consumption smoothing ability. It is important to realize that β_1 represents the outcome of a mix of consumption smoothing strategies; it does not only reflect self-insurance strategies such as borrowing, adjusting labor supply, and selling assets, but also all formal and informal risk sharing arrangements that spread the effects of income shocks across households at any point in time.

At this point we need to elaborate somewhat on these consumption smoothing strategies, the costs of different strategies and their impact on welfare. In this paper, the short term income elasticity of consumption reflects the ability of households to cope with income shocks. This is an important evaluation criterion in terms of welfare as it shows whether households are capable of consumption smoothing in a highly uncertain environment. However, the model presented in this paper does not indicate at which cost this protection is achieved. For example, households may accumulate non-productive assets that they can sell in times of trouble but this capital could have been used for investments (for example in human capital) with a higher expected return. Financial markets and the government can play an important role in the provision of efficient formal private financial services and social protection programmes. Another point, albeit beyond the scope of households' insurance arrangements, is that public authorities can achieve reduction of income risks by means of a stable macroeconomic environment as well as through the enforcement of property and civil rights. It is also relevant to mention that this paper investigates the degree of consumption smoothing *in response to income shocks*. There is also evidence that households, particularly at the lower end of the income distribution in developing and transition economies, smooth their consumption by means of income smoothing strategies such as choosing crops with low variance yields or low risk-low return entrepreneurial activities (Morduch, 1995). Our model does not capture this channel of consumption smoothing.

Table 7 and 8 summarize the consumption smoothing abilities for the overall sample and all subgroups (the β_1 's of the partial analyses). As we find evidence for partial consumption smoothing this implicitly also reflects a household choice regarding to which expenditures to smooth and which not. We have therefore also estimated the model using

Table 7: Short-run consumption smoothing abilities by household characteristics

	Total expenditures	Food expenditures	Non-food expenditures
Overall	0.160***	0.120***	0.366***
By: Settlement type			
Urban	0.159***	0.127***	0.304***
Semi urban	0.179**	0.074	0.327*
Rural	0.150***	0.100***	0.519***
By: Household size			
1	0.086*	0.065	0.456***
2	0.203***	0.141***	0.409***
3	0.158***	0.122***	0.289***
≥4	0.191***	0.141***	0.370***
By: # of children			
0	0.141***	0.110***	0.361***
1	0.191***	0.155***	0.300***
≥2	0.200***	0.112***	0.526***
By: # of pensioners			
0	0.204***	0.140***	0.400***
1	0.107***	0.102***	0.440***
≥2	0.111*	0.077	0.283***
By: Household type			
Single adult (1 step)	0.264**	0.131	-0.145
Single pensioner (1 step)	0.052	0.018	0.538***
Adult couple no kids (1 step)	0.276***	0.178***	0.457***
Elderly couple (≥1 pensioner)	0.198***	0.157***	0.408***
Single adult & kids (<18) (1 step)	0.207***	0.048	0.449***
Adult couple & kids (<18)	0.199***	0.087***	0.430***
Triple generations household	0.200	0.128	0.244*
Other households with pensioners	0.120*	0.172**	0.229
Other	0.185***	0.159***	0.306***

* 10%, ** 5% and *** 1% significance level.
Source data: RLMS panel (measured at 2 year intervals from 1994 to 2004)

food and non-food expenditures as independent variable.²⁸ A first observation is that the short term income elasticities for food expenditures are much lower than the coefficients for non-food expenditures and that this is the case for all subcategories. Thus, when income shocks occur, households smooth their food consumption and cut expenditures on non-food consumption.

A second observation is that the degree of consumption smoothing varies among the sub-samples. The decomposition into rural and (semi-)urban regions for total expenditures suggests that rural households are somewhat more capable of insuring their overall consumption from income shocks than urban households. However, when expenditures are decomposed into food and non-food expenditures, rural households appear to be quite able to smooth food expenditures but have, in comparison with their urban counterparts, a much lower ability to protect non-food consumption. From

²⁸From an econometric perspective this actually implies that the model with total expenditures is not adequate when the estimated parameters of food and non-food expenditures are different. Given the exploratory character of this analysis we decided to report the short term elasticities for total, food and non-food expenditures. The specification tests using food and non-food expenditures do not vary much with those obtained using total expenditures.

the poverty profile displayed in table 4, it can be seen that households in rural areas find themselves disproportionately more often in poverty. It is likely that rural households have more opportunities for own food production (and make use of these opportunities) which enables them to smooth food consumption. However, when confronted with an income shock, rural households have to make considerable expenditure cuts in the non-food component. Households in urban areas are more dependent on the proceeds from cash income generating activities than rural households, which renders them more vulnerable to income shocks in general; the poverty analysis in section 3 showed that during the 1998 crisis the number of poor urban households roughly tripled while the number of poor rural households doubled. At the same time, it seems that the urban environment provides more opportunities in terms of employment and entrepreneurship for making a decent living (above the poverty line) and to accumulate savings or other assets that can be used in difficult times.

The decomposition of households according to the number of household members shows that single person households have near perfect smoothing ability in terms of food expenditures but the lowest ability in terms of non-food expenditures as compared to larger households. There is no clear pattern in smoothing abilities as the number of household members rises; the decompositions of the overall sample with respect to children, elderly and household types suggest that the observed pattern arises due to a combination of factors such as dependency ratios and pension benefit receipts.

Households with children have a lower smoothing ability (thus a higher short term income elasticity) than childless households for total and food expenditures (0.191/0.200 as compared to 0.141). Households with one child have lower than average income elasticity for non-food expenditures while household with two or more children have higher than average elasticity. The poverty profile has shown that households with more children are also more likely found to be poor. Households with children have higher dependency ratios; there are fewer economically active adult(s) who have to make a living for themselves and their dependent children. This makes the household as a whole more vulnerable to poverty but also to income shocks such as job loss. Households consisting of a single caretaker and children have low overall and non-food smoothing abilities while at the same time this group has an above average poverty risk. Clearly, this household type is very vulnerable both in terms of poverty risk and low consumption smoothing abilities.

The results also show that having an elderly as household member increases the ability of consumption smoothing in terms of total and food expenditures but only enhances smoothing abilities for non-food expenditures if there is more than one elderly living in the household. According to the poverty profile, households comprised of only elderly persons or at least including 2 elderly persons have lower poverty rates of this category. Every elderly citizen in the Russian Federation is entitled to a pension (the eligible age is 55 for women and 60 for men). This pension consists of a basic amount plus increments depending on the employment record but in reality the amounts of pension received did not differ widely during the transition period (Social Security Association, 2002; Zurabov, 2002)²⁹. In this respect, one hypothesis is pensions in Russia are typically sufficient to lift elderly out of poverty and even allow them to accumulate

²⁹As a result of the pension reform in 2001 it can be expected that this discrepancy will increase in the coming years.

Table 8: Short-run consumption smoothing abilities by poverty characteristics

	Total expenditures	Food expenditures	Non-food expenditures
By: Average poverty ratio			
$\leq PL$ (1 step)	0.160***	0.182***	0.248
$> PL \leq 1.5PL$ (1 step)	0.134***	0.091**	0.561***
$>1.5PL \leq 2PL$ (1 step)	0.160***	0.086**	0.415***
$>2 PL \leq 2.5PL$ (1 step)	0.211***	0.179***	0.307**
$\geq 2.5PL$ (1 step)	0.154***	0.114***	0.266***
By: Chronic poverty groups			
Chronic poor (1 step)	0.160***	0.182***	0.248
Occasionally poor	0.188***	0.150***	0.436***
Never poor	0.115***	0.068***	0.255***

* 10%, ** 5% and *** 1% significance level.
Source data: RLMS panel (measured at 2 year intervals from 1994 to 2004)

some assets (savings) which can be used as a consumption smoothing strategy. However, this is only partially true as the high inflation during the economic crisis of 1998 eroded the real value of pensions (Zurabov, 2002). The poverty profile shows a clear jump in elderly poverty rates during this time. The old age pension might be sufficient for maintaining a welfare level above the poverty line, but when the real value of pension declines (as it did in 1998) expenditures have to be cut. Additionally, the decomposition by household type shows that the consumption smoothing ability of households with pensioners varies. Single elderly households and triple generation households have high abilities of smoothing food expenditures while the other pensioner households type smoothes predominantly through non-food expenditures.

How does the ability of consumption smoothing vary when we analyse the panel according to longitudinal characteristics of poverty? We have estimated our model for two poverty decompositions; one that is based on the average poverty ratio and one that is based on a combination of the poverty ratio and the experience of poverty spells. The average poverty ratio shows the distance of the average living standard of the household relative to the poverty line while the chronic poverty groups are a combination of the frequency of poverty spells experiences and the average living standard with respect to the poverty line (which is also why the first average poverty ratio group ($\leq PL$) and the chronic poor are the same). The patterns of consumption smoothing abilities for these dynamic poverty decompositions are interesting; non-food expenditure smoothing abilities increase (i.e. β_1 decreases) as household's average expenditures with respect to the poverty line are rising. But those households that are chronic poor have the highest non-food smoothing ability and the lowest food smoothing ability. One interpretation for this pattern is that the chronic poor spend most of their available resources on food, therefore when they are hit by an income shock they cannot avoid to cut expenditures on food. Groups with higher poverty ratios instead can choose to cut expenditures in other categories if they cannot fully smooth the income shock. The patterns in smoothing abilities observed for chronic poverty groups point in the same direction.

To sum up, what can be said about the relation between poverty and the ability of consumption smoothing? Households

that have a higher poverty risk or have experienced poverty during the transition period typically have a lower ability of consumption smoothing, particularly in terms of non-food expenditures. Chronic poor households are the exception; instead of low non-food smoothing ability they have low food smoothing ability. Another important exception in this respect are households living in rural areas, who have a high ability of consumption smoothing for food-expenditures because of home production opportunities. Nevertheless, this group also shows low smoothing abilities for non-food expenditures.

It is interesting to compare the results of this paper with those of Emmanuel Skoufias in his paper on Consumption Smoothing in Russia (2003). To estimate household's response to income shocks, Skoufias used a model which related changes in income to changes in consumption and was estimated by pooled Ordinary Least Squares (OLS) using RLMS 1994 to 2000³⁰. In line with our results, Skoufias finds that households are only partially insured against income shocks and that food expenditures are less volatile than non-food expenditures. However, Skoufias finds that rural households and households with children have higher consumption smoothing abilities whereas we find the opposite result. The use of a dynamic panel model, albeit justified in a theoretical sense, is not likely to be the reason for this difference.³¹ It is more likely that these differences arise due to measurement error caused by imputations in home production; estimates of our model without instrumenting the home production component resulted in similar outcomes for rural households and households with children as Skoufias' results. As mentioned before, according to Deaton (1997) this type of measurement error can generate an upward bias when the coefficient is positive. It is not surprising that this type of measurement error has a large impact on rural households (rural household tend to have more children as well). Moreover, the model used by Skoufias only takes short term dynamics into account.

7 Conclusion

This paper analyses to what extent Russian households have been able to protect their consumption against income shocks and further investigated how these smoothing abilities are related to poverty risk. The dynamic random effects model exploits the use of the panel dimension in the Russian Longitudinal Monitoring Survey (RLMS). This specification allows to control for unobserved random effects and for dynamic patterns in income and expenditure. The error correction model underlines the special relationship of income and expenditures; expenditures can deviate from income in the short term but in the long term there is some kind of equilibrium relationship between income and expenditures. The results from the specification tests indicate that our model does not violate the assumptions required for estimation. We also controlled for measurement error caused by imputation errors in home produced goods by

³⁰Skoufias estimated the following model $\Delta c_{i,t} = \alpha_0 + \beta_1 \Delta y_{i,t} + \sum_{j=1}^J \gamma_j x_{j,i,t} + \sum_{k=1}^K \delta_k D_{k,t} + \Delta \epsilon_{i,t}$ where $\Delta c_{i,t}$ represents the change in natural logarithm of total consumption for household i , in period t , $\Delta y_{i,t}$ represents the change in natural logarithm of total household income, $x_{j,i,t}$ is a particular household characteristic, such as family size and demographic composition, $D_{k,t}$ is a binary variable specifying each community separately by survey round, and $\epsilon_{i,t}$ is a random error term.

³¹The empirical results show that even though some of the lagged variables are significant, the dynamics in the data are rather small and not likely to reverse the results in such a way.

instrumenting income and lagged expenditures (the instruments exclude the home production component) as this component of measurement error might cause a positive bias. Estimations using the instruments indeed resulted in lower parameter estimates.³²

We find that households can partially protect themselves against income shocks. Another interesting finding is that food expenditures are smoother than non-food expenditures; the income elasticity of food expenditures is considerably lower than that of non-food expenditures indicating that income shocks have a smaller effect on food consumption. We also find heterogeneity in consumption smoothing abilities; the partial estimations suggest that the abilities of consumption smoothing vary according to household characteristics. Counterintuitive, low abilities of consumption smoothing are not always associated with high poverty risk. For instance, we find that rural households, who have a high poverty risk, manage to smooth food expenditures quite well, most likely because of enhanced food production opportunities. But households with pensioners, who have a lower poverty risk, have higher consumption smoothing abilities. Another finding is that non-food expenditure smoothing abilities increase as household's average expenditures with respect to the poverty line are rising. Exception are the chronic poor who have the highest non-food smoothing ability but the lowest food smoothing ability.

These results are informative for policymakers. Scholars such as De Neubourg and Holzman propose a new orientation of social protection policy; these policies should not only be concerned with basic poverty relief but there is also an important role for the government in terms of assisting households with risk management (de Neubourg and Weigand, 2000; Holzman *et al*, 2000). Beyond the scope of social policy, lies the fact that public authorities play an important role in capitalist economies and can exercise a positive or negative influence on macroeconomic stability and on the labour market (thus reducing sources of uncertainty in the household environment). In the context of Russia, pensions seem to assist households in terms of consumption smoothing as well as in terms of decreased poverty risk. During the observed period, child allowances do not seem to provide a significant contribution in this respect. Urban households with low income and expenditure levels are particularly vulnerable to income risk and are forced, in the event of a negative income shock, to make considerable cuts on basic necessities. This suggests that policies improving the risk management capacities of urban households should have a different orientation than those for their rural counterparts. Whereas some kind of social safety net might cushion the worst impact of an income shock for urban households, rural households would benefit more from policies focussed at improving the opportunities for income generating activities in rural areas.

We have provided a number of intuitively appealing explanations for our results but further research is required. Firstly, our partial analyses are only of an exploratory nature. It is preferable that the influence of household characteristics is directly incorporated in a model of consumption smoothing. Secondly, research into the specific smoothing strategies followed by households and the institutions which assist them with smoothing is needed. Thirdly, it should also be

³²Nevertheless, the possibility of biases caused by other components of measurement error cannot be excluded.

noted that we have thus far analysed the impact of income shocks on consumption. Households may also pursue income smoothing strategies instead of consumption smoothing (Morduch 1994 and 1995). In this way they prevent income shocks from occurring in the first place.

8 References

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9 Annex

9.1 Comparison cross-section and panel dimensions RLMS

The RLMS is a sample of *dwelling places*, which means that when a household moves, it is removed from the cross-section dimension. However, once moved, the RLMS tried to locate these households and remained interviewing them for the panel dimension (this strategy has been implemented since round 7). This explains why the size of panel increases over time. New households that moved into a sampled dwelling place were added to the cross-section. Also note that each sampled dwelling place was visited every round; even if a household refused to cooperate or was not present in one round, the household was visited again in the subsequent survey round. Thus, for round 5 (the first round of wave 2), all households in the panel are also part of the cross-section. We have included households in the panel once they have been observed for at least three consecutive periods (two-year periods in this case). For example, a household is part of the panel when it is observed in 1994, 1996 and 1998 but also when it is observed in 1996, 1998, 2000 and 2002.

Comparison of the characteristics of the weighted cross-sections with the unbalanced panel reveal a number of differences.³³ Rural households are overrepresented in the panel in comparison to the cross-section. An important factor for this difference are higher attrition rates of households in Moscow and Saint Petersburg. For this reason the RLMS included a new sample of households from these areas in 2001. Single households and childless households are somewhat underrepresented in the panel. Median income and expenditures are slightly lower in the panel while the differences for the averages are somewhat larger albeit in the same direction.

³³Note that we have used the yearly adjusted household post-stratification weights computed by the RLMS for the cross-sections. These weights attempt to match certain demographic characteristics of the sample to those observed in the 1989 census. The household-level weights adjust for household size and urban-rural residence. There are no such weights available for the panel dimension.

Table 9: Attrition effects in RLMS: comparison characteristics cross-section and panel

Year (survey round)	1994 (5)		1996 (7)		1998 (8)		2000 (9)		2002 (11)		2004 (13)	
	C*	P**	C	P	C	P	C	P	C	P	C	P
# of households	3,586	2,339	3,234	2,610	3,108	2,956	3,015	3,120	3,132	2,919	3,052	2,625
Settlement type (%)												
Urban	69.6	63.7	67.0	63.6	66.7	65.1	65.7	63.9	67.9	63.9	64.6	62.8
Semi-urban	5.5	5.7	5.8	6.2	5.7	6.1	6.5	6.6	5.7	6.6	5.3	6.6
Rural	24.9	30.6	27.2	30.2	27.7	28.9	27.8	29.5	26.4	29.5	30.1	30.6
# of children (%)												
0	53.2	50.2	53.8	50.6	54.6	52.6	55.2	53.1	57.0	56.2	61.5	59.7
1	26.1	25.5	26.0	26.7	26.8	27.4	28.0	29.6	28.1	28.7	25.9	26.7
≥2	20.9	24.3	20.3	22.7	18.7	20.1	16.8	17.3	14.9	15.2	12.6	13.6
# of pensioners (%)												
0	53.7	52.0	52.7	51.8	51.2	51.5	51.8	50.8	51.1	50.8	49.9	49.6
1	30.2	30.2	31.3	31.3	32.1	31.8	31.9	32.1	32.9	32.1	34.8	33.9
≥2	16.1	17.8	16.0	16.9	16.7	16.8	16.3	17.0	16.0	17.0	15.4	16.5
Household size (%)												
1	17.2	14.2	18.3	15.4	18.7	16.7	19.8	17.2	20.4	18.6	23.1	20.0
2	28.7	28.4	27.6	27.1	28.1	27.9	28.0	28.9	27.9	29.0	28.2	28.8
3	23.2	22.9	22.6	23.6	22.8	23.9	22.1	25.1	22.1	24.7	23.6	25.2
≥4	30.8	34.5	31.5	33.9	30.4	31.5	30.2	28.9	29.6	27.6	25.0	26.0
Per capita real income												
Median	2,087	2,046	1,504	1,457	1,241	1,250	1,416	1,421	2,014	1,950	2,306	2,218
Mean	2,754	2,648	2,064	1,926	1,607	1,563	1,899	1,858	2,749	2,436	2,938	2,763
Per capita real expenditures												
Median	2,631	2,590	2,026	1,942	1,494	1,461	2,096	1,783	2,222	2,106	2,419	2,248
Mean	3,767	3,484	2,947	2,713	2,162	2,056	2,528	2,483	2,942	2,823	3,270	2,982

* C= Cross-section (unweighed)

** P = Observations in panel comprising of households that are at least observed 3 consecutive times.

9.2 Partial estimations: error correction coefficients and specification tests

Table 10: Summary results overall and partial estimations by household characteristics

	α_1	β_1	$-\beta_2/\alpha_1$	Hansen (P-value)	AR(1) (P-value)	AR(2) (P-value)	# of obs
Overall	-0.941***	0.160***	0.185***	0.647	0.000	0.101	9,187
By: Settlement type							
Urban	-0.920***	0.159***	0.188***	0.321	0.000	0.043	5,742
Semi-urban	-0.849***	0.179**	-0.287	0.000	0.150	0.505	576
Rural	-1.004***	0.150***	0.168***	0.355	0.000	0.844	2,869
By: Household size							
1	-1.004***	0.086*	0.097	0.453	0.000	0.064	1,716
2	-0.948***	0.203***	0.228***	0.132	0.000	0.593	2,654
3	-0.968***	0.158***	0.180***	0.818	0.000	0.185	2,179
≥ 4	-0.888***	0.191***	0.238***	0.518	0.000	0.740	2,638
By: # of children							
0	-0.958***	0.141***	0.148***	0.462	0.000	0.307	5,279
1	-0.948***	0.191***	0.262***	0.219	0.000	0.549	2,405
≥ 2	-0.846***	0.200***	0.242***	0.132	0.000	0.428	1,503
By: # of pensioners							
0	-0.900***	0.204***	0.241***	0.390	0.000	0.406	4,460
1	-1.003***	0.107***	0.140***	0.948	0.000	0.522	3,089
≥ 2	-0.896***	0.111*	0.100	0.015	0.000	0.450	1,638
By: Household type							
Single adult (1 step)	-1.128***	0.264**	0.233	1.000	0.004	0.082	247
Single pensioner (1 step)	-1.350***	0.052	0.054	0.878	0.000	0.344	1,469
Adult couple no kids (1 step)	-1.012***	0.276***	0.424***	1.000	0.002	0.001	645
Elderly couple (≥ 1 pensioner)	-0.975***	0.198***	0.223**	0.153	0.000	0.541	1,486
Single adult & kids (<18) (1 step)	-1.026***	0.207***	0.139*	1.000	0.177	0.050	323
Adult couple & kids (<18)	-0.872***	0.199***	0.289***	0.336	0.000	0.950	1,721
Triple generations household	-1.001***	0.200	0.275*	0.899	0.849	0.737	897
Other households with pensioners	-0.857***	0.120*	0.049	0.050	0.013	0.064	475
Other	-0.893***	0.185***	0.187***	0.592	0.000	0.665	1,524

* 10%, ** 5% and *** 1% significance level.

Source data: RLMS panel (measured at 2 year intervals from 1994 to 2004)

The null-hypothesis that the structural parameter is equal to zero.

The standard error of the long term elasticity is estimated using the delta method.

Two step GMM estimator with robust standard errors (Windmeijer Finite Sample Correction, 2000).

Control variables included in estimation: changes in demographic composition and time-community dummies (at level of primary sampling unit).

Table 11: Overall and partial estimations by poverty characteristics

	α_1	β_1	$-\beta_2/\alpha_1$	Hansen (P-value)	AR(1) (P-value)	AR(2) (P-value)	# of obs
By: Average poverty ratio							
$\leq PL$ (1 step)	-0.990***	0.160***	0.185*	1.000	0.000	0.702	675
$> PL \leq 1.5PL$ (1 step)	-0.935***	0.134***	0.106	0.566	0.000	0.899	1,439
$> 1.5PL \leq 2PL$ (1 step)	-1.020***	0.160***	0.166***	0.953	0.000	0.188	1,561
$> 2 PL \leq 2.5PL$ (1 step)	-0.977***	0.211***	0.282***	0.500	0.000	0.701	1,672
$\geq 2.5PL$ (1 step)	-0.916***	0.154***	0.189***	0.755	0.000	0.192	3840
By: Chronic poverty groups							
Chronic poor (1 step)	-0.990***	0.160***	0.185*	1.000	0.000	0.702	675
Occasionally poor	-0.966***	0.188***	0.206***	0.483	0.000	0.181	4,008
Never poor	-0.955***	0.115***	0.152***	0.536	0.000	0.527	4,504

* 10%, ** 5% and *** 1% significance level.

Source data: RLMS panel (measured at 2 year intervals from 1994 to 2004)

The null-hypothesis that the structural parameter is equal to zero.

The standard error of the long term elasticity is estimated using the delta method.

Two step GMM estimator with robust standard errors (Windmeijer Finite Sample Correction, 2000).

Control variables included in estimation: changes in demographic composition and time-community dummies (at level of primary sampling unit).

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