

THE CONSEQUENCES OF PENSION FAILURE: THE RUSSIAN CASE\*

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August 2000

**Abstract** Worldwide, the vast majority of the elderly are heavily dependent on social security or pension systems for their income. However, in most countries there is growing concern over the stability of such systems. Several countries have recently experienced severe pension crises, including periodic failure to pay benefits or the dramatic erosion of benefit levels. In this paper, we explore the impact that such instability can have on the well-being of the elderly. We focus on a recent pension crisis in Russia during which 14 million of the 38 million pensioners were not paid ('in arrears') for an extended period of time. We use panel data spanning the crisis to evaluate the impact of the loss of pension income on living standards, nutritional status and mortality. We find that poverty rates doubled among pensioners in arrears, daily caloric intake declined on average by 200 calories per person (10 percent of the original level), and daily protein intake declined by 5 grams. However, the self-reported incidence of illness, likelihood of using health care services, and use of medications for those with chronic illnesses was largely unchanged. Overall, however, male pensioners who were not paid were 5 percent more likely to die in the two years following the crisis.

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\* Comments welcome: robert\_jensen@harvard.edu or krichter@worldbank.org. We would like to thank Clemens Grafe, Michael Greenstone, Alan Manning, Imran Rasul, Richard Zeckhauser, Elena Zotova and seminar participants at the NBER Aging Summer Institute, New Economic School, Moscow and Higher School of Economics, Moscow, for valuable discussions and comments. We also thank Laura Henderson for authoritative assistance with the data, and Elena Romanova for excellent research assistance. Jensen would also like to thank STICERD/LSE for graciously hosting him as a visitor.

## 1. INTRODUCTION

In Russia, as in much of the rest of the world, the elderly are heavily dependent on the state pension system for their income. Prior to 1996, Russia's generous pension system was fairly stable; pension fund revenues, collected primarily through payroll taxes, were broadly sufficient to cover outlays. However, poor economic performance, weakened tax enforcement and a wave of tax amnesties and exemptions resulted in a sharp decline in payroll tax collection in 1996, compromising the financial stability of the fund. As a result, approximately 14 million of Russia's 39 million pensioners underwent a sudden, prolonged period during which they did not receive any payments ('in arrears'). In this paper, we analyze the consequences of the failure of the pension system on living standards.

Beyond income as a measure of well-being, our concern will focus on the impact of the pension crisis on nutrition and mortality. Given the great dependency of the elderly on the pension system, one might expect that a pension failure would lead to worsened health, especially because of the diminished ability to purchase the inputs into health (for example, nutrition). This work thus also adds to the growing evidence of the impacts of socioeconomic status on health.<sup>1</sup> For the more specific case of Russia, it also provides an important link for understanding the dramatic decline in health that has followed economic transition and the subsequent economic decline. Russia in the 1990's experienced one of the largest peacetime (non-epidemic) declines in health in human history (McKee 1998).<sup>2</sup> This paper fills an important gap, because while both the health and economic crises have separately received wide attention from researchers, the links between the two remain less well explored.

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<sup>1</sup> ex, Fuchs 1993, Marmot 1994, McIntyre 1997, and Smith and Kington 1997. The advantage of the present study is that rather than relying on cross-sectional variation in the two variables, we exploit a large, exogenous income shock, and thus the direction of causality is clear. Further, our analysis allows us to explore the impacts on health through the purchase of the inputs into health (for example nutrition) rather than the reduced-form association.

<sup>2</sup> A special issue of *World Development* in November 1998 contains a set of articles on the health and mortality crises in Russia and the CIS.

The essence of the empirical strategy is to compare households who did not get paid their pensions with suitable ‘control’ or comparison groups of pensioner households that were paid. The strategy exploits variation in pension arrears created by the regionally-decentralized structure of the pension system. Each of Russia’s 89 administrative regions or *oblasts* are independently responsible for collecting taxes and making payments. Since no given *oblast* has an exact match between receipts and entitlements, the system relies on the redistribution of surplus revenues from regions with a high tax base relative to pension entitlements to those with a lower tax base. When payroll tax collection declined for both ‘debtor’ and ‘donor’ regions, the fiscally weaker regions had both lower revenues of their own and received reduced surpluses from the donors. Accordingly, while nearly all pensioners in wealthier regions continued to be paid, between one-third and one-half of pensioners in debtor regions experienced pension arrears. We also exploit variation within debtor regions created by program rules which establish a system of priorities for which pensioners should be paid in the event of revenue shortfall.

We use panel data from the Russian Longitudinal Monitoring Survey (RLMS), which cover the period before and after the pension crisis.<sup>3</sup> The RLMS is a nationally-representative household survey of approximately 4,000 households, designed to measure the effects of the changes in Russia from the early 1990’s on the well-being of individuals and households. We also merge the RLMS data with detailed, *oblast*-level fiscal and economic data from the Russian Ministry of Finance, State Tax Service, national statistical office *Goskomstat*, and the Pension Fund of Russia (PFR). Our results show that the pension crisis had a large impact on living standards, with income declining by over one-third for pensioner households, and poverty rates doubling to over 50 percent. Food expenditures declined dramatically for pensioner households; as a result, daily intake of calories declined on average by over 200 calories (10 percent) per person and protein declined by 5 grams per person. We also find that in households with many

members, the decline was largest for the pensioners themselves. This latter result suggests that individual consumption within households is affected by the distribution of income among members, rather than being pooled and shared among members according to a fixed rule.<sup>4</sup> Finally, male pensioners who were in arrears were 5 percent more likely to die in the two years following the crisis.

The analysis in this paper carries more general lessons as well. Many countries face concerns over the stability of their pension systems, especially due to population aging, system financing or management. Further, there have recently been several cases of pension system failures (for example, Argentina, China, and Poland), resulting either in extended periods of non-payment of benefits, or the erosion of entitlements to below subsistence levels. And there are many more countries where fragile systems are increasingly vulnerable to failure. The instability and consequent adjustments directly affect the well-being of the elderly, who are typically highly dependent on pensions as their largest, or only, source of income. The present case provides evidence of what kinds of impacts such adjustments can have.

The paper proceeds as follows. Section 2 discusses the system of state benefits in Russia, and describes the pension crisis of 1996. We devote significant attention to the structure of the system and causes of the crisis, since they form an important part of the identification strategy for the empirical analysis. Section 3 examines the impact of pension arrears on living standards and poverty. Section 4 discusses the empirical strategy, identification issues and presents the results, while section 5 concludes.

## 2. THE RUSSIAN PENSION SYSTEM AND THE CRISIS OF 1996

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<sup>3</sup> The survey is organized and coordinated by the Carolina Population Center at the University of North Carolina at Chapel Hill. Further description of the data and sampling techniques can be found at [www.cpc.unc.edu/projects/rlms/rlms\\_home.html](http://www.cpc.unc.edu/projects/rlms/rlms_home.html)

<sup>4</sup> See Alderman et. al (1995) for a review of the substantial literature on intrahousehold allocation and models of the household.

## A. DETAILS OF THE SYSTEM<sup>5</sup>

Russia's current old age pension system originates from the Soviet period, when it was part of a comprehensive social insurance program (Barr 1992). Under the system, all women over the age of 55 and all men over the age of 60 are entitled to a monthly cash transfer from the Pension Fund of Russia (PFR). Eligibility is not affected by current employment status; as a result, prior to the crisis nearly 98 percent of individuals simply age-qualified for the pension reported receiving one.

Pension levels are set at 55% of the average wage the individual earned during either the last two years of employment, or any continuous working period of 60 months. However, benefits can not fall below the minimum wage nor exceed three times that value. The average benefit level in 1996 was 1,700 Ruble (about \$66 U.S.), which was just below the mean per capita household income among all Russians. By statute, pension levels are related to current earnings, but the means test is very generous, and anecdotally it is considered to not be widely applied. The RLMS data confirm these observations; in a regression of the level of pension received, the coefficient on current non-pension income is small, positive, and not statistically significant. Given that nearly everyone age qualified for the pension receives one and the general unresponsiveness of benefit levels to current earnings and employment, the pension system does not create the same labor supply disincentives as many other social programs found throughout the world (aside from any income effect)

At the end of 1995, the Pension Fund had 38 million beneficiaries (26% of the population of Russia). Total outlays amounted to 5.7% of GDP (\$33bn U.S.) in 1996, greater than the combined government spending on health, education and other social cash transfers. The system is financed on a pay-as-you-go (PAYGO) basis by a payroll tax amounting to 29% of employee

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<sup>5</sup> This section describes the main features of the pension system up to 1996. The system has been partly reformed since that time (Denisova, Gorban and Yudaeva 1999).

wages.<sup>6</sup> The PFR itself is an extra-budgetary agency of the central government, meaning its funding and operation are not affected by the federal budget law passed each year. The system is largely decentralized, consisting of one federal, 89 regional and 2,342 local departments. Despite this decentralization, however, there is a uniform ‘vertical’ structure throughout the regions. Local pension offices collect payroll tax revenues from firms and pass them to accounts of the regional pension fund. Social Welfare Offices (SWO’s) in the local pension districts and regions are responsible for both identification of and payment to recipients, drawing their funds directly from the regional pension accounts. Each regional pension department then transfers to the central fund any surplus tax revenues beyond what is needed to meet entitlements in their region, which the central fund then redistributes across regions. The funds obtained by the center from approximately 15 ‘donor’ regions, which have a large payroll tax base relative to pension entitlements, are redistributed in order to finance pension payments in 74 ‘debtor’ regions. Column 1 of table 1 shows official estimates from the PFR of a measure of ‘self-sufficiency’ for various regions, i.e., the ratio of payroll tax receipts to total benefit entitlements, with donor regions characterized by sufficiency ratios above 100. The data confirm that there were many districts that fell far short of needs, and a few larger regions like Moscow City that had surpluses.

## 2B. THE ARREARS CRISIS OF 1996

Before 1996, Pension Fund revenues were just barely sufficient to meet entitlements, with no excess funds to ensure future payments. In 1996, a significant funding crisis developed. The crisis was caused in part by a sharp decline in economic output due to an uncertain political climate created by impending presidential election.<sup>7</sup> The decline led to a large, sudden reduction of the tax base, especially for the payroll taxes that financed the pension system. Beyond the

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<sup>6</sup> The statutory incidence is 28% on the employer, 1% on the employee.

<sup>7</sup> Enterprises and investors were postponing decisions and waiting to observe the outcome of the elections in July. The uncertainty was caused in part by the poor performance of pro-government parties in

sluggish performance of the economy, payroll tax revenues fell for a number of additional reasons, including the reduced effectiveness of tax collection, a lack of political will to put pressure on large enterprises, and a widening of tax exemptions and tax amnesties throughout major sectors of the economy (also associated with the elections). The shortfalls in payroll tax collection were exacerbated by the emergence of non-monetary forms of settling tax obligations,<sup>8</sup> which could not be easily transferred across regions.

The decline in payroll tax revenues and use of non-monetary forms of tax settlement led to a breakdown in the redistributive system from donor to debtor regions. Table 1 shows that between 1995 and 1996 pension offices in most regions experienced a decline in their tax revenues relative to entitlements. Donor regions used their receipts to fund their own pension payments, and the residual sums transferred for redistribution to other localities were insufficient to prevent sharp increases in pension arrears in debtor regions. While there are no official data on pension arrears, according to press releases of the Pension Fund reported in the *Moscow Times*, national arrears in payments increased to R14trn by December 1996. Lacking additional official statistics, we turn to the RLMS to provide estimates of arrears at aggregated geographic levels.<sup>9</sup> Table 2 shows that arrears increased from approximately 9 percent at the end of 1995 to 34 percent in 1996. Variation across the eight geographical groupings is considerable. Not surprisingly, regions such as the Metropolitan area, which includes primarily the donor districts of Moscow and St. Petersburg, had only minimal pension arrears, with very little change between the two periods. However, all other areas had large increases, with between 28 and 55 percent of pensioners in arrears in 1996. These groupings also hide significant variation across regions within these geographic aggregations.

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parliamentary elections in December 1995. Also, polls showed President Yeltsin trailing his Communist opponent in the elections, including single-digit approval ratings.

<sup>8</sup> These included barter, payment in goods, and 'veksel' (Guriev and Ickes 1999).

## 2C. WHICH PENSIONERS WENT INTO ARREARS?

At the time of the arrears crisis, the central PFR adopted a set of guidelines for regions on the payment of pensions in the event of revenue shortfall. The guidelines suggested priority be given to paying pensioners with entitlements less than the minimum subsistence level ('poor'), followed by non-working and single pensioners, since these were perceived to be the 'most vulnerable and dependent' pensioners. However, as the system is decentralized, in addition to these two criteria, some regions also prioritized pensioners who were very old or disabled.<sup>10</sup> (Only one region, Orenburg *oblast*, made payment to all pensioners proportionately rather than paying some pensioners and excluding others). Regional authorities typically applied 'pre-crisis' attributes in determining priority; thus it is unlikely that individuals engaged in significant changes in behaviors intended to increase their likelihood of payment (i.e., changes in labor supply or marital status).

For the purposes of understanding pension arrears and assessing their impact on well-being, it is important to explore further the incidence of pension arrears both across and within regions. Using the RLMS panel data for the year before and year after the crisis, the determinants of pension receipt are examined in Table 3 where we estimate probit regressions for the probability of pension receipt (among pensioners) in 1996 (marginal effects reported in the table). Column 1 begins by regressing pension receipt on the self-sufficiency ratio in the *oblast* of residence. The effect is positive and statistically significant, confirming that the arrears crisis was concentrated in areas with low pension fund revenues and dependence on redistribution.

In column 2 we add indicators corresponding to the various characteristics that were used to define priority for payment during the crisis. Consistent with the priority rules specified, pensioners with the lowest pensions were 5 percent more likely to be paid and single pensioners were 10 percent more likely. The set of priority criteria are jointly statistically significant, with an

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<sup>9</sup> While the previous discussion makes it clear that arrears should be analyzed at the *oblast* level, the sampling frame of the RLMS does not allow for inference at that level.



*F*-statistic of 12.84. In column 3, we add a set of individual and household characteristics aside from those which were reported to be used in determining priority. We find little evidence that they affect the probability of pension receipt, once the priority characteristics are controlled for. In particular, pre-crisis, non-pension household income is not statistically significant, consistent with a lack of means testing in determining arrears, aside from benefit levels.

In columns 4-6, we perform the same analysis while restricting the sample to only those pensioners living in debtor regions. Even conditional on residing in a debtor region, the coefficient on the sufficiency ratio shows that being in a region that is less dependent on redistribution makes it more likely that an individual was paid. The priority variables are jointly significant, as lower pension benefits and being single made it more likely that an individual was paid. And again, household characteristics other than the priority characteristics are neither individually nor jointly significant. Overall, the regressions confirm that the collapse of the redistributive mechanism of the Pension Fund accounts for the incidence of pension arrears. And within debtor regions, specific indicators determined which pensioners were paid. Furthermore, household and individual characteristics aside from those specified priority characteristics did not affect the probability of pension receipt.

### 3. THE IMPACT OF PENSION ARREARS ON INCOME AND POVERTY

The dramatic impact of the pension crisis on living standards can be seen in the bottom panel of table 4. We split the RLMS pensioner-household sample into three groups: households that were in arrears; all pensioner households not in arrears; and the subset of non-arrears pensioner households living in debtor regions. Poverty rates were high even before the crisis, with over 20 percent of all three groups living below the poverty line.<sup>11,12</sup> The share of total

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<sup>11</sup> The poverty line is the official poverty line of the Russian Federation, calculated in accordance to the recommendations of the World Bank and the World Health Organization, and adjusted for regional price differences. It was developed by pricing a food basket which was constructed on the basis of nutritional

expenditures devoted to food is very high, at nearly two-thirds. This budget share is in itself often used as an indicator of living standards, but in this particular case also demonstrates that food consumption is likely to suffer when households lose a large source of income like the pension.

Households are very dependent on the pension; in the pre-crisis year of 1995, across all three groups of households the average income share of the pension was over 40 percent. Thus, not surprisingly, the crisis had a large impact on household welfare. Household income declined on average by 2,000 ruble (36 percent) for the arrears group, whereas the income of both other pensioner groups increased slightly. The poverty rate increased to over 50% among pensioner households in arrears, and dropped among non-arrears households. Figure 1 provides nonparametric (kernel) density estimates for (log) income per capita for the arrears and non-arrears (debtor and donor regions combined) pensioner households. The right-hand graphs present the differences between the estimated densities. The vertical line represents the (log) poverty line. Overall, we see that pension arrears caused a large shift of mass in the income density, especially from around the middle of the pre-crisis distribution into the lower end. Arrears lead to a large reduction in households just above the poverty line, and a large increase in the percentage below that line. There is also a large increase in the dispersion of incomes, since prior to the crisis pensions accounted for a large fraction of total household income, and there was not a great deal of variation in pension levels. Notice that by comparison, the estimated density for the non-arrears group changed only slightly over this period, with more mass in the density significantly above the poverty line and less just above and just below the poverty line.

#### 4. IMPACT OF THE PENSION ON NUTRITION AND MORTALITY

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criteria. Food shares in overall expenditures were separately estimated for each age-gender group. Poverty lines vary according to the demographic composition and regional location of a household. Further analyses of poverty in the Russian Federation can be found in Mroz and Popkin (1995), Klugman and Braithwaite (1998) and Lokshin and Popkin (1999).

<sup>12</sup> However, it should be noted that the elderly were among the better-off of the demographic groups in Russia prior to the crisis.

## A. ESTIMATION STRATEGY AND IDENTIFICATION.

We examine the changes in various health-related variables for the group of pensioners who went into arrears compared to those who continued to be paid. In so doing, we will exploit the variation in pension arrears across regions (created by the decentralized funding structure) and within regions (created by the pension priority criteria). The identifying assumption that will allow us to isolate the impact of the loss of pension income on the health measures is that in the absence of the arrears crisis, the arrears and non-arrears groups would not have experienced differential change with regard to the outcome variables of interest. Momentarily deferring discussion of this assumption, table 5 presents the essence of the basic strategy. In this table, we present the average daily caloric intake for the arrears and non-arrears pension households in 1995 and 1996. The RLMS contains information from a 24 hour recall of food intake, which researchers at UNC converted into total caloric and protein intake. Calories, and protein, which we also use below, are among the two most important nutrients for health, especially for the elderly; for example, protein deficiency can lead as muscle wasting, oedema and anemia (Mobarhan and Trumbore 1991, Ahmed 1992, Schlienger et. al 1995, Blumberg 1997).

Focusing on panel A, we see that prior to the crisis, households that would later go into arrears consumed on average 80 more calories per day than pensioners (including those living in both debtor and donor regions) who continued to be paid in both periods. However, there is a striking change in 1996, where average daily caloric intake of the arrears group declined by 243 calories. The non-arrears households declined as well, but only by 22 calories. There could be a common factor that lead to some of the decline for both groups, such as the normal declining needs with age, relative price changes, or expectations.<sup>13</sup> Overall, the arrears group declined by

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<sup>13</sup> It may also be the case that the control group reduced their caloric intake, in anticipation of the that the pension crisis might soon affect them. The survey asked two questions about expectations more generally, namely whether they expect their financial situation to get better or worse in the next 12 months (1 to 5 scale), and whether they anticipate having difficulties in having enough money to meet basic needs in the next 12 months (1 to 5). While many non-arrears pensioners felt things would get worse, equally as many

221 calories more per day than the non-arrears group, 10 percent of the original intake, which is our estimate of the impact of the loss of pension income under the identifying assumption.

More detail on the changes in caloric intake can be seen by examining the distributions of caloric intake rather than just the means. Figure 2 shows kernel estimates of the density of (log) caloric intake for the arrears and non-arrears groups for the period before and after the crisis. The diagrams in the second column show the simple differences in the estimated densities, and the figure in the third column shows the difference in the differences. As a descriptive tool, these differences in estimated densities demonstrate that there was an extremely large change in the distribution of caloric intake for the arrears group, with a large shift in mass from the middle and upper part of the pre-crisis distribution to the lower part. The vertical line represents the recommended (log) 2,000 calories per day. While exact caloric requirements vary across individuals by gender, age and level of physical activity, we can see that for any threshold around 2,000 calories, there is a substantial increase in the fraction of individuals in the arrears group not meeting that requirement after the crisis, with a much smaller change for the non-arrears group. This figure demonstrates the large and differential decline in nutritional status for the arrears relative to non-arrears group.

In order to control for differences in other covariates relevant to health, in our full analysis below we estimate ‘treatment-effects’ regressions of the form,<sup>14</sup>

$$(1) \quad h_{it} = \alpha_0 + \alpha_1 * 1996 + \alpha_2 * Arr + \alpha_3 * Arr * 1996 + \beta * X_{it} + u_{it}$$

$$t = (1995, 1996), \quad i = (1, \dots, N).$$

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felt the same way in the year prior to the crisis. Thus, if reported expectations are useful indicators, any adjustment in response to these expectations were the same before and after the crisis.

<sup>14</sup> An alternative estimation strategy would be to regress changes in the outcome variables on changes in pension receipt, or to add individual fixed-effects (or fixed-effects interacted with the other independent variables) directly to the treatment-effects regression (1). Both of these alternative approaches would control for individual-specific fixed effects, observable and unobservable. Results for these alternate specifications are also reported below, but are nearly identical, so for the purposes of exposition and facilitating discussion of the identifying assumption, we use this treatment-effects framework.

where  $Arr$  is an indicator for whether a pensioner was in arrears,  $1996$  indicates the observation is from before the crisis, and  $X$  is a vector of individual and household characteristics thought to affect caloric intake. The effect of arrears is captured by the interaction term  $a_3$ . For health-related variables, we use daily intake of calories and protein, and whether an individual had died by the time of a follow-up survey two years after the crisis.

We restrict our sample to households containing pensioners, and in order to isolate the impact of the pension crisis in 1996, we drop households that incurred pension arrears in 1995 (though there were few of them, and their exclusion does not affect the results appreciably). The sample includes all individuals living in households with a pensioner in order to capture the effects of arrears on the entire household. We also perform the regressions separately for various age and gender groups rather than assuming the mean effect is the same across all individuals.

## B. THE IDENTIFYING ASSUMPTION

Our primary interest is in isolating the effects of the loss of pension income on nutritional status and health. By comparing the change in caloric intake for arrears pensioners relative to non-arrears pensioners, we are controlling for economy-wide changes that affected all individuals, or all individuals living with pensioners more specifically. Thus for instance, declines in the health system, pollution and the quality of environment, price changes or other macroeconomic shocks would be controlled for.

However, we know that assignment of arrears is correlated with living in a debtor region and having certain attributes, such as higher pension level, working, or being married. We briefly explore various aspects of the identifying assumption and potential violations below.

### *B1. Differential Changes in Debtor and Donor Regions*

Since going into arrears is correlated with living in a debtor region, the identifying assumption would be violated if there were differential changes in economic policy or living conditions in debtor vs. donor regions aside from the pension. For example, the erosion of the tax

base may have meant other services and programs were also cut back,<sup>15</sup> or there could have been changes in relative prices. We can control for differential changes in any regional aggregate factors by restricting the sample of non-arrears pensioners to only those living in debtor regions. Panel B of table 5 presents results from this restricted control group. Relative to the full control group, the initial level of caloric intake of this control group is closer to the treatment group. However, the decline in caloric intake is nearly identical for both control groups, and the overall differential change between treatment and control groups is very similar. Thus, differential changes between debtor and donor regions cannot account for the change in caloric intake.

### *B.2 Changes Associated with Characteristics of Arrears Households Within Debtor Regions*

The previous results involve comparing arrears and non-arrears pensioners within debtor regions. However, since assignment of arrears within debtor regions was determined by specific individual characteristics, there may be concern that these characteristics would be associated with a decline in caloric intake even in the absence of a pension crisis. Of course, if anything, payment was targeted towards the more vulnerable. Therefore, one might expect that in the absence of arrears, the control group would have dropped more than the treatment group, leading to understated estimates

In order to address this issue further, we use probit estimates of the determinants of pension arrears/receipt for individuals living in debtor regions (as in table 3) to fit the probabilities of arrears among pensioners living in donor regions. Thus, one way to view this exercise is that if there was concern that assignment of pension arrears was correlated with characteristics which would have lead to a greater decline in caloric intake even without the loss of the pension, then even in donor regions we might also see the same relative decline in caloric

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<sup>15</sup> Table 6 provides *oblast*-level data on social spending from regional budget reports. Per capita social spending actually increased slightly in debtor areas and declined slightly in donor regions. However, these changes are unlikely to have affected health or nutrition, because for debtor regions the largest increase was on education, and the decrease in debtor regions was largely on housing. In both areas health spending was largely unchanged. This is not to say that the health system was well-functioning or high quality. For the purposes of identification we are concerned with whether it worsened more for debtor than donor regions.

intake among those pensioners with similar characteristics as the arrears group in debtor regions. Panel C of table 5 presents mean caloric intake for individuals living with pensioners in donor regions, split according to whether they would have had a high or low probability of being in arrears if they lived in a debtor region. Mean caloric intakes for the low and high arrears-probability groups differ both before and after the crisis (similar to, but larger than, the differences in arrears and non-arrears groups in debtor regions), but the changes between 1995 and 1996 are similar for the two groups. This suggests that there were no factors common to all individuals of high arrears probability (live with others, receive high benefits before the crisis, have employment) that explain the trends for the arrears group. And since there were no differential changes for the groups, we are also more confident that we are not underestimating the impacts either.

### *B3. Differential Changes for Arrears and Non-Arrears Households within Debtor Regions*

One aspect of the identifying assumption which remains is that there may have been other factors within debtor regions that changed differentially for arrears and non-arrears households. The most natural candidate is whether additional social spending or assistance was also lost to arrears individuals, or whether arrears households were targeted for additional benefits or programs. While records from the social welfare offices show that there were no government social programs or assistance targeted towards or away from pension arrears households during this period,<sup>16</sup> we can also approach this issue using the RLMS. The survey asked respondents to report whether they had received any transfers or benefits from the government (ex. cash transfers, fuel or apartment benefits, whether they have to pay for visits to the doctor or are eligible for subsidies on the purchase of medication) or private charities. Table 7 presents the responses to those questions. Within debtor regions before the crisis, non-arrears households were

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<sup>16</sup> There is some record of smaller scale programs being targeted more generally towards all pensioners (regardless of arrears status) in some regions during this period. However, most of these programs were implemented around or after the time of our survey. Further, many of the programs were not particularly

slightly more likely to receive apartment benefits and to have their medical insurance premiums paid for by the government, while most other services were fairly similar. The only program with a large percentage of participants and moderate change over this time period was the public payment of medical insurance premiums. However, the small increase was the same for both treatment and control groups, so this program could not explain a differential change in our outcomes of interest across the groups within debtor regions. Overall, there appears to be no evidence that pensioners who went into arrears received either a larger or smaller change in services relative to the control group. Finally, the bottom row shows that contributions or assistance from private charitable organizations is minimal, and did not change much over the period for either group.

#### *B4. Assumption of Parallel Paths*

While it is not possible to observe the true counterfactual, i.e., what would have happened in the absence of the crisis, data from an earlier round of the RLMS can be used to provide a composite ‘pre-test’ of the identifying assumption that in the absence of the arrears crisis, the treatment and control groups would not have changed differentially over this time period, i.e., the paths of their caloric intake would have been ‘parallel.’ The RLMS was carried out for 5 rounds prior to the two that were used above. Unfortunately, these earlier rounds constituted a panel only in the sense that the same physical dwellings were followed across years of the survey. It was only in the 1995 and 1996 rounds that efforts were made to follow individuals and households. Thus, attrition from a ‘true panel’ is much greater in the earlier rounds, and change of residence is likely to be non-random. Keeping this caveat in mind, in figure 3 we examine the caloric intake of members of households who are in the sample for round 5, collected in 1994, in addition to rounds 6 and 7. The means for rounds 6 and 7 are slightly changed when we include only those households who are also in round 5, and in particular the treatment group now consumes fewer

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generous, which is not surprising given the general shortfall of revenue for social services in debtor regions. One of the most common programs cited is free transportation on city buses and trains.



calories than either control group. However, the graph reveals that for the 3 groups in the pre-crisis rounds the paths of changes were very similar. More striking, is the magnitude of the drop for the treatment group, which seems very out of line with previous changes for the three groups, and makes it more convincing that pension crisis caused the decline in caloric intake.

### *B.5 Other Concerns*

Two final concerns in the evaluation of most social programs are selective take-up and mobility. For the former, as mentioned earlier, take-up of the pension is nearly universal among the age-qualified, and so selective participation in the pension program is unlikely to be a concern for our results. For the latter, we must be concerned with whether individuals changed residence in response to the arrears problem, in particular relocating to low-arrears areas in order to receive payments. However, official statistics reveal that such mobility is extremely low (Chudinovskikh 1998), due to a number of substantial administrative, legal, economic and practical impediments.<sup>17</sup> And to the extent that movement occurred at all, it would not have enabled pensioners to increase their likelihood of receiving a pension, since payment is tied to original region of residence. This would hold for both official and unofficial migration.

## C. REGRESSION RESULTS

Table 4 presents summary statistics for the sample. The most notable differences are consistent with the payment priority rules, namely that arrears households are larger on average, more likely to have a working pensioner, and have higher pre-crisis benefit levels. Despite the

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<sup>17</sup> There are several reasons for lack of mobility. First, housing poses a substantial impediment to migration. Many pensioners live in housing belonging to their past or current employer, or in housing they own as a result of privatization. In either case, housing is often tied to the region of residence. And aside from the direct costs, there is a shortage of housing in major metropolitan, (low-arrears) areas like Moscow and St. Petersburg. Second, low-arrears regions like Moscow actively restrict migration with the help of an official registration system. While some individuals may move illegally, without legal residence they would not be able to collect pensions, and in fact the greater distance from home might jeopardize the payment of the pension at the original residence. Additionally, individuals may receive in-kind benefits (aside from housing) from their past employer. These benefits could also be lost with a change of residence. Finally, the worsening of the pension crisis was too sudden to have led to widespread pensioner migration, at least at the time of the survey.

regional differences and variation within regions in who was paid, arrears and non-arrears pensioners and their households are fairly similar along most other dimensions. Given the well-documented male-female difference in life expectancy in Russia, it is not surprising that only 40 percent of pensioners are men, across all groups. Education levels are slightly lower for the arrears pensioners, even relative to other pensioners within debtor regions. Only 11 percent of pensioner households have only one member, while an additional 20 percent are households containing only pensioners. Such household structure may work to the advantage of the elderly if younger household members are able to contribute more to the household when the pension income declines (akin to the ‘added worker’ effect).

Table 8 shows the treatment-effect regression results for caloric intake of men. Column 1 mirrors the strategy in panel A of table 5 and regression equation (1) by using the total sample of pensioners, but also includes as explanatory variables the individual’s age,<sup>18</sup> education and employment status, as well as household demographic characteristics. Also included as regressors (not shown in the table) are indicators for whether the household received any of a variety of targeted social programs (mostly in-kind benefits such as goods or services) to account for the possibility that arrears and non-arrears households may have experienced differential access to programs other than the pension.

Pension arrears were associated on average with a reduced caloric intake of 239 calories for the arrears group relative to the control group. The estimate is very close to what was arrived at in the univariate results in the previous section, suggesting that the assignment of pension arrears was uncorrelated with other characteristics of the household which might affect caloric intake. The decline in caloric intake is large, and significant from a nutritional perspective. Such a daily reduction of caloric intake would result in weight loss of two pounds per month.

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<sup>18</sup> We also included age as a quadratic, but do not reject hypothesis of linearity. The coefficient on pension arrears is largely unaffected.

Column 2 adds non-pension income as a regressor. We excluded it from the original regression because of concerns over the endogeneity of income. Higher non-pension income is correlated with higher caloric intake. However, inclusion of this income has little effect on the coefficient on pension arrears, again due to the orthogonality of assignment of pension arrears with respect to income. In an additional specification, we instrument for income using various demographic characteristics of the household head, and their occupation and industry if employed. The instruments have adequate of predictive power in the first stage regression, and the estimate of the effect of pension arrears are largely unchanged in the second stage regression.

Column 3 adds an indicator for whether anyone in the household was in arrears on wage payments from their employers. Since the transition from communism in 1992, Russian firms have frequently experienced difficulties in paying wages, meaning that workers are frequently in arrears on wage payments. For our purposes, there may be concern that wage arrears themselves affect income and thereby possibly caloric intake, and may be more likely to occur in pension arrears areas (since firms that had difficulties paying wages are likely to also have had difficulty in paying payroll taxes). Therefore we include an indicator for whether any workers in the household were not paid wages in the previous 30 days (we also included a ‘stock of arrears’ variable, the total amount of wages owed, with similar results). As expected, wage arrears themselves are associated with a substantially reduced caloric intake, nearly three-quarters as large as for the pension. However, the effect of pension arrears is unchanged.

Finally, column 4 performs regressions where the change in caloric intake is regressed on whether the individual was in pension arrears in the second round (households in arrears in the first round were excluded), and changes in all other individual and household characteristics. This specification has the advantage of eliminating all unobservable, fixed differences. The results are nearly identical to the results using the treatment effects regressions in columns 1 to 3.

Columns 5 through 8 present the same regressions, where the sample is restricted to households in debtor regions only. The estimated treatment effects, as well as nearly all the other

coefficients, are largely unchanged using the restricted control group, consistent with the univariate results earlier and with the conclusion that region-specific shocks or changes did not cause the sharp change in caloric intake for the pension arrears group. In alternate specifications, within debtor regions we estimated separate regressions for urban and rural households, with similar results.

Overall, the estimated effects for men's caloric intake are extremely robust across specifications and control groups. Therefore, for the remainder of the results on protein intake and regression results for women, we present only the results from the specification in column 3, which includes income and wage arrears. Table 9 presents the additional results. The calorie effects for women are smaller than for men in absolute levels, with a loss of pension income associated with a decline of 163 calories on average. However, average male caloric intake is around 2100, whereas for women it is around 1800, so as a percentage of original intake, the results are fairly similar. For both men and women, daily intake of protein declines by about 4 to 5 grams per person, and the results are statistically significant at the 10 percent level. These declines represent a reduction of around 5 to 10 percent of the original levels. The recommended daily intake of protein is about 1 gram per kilogram of weight, or a US RDA of about 65 to 70 grams for men and 50 for women. Following the crisis, the rate of protein deficiency among arrears pensioners increased by 7 percentage points for men and 4 percentage points for women, while the rate among non-arrears pensioners were largely unchanged.

### C. MORTALITY

The loss of the pension lead to a substantial decline in nutritional status. This decline in turn could lead to worsened health and increased mortality rates, especially among the elderly. There are of course additional channels through which the loss of the pension could have affected health, aside from nutrition. For example, individuals may have cut back on the use of health services or medicines. Or it could be that the stress and uncertainty created by the pension loss

lead to worsened health directly. While we are unable to untangle these various effects, we investigate in reduced-form whether the crisis lead to an increase in mortality rates, using data from the 8<sup>th</sup> round of the RLMS, which was collected 2 years after the arrears crisis.

Table 10 presents results from probit regressions in which the dependent variable is whether the individual died between rounds 7 and 8 of the survey. We restrict the sample to individuals aged 50 or older. We also include age, rural vs. urban indicators, and indicators for chronic health conditions (diabetes, stroke, previous heart attack) and other mortality risk factors (obesity,<sup>19</sup> whether an individual smokes, the number of years that person smoked during their life and alcohol consumption) and indicators of potentially undiagnosed health problems (whether had chest pains, and chest pains lasting longer than 30 minutes) in 1996. These factors represent long-term, chronic risk and health factors and are likely to affect the probability of dying, though they are unlikely to have been affected by the pension in such a short time after the crisis. Finally, to account for possibly unmeasured health conditions, we include an index of physical limitations. This index ranges between 0 and 8, with one point for each activity (for example, walking 1 kilometer, getting up from bed, climbing a flight of stairs) the individual is either unable to perform, or can only perform with great difficulty.<sup>20</sup> These measures are likely to be important indicators of underlying health conditions, yet since they are more long-term, cumulative and chronic, in 1996 should not already reflect the influence of the pension crisis.

Pension arrears increased the likelihood that the individual died within the next two years by nearly 6 percent for men. For women, we do not see much of an effect. This is consistent with other research which has found that men's mortality rates increased far more dramatically than those of women in Russia, despite exposure to similar health risks (Shkolnikov et al. 1998).

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<sup>19</sup> Individuals are defined as obese if their Body Mass Index (weight divided by height squared) is >30.

<sup>20</sup> The ADL Index ranges from 0 to 8, with a one unit increase for every activity of daily living (ADL) for which the respondent indicates they either cannot do, or can do but it is very difficult (possible responses were 1 to 5; 1. Not at all difficult; 2. Slightly difficult; 3. Somewhat difficult; 4. Very difficult, but possible; 5. Cannot do it). Activities were: walk across a room; walk 200 meters; walk 1 kilometer; run 1

The signs of most of the variables on predictors of mortality are in accord with expectations, though few are statistically significant. The ADL index, smoking and years smoked (for men) are all correlated with an increased likelihood of mortality. Estimates are similar when only debtor regions are considered, though the standard errors are somewhat larger. Chronic illnesses surprisingly do not enter in significantly to the likelihood of dying. One problem is that the incidence of serious illnesses is quite low in the sample, and the sample of individuals who survive, say, a heart attack, may be unusual. However, more important for our results, the inclusion of these variables does not affect the estimates of the loss of the pension, suggesting assignment of pension arrears was uncorrelated with prior (measurable) health status.

We know from the earlier discussion of the determinants of arrears that arrears households were more likely to be non-poor and single. And again, there is concern as before that mortality might be correlated with those attributes which also determined pension arrears. Thus, in column 3, we compare the mortality rates of those pensioners in donor regions who were high and low probability of being arrears if they lived in debtor regions. We find that there was no significant difference in the likelihood of death for high and low arrears probability pensioners living in these regions.

## 5. DISCUSSION AND CONCLUSION

This paper has shown that a financially unstable pension system, characterized by irregular payments and adjustments in pension levels, can have take a large toll on both the financial and physical well-being of the elderly and their dependents. There are important implications of these results for the numerous countries where pension systems are proving increasingly unstable. In cases where reform of the retirement pension system become necessary, it will be important to pay attention to ensuring that households are able to cope during the transition phase, including efforts to identify and design alternate safety nets for the most

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kilometer; sit for 2 hours; stand up after sitting; lie down and get up from a bed unassisted; climb one flight

vulnerable households. Russian households were particularly vulnerable because they had little measurable savings. Aside from social insurance programs, efforts to promoting savings, coupled with increased access to financial instruments, could prove valuable for assisting elderly households in coping with economic shocks and instability in pension systems.

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of stairs; climb several flights of stairs; lift and carry a weight of about 5 kilograms; squat, crouch or kneel.

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**Table 1. Pension District Revenues as a Percentage of District Pension Entitlements**

<b>Oblast</b>	<b>1995</b>	<b>1996</b>
Altaisky Krai	49.4	44.3
<b>Amursky oblast</b>	117.9	87.1
Chelyabinsk oblast	81.3	77.2
Chuvashskaya Rep	61.4	51.2
Kabardino-Balkar Rep.	42.3	35.9
Kaluzhsk oblast	66.2	63
<b>Komi Republic</b>	144.1	106.5
Krasnodar Krai	66.5	64.2
<b>Krasnoyar Krai</b>	132.3	86.7
Kurgan oblast	56.6	49.5
Leningrad oblast	61.8	85.9
Lipetsk oblast	66.2	72.8
<b>Moscow</b>	153.7	178.7
Moscow oblast	77.8	80.9
Nizhegorod oblast	73.1	87.6
Orenburg oblast	74	63.5
Penzenskaya oblast	47.1	45.2
Perm oblast	93.3	87.9
<b>Primorski Krai</b>	134.5	110.6
Rostov oblast	61.7	52.4
Saratov oblast	57.4	51.5
Smolensk oblast	54.9	54.1
St. Petersburg City	92.4	100.1
Stavropolsky Krai	59	55.9
Tambov oblast	43.4	37.1
Tatarstan Rep.	93.7	75.7
<b>Tomsk oblast</b>	110.9	98.8
Tulsk oblast	50.9	47.8
<b>Chanty-mansi AO</b>	506.5	624.2
<b>Yamalo-Nenetsky AO</b>	820.6	940.6
Tversk oblast	55.7	51.7
Udmurtia Rep.	71.3	67.4
Volgograd oblast	75.1	71.6

Source: Pension Fund of Russia

**Table 2: Regional Incidence of Pension Arrears**  
 (% of pensioners who reported not receiving their pension)

	<b>1995</b>	<b>1996</b>
<b>Overall</b>	9	34
<b>Geographic Regions</b>		
Metropolitan	6	4
Northern and North Western	6	28
Central and Central Black-Earth	9	29
Volga-Vaytski and Volga Basin	8	38
North Caucasian	13	55
Ural	9	31
Western Siberian	20	45
Eastern Siberian and Far Eastern	1	30

**Table 3: Determinants of Pension Receipt in 1996**

	FULL PENSIONER GROUP						DEBTOR REGIONS ONLY					
	(1) Marginal Effect	t-stats	(2) Marginal Effect	t-stats	(3) Marginal Effect	t-stats	(4) Marginal Effect	t-stats	(5) Marginal Effect	t-stats	(6) Marginal Effect	t-stats
<i>Local/ Regional Characteristics</i>												
<b>Sufficiency Ratio</b>	0.0021	5.3	.003	10.68	0.0021	5.31	0.0077	9.16	.0077	9.9	0.0082	9.43
<i>Payment Priority</i>												
<b>Poor</b>			.054	1.21	0.067	1.86			.095	1.7	0.13	2.24
<b>Single</b>			.097	2.82	0.093	1.96			.099	2.35	0.076	1.71
<b>Elderly</b>			.053	.68	0.062	0.08			.24	1.9	0.20	1.57
<b>Working</b>			-.033	-.92	-0.022	-0.59			-.067	1.5	-0.068	-1.48
<b>Disabled</b>			.127	1.35	0.115	1.19			.023	.13	0.011	0.06
<i>Individual and Household Characteristics</i>												
<b>Income w/o Pensions</b>					2.3E-06	1.11					4.0E-07	1.40
<b>Household Size</b>					-0.0119	-1.07					-0.0072	-0.52
<b># of Children 0 - 16</b>					0.0118	0.49					-0.015	-0.5
<b>Male</b>					0.0247	1.15					0.044	1.43
<b>Years of Education</b>					0.003	1.25					0.0029	0.96
<b>F-test Rules</b>			12.84		8.46				15.66		13.5	
<b>Log Likelihood</b>	-1146		-1170		-1139		-955		-1002		-938	
<b>Number of Obs.</b>	2066		2066		2066		1627		1627		1627	

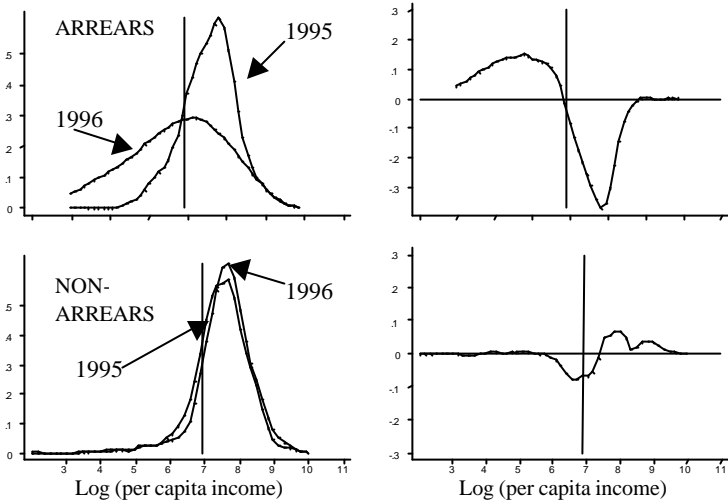
Source: RLMS. Probit regressions, with marginal effects reported.

**Table 4: Summary Statistics of Members of Pensioner Households by Pension Arrears Status**

	Pension Arrears				Non-Arrears Pensioners				Non-Arrears Pensioners, Debtor Regions Only			
	(1)		(2)		(3)		(4)		(5)		(6)	
	1995 Mean	SE	1996 Mean	SE	1995 Mean	SE	1996 Mean	SE	1995 Mean	SE	1996 Mean	SE
<i>Individual Characteristics</i>												
Male	0.43	0.01	0.43	0.01	0.40	0.01	0.40	0.01	0.4	0.012	0.4	0.01
Years of Education	7.81	0.22	7.89	0.21	8.69	0.12	8.82	0.12	8.4	0.13	8.5	0.12
Currently Employed? (%)	0.38	0.01	0.39	0.02	0.38	0.01	0.37	0.01	0.32	0.01	0.33	0.01
Wage Arrears (%)	0.08	0.01	0.10	0.01	0.06	0.01	0.08	0.01	0.06	0.01	0.09	0.01
<i>Household Characteristics</i>												
Household Size	3.49	0.15	3.51	0.15	3.33	0.09	3.30	0.09	3.34	0.04	3.28	0.04
Household Contains Only Pensioners	0.29	0.01	0.30	0.01	0.26	0.01	0.28	0.01	0.35	0.01	0.33	0.01
# Pensioners in household	1.47	0.04	1.53	0.04	1.45	0.02	1.47	0.03	1.22	0.01	1.37	0.01
# Children up to 16 years	0.63	0.07	0.63	0.08	0.59	0.04	0.58	0.04	0.65	0.03	0.61	
<i>Economic Characteristics of HH</i>												
Income	5646	218	3632	263	5834	192	5906	189	5369	257	5823	216
Pension Income	2434	60	0	.00	2389	50	2460	58	2312	262	2620	71
Pension Share of Income	.43	.01	.00	.00	.41	.01	.44	.01	.43	.02	.44	.01
Share of Expenditure on Food	0.67	0.00	0.70	0.01	0.66	0.00	0.65	0.00	0.67	0.00	0.66	0.00
Poverty Rate	0.20	0.01	.54	0.03	.19	0.02	0.15	0.02	0.23	0.02	0.17	0.01

Source: RLMS. All monetary figures in ruble.

Figure 1. Per Capita Income Densities



**Table 5. Daily Caloric Intake of Male Members of Households with Pensioners**

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<b>A. Full Sample of Pensioners</b>	<u>1995</u>	<u>1996</u>	<u>Difference</u>
Arrears Pensioners (‘treatment’)	2213 (48)	1970 (38)	-243
Non-Arrears Pensioners (‘control 1’)	2133 (33)	2111 (33)	-22
<i>Difference</i>	+80	-141	-221

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<b>B. Debtor Regions Only</b>	<u>1995</u>	<u>1996</u>	<u>Difference</u>
Arrears Pensioners (‘treatment’)	2213	1970	-243
Non-Arrears Pensioners (‘control 2’)	2147	2130	-17
<i>Difference</i>	+66	-160	-226

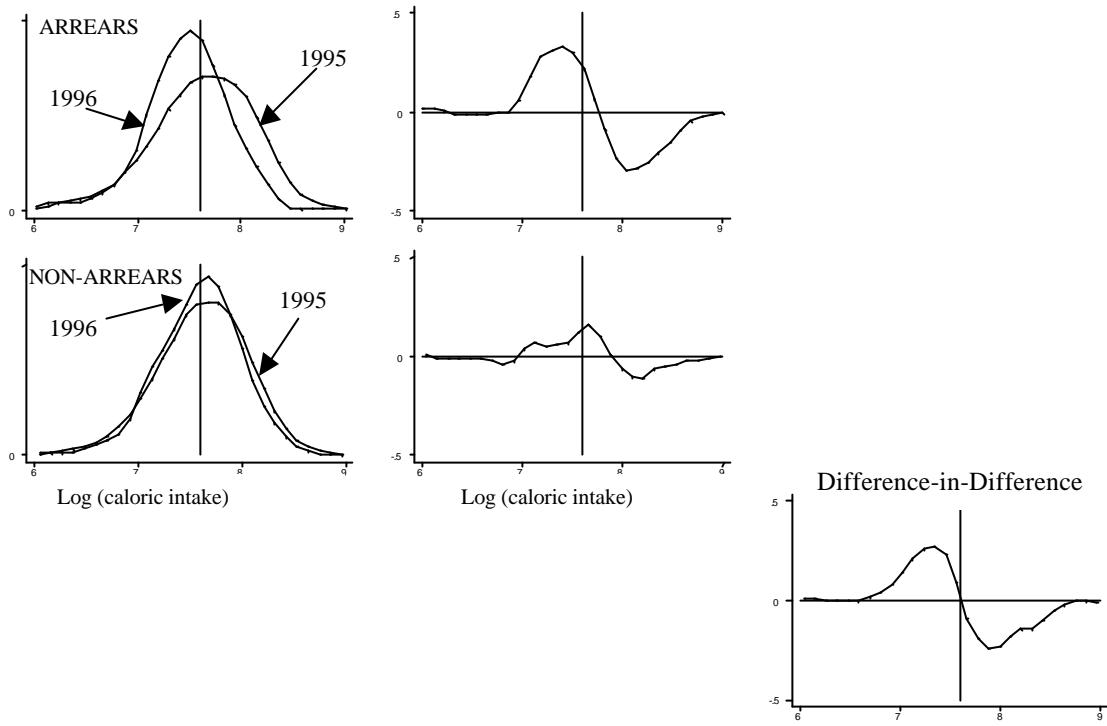
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<b>C. High vs. Low Probability Arrears Groups--Donor Regions</b>	<u>1995</u>	<u>1996</u>	<u>Difference</u>
Likely Arrears	2179	2186	+7
Non-Likely	1969	1953	-16
<i>Difference</i>	+210	-233	+23

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Standard errors in parentheses.

Figure 2. Caloric Intake Densities

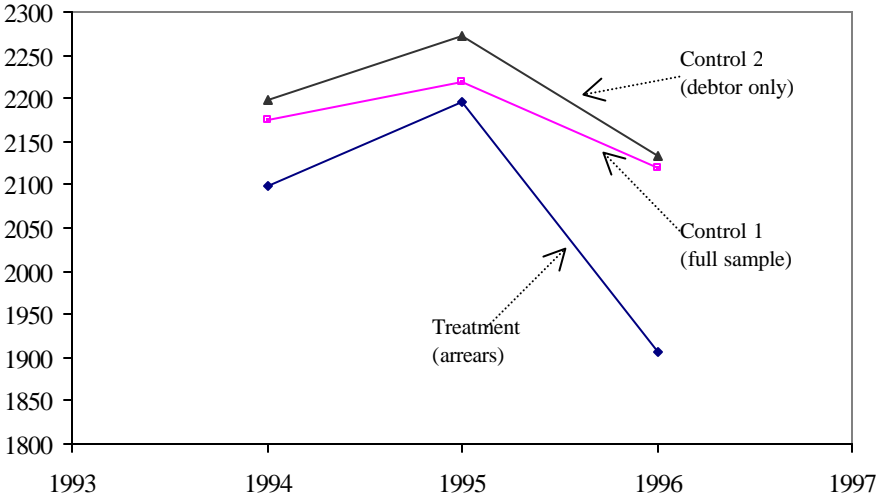


**Table 6. Region-Level Social Spending, by Pension Fund Debtor vs. Donor Status**

	<u>Debtor Regions</u>				<u>Donor Regions</u>			
	1995		1996		1995		1996	
	<i>R bn</i>	<i>SD</i>	<i>R bn</i>	<i>SD</i>	<i>R bn</i>	<i>SD</i>	<i>R bn</i>	<i>SD</i>
<b><i>Total Social Spending</i></b>	6846	337	7074	307	8868	768	8473	530
Health	1574	78	1569	69	1850	138	1861	141
Housing	2264	142	2338	138	3647	483	3153	317
Education	2160	100	2236	89	2502	172	2535	146
Miscellaneous social	849	41	930	46	870	57	924	62



Figure 3. Calorie Trends 1994-96, Treatment and Control Groups



**Table 7: Receipt of Government and Private Assistance, by Pension Arrears Status**

	Pension Arrears				Non-Arrears Pensioners				Non-Arrears Pensioners, Debtor Regions Only			
	(1)		(2)		(3)		(4)		(5)		(6)	
	<b>1995</b> Mean	SE	<b>1996</b> Mean	SE	<b>1995</b> Mean	SE	<b>1996</b> Mean	SE	<b>1995</b> Mean	SE	<b>1996</b> Mean	SE
<i>Receipt of services and assistance</i>												
Get fuel benefits?	.018	.004	.024	.004	.008	.002	.010	.002	.010	.002	.007	.002
Get apartment benefits?	.043	.006	.048	.006	.083	.006	.116	.007	.082	.007	.104	.008
Get stipend?	.052	.007	.023	.005	.044	.004	.038	.004	.046	.005	.039	.005
Medical insurance paid by govt?	.25	.014	.32	.015	.36	.011	.442	.011	.36	.013	.43	.013
Eligible for medicine discount?	.061	.007	.056	.007	.092	.006	.105	.006	.082	.007	.089	.007
Received assistance from private organization?	.023	.005	.027	.005	.027	.003	.028	.003	.026	.004	.023	.004

Source: RLMS.

**Table 8. Regressions for Caloric Intake: Men**

	Total Sample OLS (1)	Total Sample OLS (2)	Total Sample OLS (3)	Total Sample Fixed Effects (4)	Debtor Only OLS (5)	Debtor Only OLS (6)	Debtor Only OLS (7)	Debtor Only Fixed Effects (8)
Pension Arrears*1996	-239 (73.8)	-226 (77.0)	-228 (76.3)	-258 (53.2)	-232 (79.9)	-227 (83.7)	-224 (82.7)	-221 (58.7)
Pension Arrears	145 (64.1)	144 (64.1)	146 (63.9)		146 (71.2)	146.2 (72.5)	147 (72.0)	
1996	30.1 (45.6)	21.5 (45.0)	29.6 (45.6)		27.5 (55.9)	21.2 (56.3)	27.3 (56.5)	
Household Size	32.7 (26.7)	24.4 (25.7)	24.1 (25.4)	27.2 (35.1)	56.5 (30.3)	39.1 (29.3)	38.1 (29.0)	26.9 (36.7)
# children 0-16	1.07 (51.0)	17.5 (49.4)	16.0 (48.5)		-49.4 (58.3)	-11.4 (56.9)	-12.8 (55.8)	
Age	1.5 (1.2)	2.3 (1.2)	2.2 (1.2)		2.2 (1.4)	2.9 (1.4)	2.7 (1.4)	
Years of Education	34.8 (4.6)	32.6 (4.7)	32.1 (4.6)		32.9 (6.0)	32.7 (5.9)	32.4 (5.8)	
Employed?	198 (48.7)	184.4 (52.3)	236.3 (56.0)	49.3 (88.1)	192.3 (56.9)	161.2 (58.3)	215 (62.8)	-3.0 (98.2)
Household Income w/o Pension		.065 (.019)	.056 (.019)	.009 (.028)		.074 (.023)	.064 (.022)	.024 (.032)
Household in wage arrears?			-167 (75.7)	-46.2 (18.1)			-178 (80.5)	-101 (92.4)
Urban	-31.8 (58.5)	-21.3 (55.6)	-27.3 (54.0)		-41.5 (62.8)	-28.1 (59.8)	-35.2 (59.5)	
Constant	1485 (112)	1376 (116)	1390 (117)	37.2 (1276)	1450 (143)	1352 (145)	1376 (146)	1221 (1608)
Number of Observations	1958	1958	1958	1958	1532	1532	1532	1532

**Standard errors in parentheses.**

**Table 9. Nutritional Status Regressions**

	Men: Calories (kcal/day) (1)	Men: Protein (grams/day) (2)	Women : Calories (kcal./day) (3)	Women: Protein (grams/day) (4)	Intrahousehold Allocation	
					Men: Calories (kcal/day) (5)	Women : Calories (kcal./day) (6)
Pension Arrears*1996	-228 (76.3)	-4.3 (2.4)	-163 (73.2)	-4.7 (2.6)	-238 (77.0)	-163 (73.3)
Pension Arrears	146 (63.9)	4.3 (2.3)	163 (90.2)	6.1 (2.1)	146.1 (63.4)	164 (67.0)
1996	29.6 (45.6)	-.18 (2.3)	67.7 (40.2)	1.8 (1.4)	35.3 (45.0)	67.4 (40.2)
Household Size	24.1 (25.4)	2.6 (1.1)	12.6 (21.7)	.59 (.70)	25.3 (25.6)	11.3 (21.9)
# children 0-16	16.0 (48.5)	-2.9 (2.4)	4.9 (39.8)	-.60 (1.2)	19.2 (48.8)	6.9 (39.7)
Age	2.2 (1.2)	.091 (.063)	-3.5 (.94)	-.10 (.034)	3.7 (1.7)	-3.1 (1.4)
Years of Education	32.1 (4.6)	1.6 (.24)	18.8 (4.6)	.73 (.17)	31.8 (5.0)	18.7 (4.7)
Employed?	236.3 (56.0)	5.4 (2.4)	32.8 (39.0)	.88 (1.5)	155 (59.1)	28.4 (40.0)
Household Income w/o Pension	.056 (.019)	.0041 (.0008)	.055 (.018)	.003 (.001)	.066 (.020)	.056 (.018)
Household in wage arrears?	-167 (75.7)	5.5 (3.1)	-129 (66.2)	-3.6 (3.6)	-162 (74.3)	-130 (66.4)
Urban	-27.3 (54.0)	-4.0 (2.2)	-59.1 (56.9)	-3.8 (1.9)	-34.3 (54.5)	-58.9 (57.0)
Person is Pensioner					-95.3 (76.0)	-22.4 (60.0)
Constant	1390 (117)	36.7 (5.11)	1429 (39.1)	41.3 (4.1)	1354 (127)	1427 (115)
Number of Observations	1958	1958	2504	2504	1800	1991

**Standard errors in parentheses.**

**Table 10. Determinants of Mortality**

	<u>Men</u>	<u>Women</u>
Pension Arrears	.058 (.030)	.01 (.01)
Age	.004 (.002)	.001 (.0004)
Obese	.021 (.026)	.014 (.077)
Has diabetes	.011 (.052)	.017 (.015)
Has had a heart attack	.001 (.033)	.001 (.021)
Has had a stroke	.11 (.083)	-.001 (.006)
Has experienced chest pain	.018 (.020)	.001 (.006)
ADL Index	.013 (.004)	.0063 (.0028)
Smoker	.065 (.029)	.001 (.021)
# years smoked	.0012 (.0007)	-.008 (.016)
Drinks	.001 (.021)	-.001 (.006)
Household income	.022 (.034)	-.003 (.0021)
Number of Observations	642	1240

**Notes:** Marginal effects from probit regressions, dependent variable is whether individual died between 1996 and 1998 surveys. Sample restricted to individuals over the age of 50, in households containing at least one pensioner. ADL Index ranges from 0 to 8, with a one unit increase for every activity of daily living (ADL) for which the respondent indicates they either can not do, or can do but it is very difficult (possible responses were 1 to 5; 1. Not at all difficult; 2. Slightly difficult; 3. Somewhat difficult; 4. Very difficult, but possible; 5. Cannot do it). Activities were: walk across a room; walk 200 meters; walk 1 kilometer; run 1 kilometer; sit for 2 hours; stand up after sitting; lie down and get up from a bed unassisted; climb one flight of stairs; climb several flights of stairs; lift and carry a weight of about 5 kilograms; squat, crouch or kneel. Standard error in parentheses.