THE DISTRIBUTIONAL ASPECTS OF THE RUSSIA'S PENSION SYSTEM

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The Russia's social security system on the eve of reform

Comprehensive economic transformations of the last decade in Russia affected social security system in many respects. First of all, this system experienced drastic institutional modifications, and actually only since 1990 it can be regarded as a relatively independent institution rather than subordinate part of the budgetary system. The new stage in the development of the pension system was initiated in 2002, when the pay-as-you-go (PAYG) principle was supplemented with a funded component. We start with a brief outline of the Russian pension system on the eve of this reform, and then discuss in details possible implications of a transition to the new system.

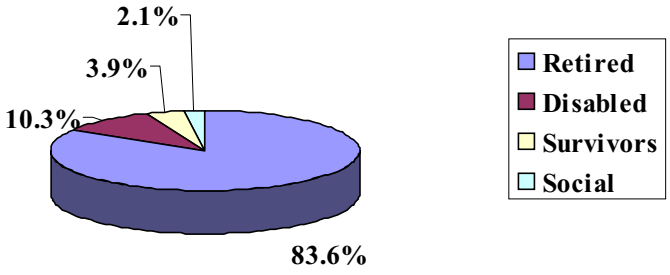
The salient feature of the Russian pension system was (and still is) relatively generous eligibility rules for granting pensions. First of all, Russia has exceptionally low (lower than in any other country) retirement age: 60 years for males and 55 years for females. Relatively large required length of service (25 years for males and 20 years for females) eliminated only a minor part of the aged population, taking into account very high participation and employment rates in the past, under centrally planned economy. In addition to that many retired pensioners enjoyed privileged terms of eligibility in the form of early retirement or smaller required length of service. Grounds for granting privileged retirement terms included broad range of reasons, like working in unfavorable conditions (specific professions, or employment in the Far North territories), having some severe diseases, or having special merits (say, raising 5 or more children). Pension legislation was getting more and more generous over 90-s. As a result number of retired on privileged terms hiked by over 80% as compared with the end 1990, and they accounted for almost one third (31%) of all retired pensioners. Almost one tenth of retired pensioners were younger than the standard retirement age in 2001, and share of pensioners who became eligible for a retired pension in the earlier than standard age amounted to some 18%. Number of social pensions (granted to some categories of disabled and aged persons not having sufficient duration of past employment) rose 3.1 times, and number of disabled pensioners increased by 38% over the same period. It is important to note also that it was allowed to aged pensioners to work, getting both pensions

and wages. One more factor that affected number of pensioners was their immigration to Russia from the other former Soviet republics after the dissolution of the USSR. These trends led to deteriorated ratio of pensioners to population in the working age: it grew from 39% to 44%, and share of pensioners in the total population rose from 22% to 27%. Number of retired pensioners practically reached number of aged. The fact worth special concern is an increase in the proportion of pensioners to employees from around half (51%) to three-quarters (76%).

Table 1. Number of pensioners and composition of population (year end)

	Million		% of total population	
	1990	**2001**	**1990**	**2001**
Pensioners total	32.8	38.6	22.2%	26.8%
Retired	26.1	29.7	17.6%	20.6%
o/w privileged	5.1	9.3	3.4%	6.5%
Disabled	3.5	4.9	2.4%	3.4%
Survivor's	2.8	2.6	1.9%	1.8%
Social	0.5	1.5	0.3%	1.0%
Employees	63.9	51.0	43.1%	35.4%
Population in the working age	84.0	87.3	56.7%	60.6%
Aged population (males over 60; females over 55)	28.2	29.9	19.0%	20.8%
Total Population	148.2	144.0	100.0%	100.0%

Fig.1. Composition of Pension Benefits (2001)



As distinct from the number of pensioners, total amount of pension benefits was not high as compared to other countries. Benefits were financed mainly from payroll taxes, equal to 28% of the wage bill (as of 2001), paid by employers; in addition a minor part of pensions was

financed from the budget. Total amount of pension benefits paid in 2001 was equal to 5.2% of GDP. Both rate of contributions and total benefits are lower than in most transition countries.

Retired pensions accounted for a bulk of total pension benefits (84%), while survivors' and social pensions taken together accounted for just 6% of total.

Real value of pensions dropped by more than a half in the course of transition: amounting in 2001 to just 47% of its level in 1990. Losses of pensioners exceeded by far decrease in the disposable income, though were roughly proportional to that of the working population. Real disposable income declined from 1990 to 2001 by 38%, while real wages fell by 53%, just as did pensions.

The social security system had most hard times in the aftermath of the financial crisis of 1998. Following sharp decline in real wages, pensions dropped to just 30% of their real level in 1990. Average pension fell for the first time below the subsistence level - to just 70% of it (pensions in 1992 stood at 119% of subsistence, while earlier this level was not officially defined). Pensions recovered in the years 2000 and 2001, but still did not reach the subsistence level (amounting to just 90% of it in 2001[1]). Ratio of pensions to wages throughout transformation period varied around its initial level (34%), and was standing at 33% in 2001. Lower than average wages in the pre-retirement age implied though, that the replacement rate (size of pensions for the newly retired relative their recent wages) amounted in 2000 according to RLMS data to 55% for men and 60% for women.

Table 2. Average pensions (end 2001)

	Rouble/ month	$/month (PPP exchange rate)	In % of average wage (adjusted for hidden wages)	In % of subsistence level
All pensioners	1144	126	21%	96%
Retired	1255	138	23%	105%
Disabled	940	103	17%	79%
Survivors	669	74	12%	56%
Social	632	69	11%	53%

Source: Goskomstat

[1] It should be noted that a revised procedure of setting subsistence level is applied starting 2001. Thus defined subsistence level rose noticeably as compared with what would be produced according to the previously applied procedure.

It should be noted that the official figures on the replacement rate do not take into account the hidden wages, which amounted to almost half of the openly paid wages in 2001. Hence average pensions actually amounted to just 21% of the full wages (including hidden).

Throughout the transition period pensions had relatively stable share (around 10%) in the composition of household incomes. Changes in the composition of income consisted mainly in decreasing share of wages and increasing share of mixed income and revenues from property.

Table 3. Composition of household incomes

	1990	**2001**
Total cash income	100.0	100.0
Wages	76.4	64.6
Pensions	10.1	10.1
Other transfers	4.6	5.2
Other incomes	8.9	20.1

Source: Goskomstat

Pensioners' Standards of Living

Evidences on standards of living of pensioners are contradictory. According to the households budget surveys carried out by the Goskomstat, they contribute substantially to the poverty formation. Share of low-income[2] persons varied for different categories of pensioners from 26% (for retired) to 51% (for survivors). As demonstrated in the Tab. 4, share of low-income retired pensioners was lying significantly lower than this share for the entire population, but other categories of pensioners were worse off than all population. Worth noting is almost two-fold difference between poverty incidence in the working and non-working pensioners. The same conclusions were true for the incidence of extreme poverty (defined as disposable income below half of the subsistence level).

On the other hand, the Goskomstat survey of household budgets found, that only 4.2% of pensioners entered bottom decile of the overall distribution by per capita disposable income in

[2] The low-income households were defined as those with disposable cash and non-cash income below the subsistence level. The cash income was derived indirectly from expenditures reported by households.

2000, and 19.4% entered the top decile. Families with one parent and several children, and families where adults were unemployed proved to be the most vulnerable categories.

Table 4. Contribution of pensioners to poverty in 2000 (%)

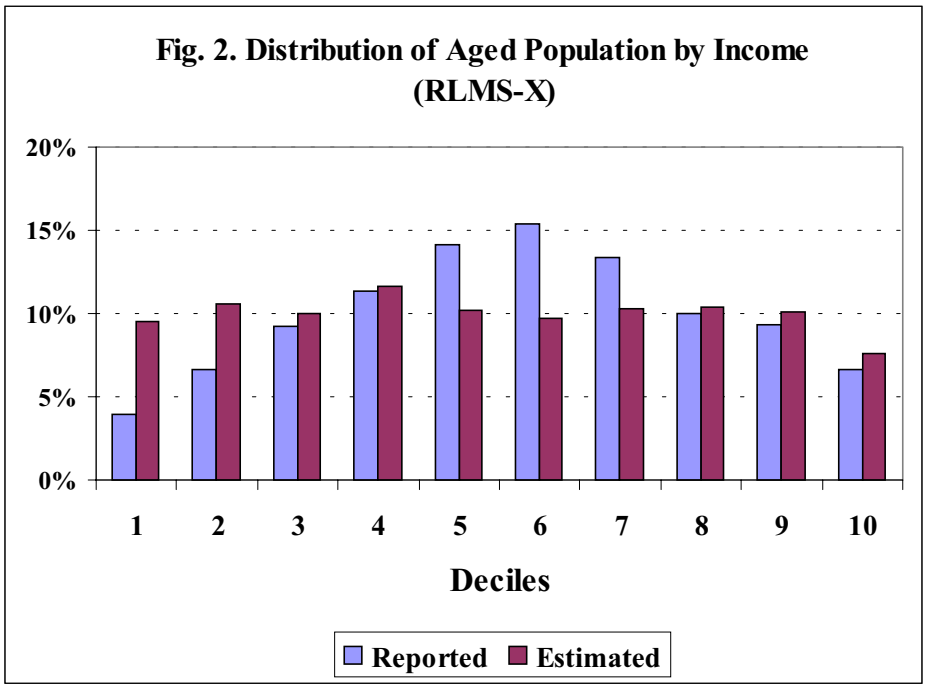
Category	Share in the particular group	
	Low-income	Very poor
Total population	40.0	10.3
Pensioners:		
Retired	25.7	4.6
Disabled	43.8	11.3
Survivor's	51.0	12.7
Social	49.7	12.9
Working	18.2	3.1
Not working	30.1	5.9

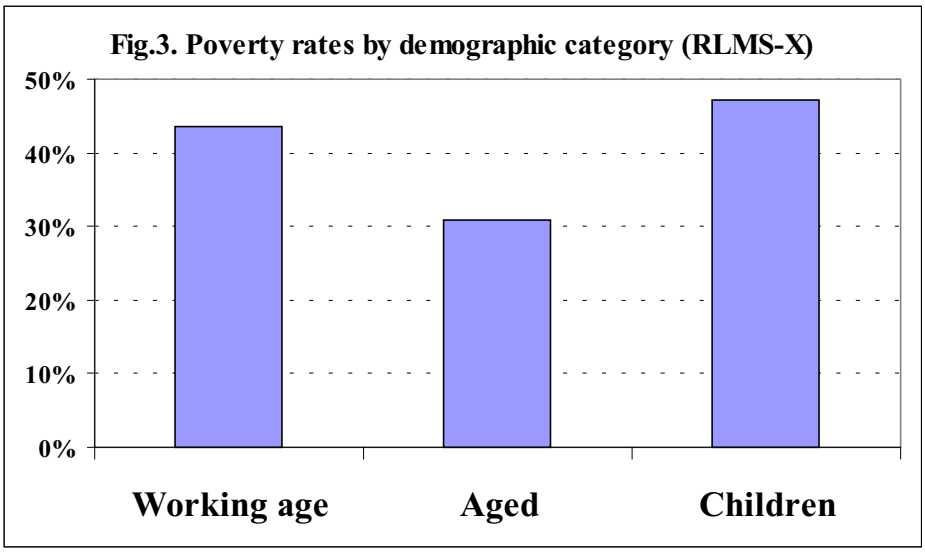
Source: Goskomstat

The average values of reported income in the Goskomstat household budget surveys differed substantially from the aggregated estimates of the overall incomes. This made Goskomstat to construct an alternative indicator of household disposable incomes, based on reported values of expenditures and savings. Comparison of the latter indicator with the poverty line revealed that share of aged population below subsistence level amounted to 15.3% for males, and 19.6% for females, while for the population in general 29.1% had income below subsistence level. This finding supports the above made conclusion that aged pensioners had higher than average standards of living.

Still more optimistic estimates of the pensioners' standards of living are given by the RLMS data. Data of the Round X, run in September-December 2001, evidence that only 4% and 7% of aged population fall in two bottom deciles by reported income (Fig.2). More plausible conclusions can be made if alternative characteristic of standard of living is used: disposable income was estimated (like in the Goskomstat survey), as a sum of expenditures, non-cash income, and savings. Distribution of aged population by deciles turns to be then close to that of the general population, this group being significantly underrepresented only in the top decile. The evident distinction between two measures of income can be explained by lower willingness of respondents to report their wage income (which is often hidden from taxation) as compared with pensions and other transfers. Our hypothesis is confirmed by the

composition of household incomes self-reported in the RLMS survey: contribution of pensions there is as high as 18% (instead of 10% according to the Goskomstat), while share of wages makes up just 57% (instead of 65% reported by the Goskomstat). On the other hand, pension benefits amount to 11% of the estimated total income, hence we can suggest that: 1) the latter indicator gives reasonable proxy for actual income, and 2) RLMS data on pension benefits are relatively reliable. Households' incomes calculated basing on their expenditures are used in all our further analysis.





RLMS data were used then to measure poverty rates by demographic group. Poor population was defined as that with disposable income below regional subsistence level. Share of poor for aged was found to be lower than for the general population (Fig. 3).

Poverty rates practically did not differ by gender both in the working age and for aged.

As a next step we sorted all households into 5 categories (See Tab. 5). We found that 'aged families', with only aged members, account for quarter of all households, and 13% of population. Single aged are represented mainly with females (5% of population, and 21% of all aged), and almost half (44%) of all pensioners are entering 'mixed' households.

Table 5. Households sorted by composition (RLMS-X)

#	Household Profile	Share in the sample		Average number of household members				
		By number of households	By number of household members	Total	Aged males	Aged females	Working age	Children
1	Aged couple	9.8%	7.1%	2.0	1.0	1.0	0.0	0.0
2	Aged male	2.4%	0.9%	1.0	1.0	0.0	0.0	0.0
3	Aged female	13.5%	4.9%	1.0	0.0	1.0	0.0	0.0
4	Mixed households (aged and non-aged)	21.5%	27.6%	3.5	0.3	1.0	1.6	0.7
5	No aged	52.9%	59.5%	3.1	0.0	0.0	2.2	0.9
6	ALL HOUSEHOLDS	100.0%	100.0%	2.7	0.2	0.4	1.5	0.6

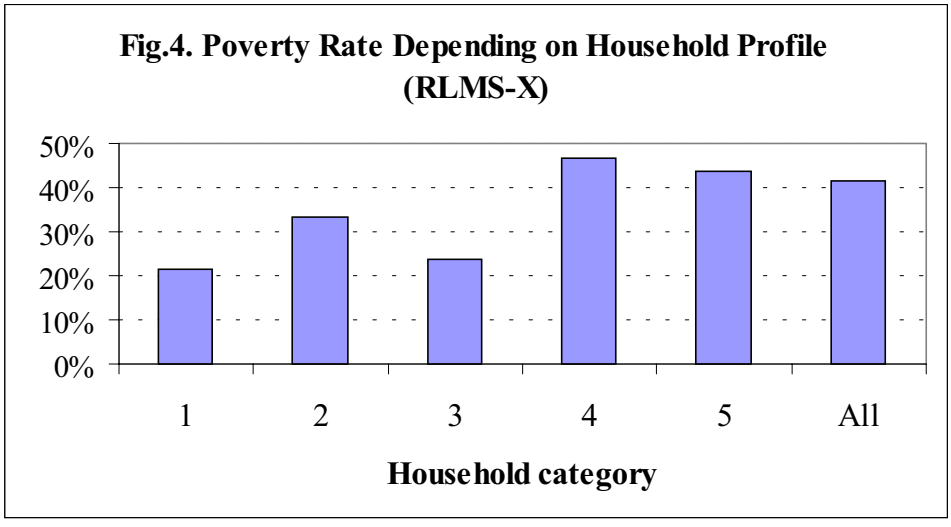


Chart 4 demonstrates that poverty incidence in the 'pure aged' households is low in relation to other groups. Larger poverty incidence among single aged men as compared with single aged women (despite higher average income of the former) looks a surprise. It can be explained with higher variance of men's income.

Analysis of the RLMS data gives thus the same general conclusion as that of the Goskomstat survey: poverty incidence in the aged population is lower than in the general population. This conclusion may look unexpected taking into account the large gap between average pensions and wages, and the fact that average pension was lying below the pensioners' subsistence level in 2001. Our analysis found two factors, that played fundamental role in restraining poverty among aged.

The first reason is that aged population had substantial incomes from sources different from pensions. Table 6 demonstrates income profile by household categories. The 'Other reported incomes' include transfers (subsidies, allowances), income from property, support from relatives, and non-cash incomes. We found that pension benefits account for around half of disposable income in the 'purely aged' households. Lower poverty incidence in these households is partly explained with smaller subsistence line for pensioners as compared to younger persons.

Table 6. Income by household category, (RLMS-X)

Household category	Per capita income (Ruble/month)	Income Composition (%)			
		Pension Benefits	Wages	Other Reported	Unreported
1	2449	50.7%	9.5%	21.5%	18.3%
2	2586	53.4%	9.2%	12.7%	24.7%
3	2310	50.7%	2.6%	19.7%	27.1%
4	2140	21.5%	37.3%	23.0%	18.1%
5	2935	2.3%	45.8%	22.3%	29.7%
All	2647	12.3%	39.3%	22.2%	26.2%

Still role of pension income is by far more important for poor than for the population in general: contribution of pensions to total income according to RLMS data amounted to 25% for poor, i.e. exceeded two times their share for all households.

Further estimates of the effect of pensions on poverty patterns are presented in the Tab. 7. One can see that even in the 'aged families' income and poverty rate are not too sensitive to the average pension size. Surprisingly, the largest sensitivity was found for mixed families, which include both aged and non-aged members (in addition to aged couples). Share of pension benefits in income of mixed households is not very high, but low general standard of living makes pension important in these families. Sensitivity of the 5-th category of households (despite negligible contribution of wages to total incomes) is explained with the fact that poverty is concentrated here in families, which have disabled, or have lost provider.

Table 7. Sensitivity of income and poverty incidence to average size of pensions (RLMS-X)

Household category	Effect of raising average pension by 1% on:	
	Income (%)	Poverty rate (percentage points)
1	0.5%	-0.8
2	0.5%	-0.4
3	0.5%	-0.4
4	0.2%	-0.8
5	0.0%	-0.2
All	0.1%	-0.4

Table 8. Working pensioners as of end-2001

	Million	% of Pensioners
Retired	4.8	16.2%
Disabled	0.8	16.9%
Survivors	0.1	2.0%
Social	0.1	5.3%
TOTAL	5.8	14.9%

Source: Goskomstat

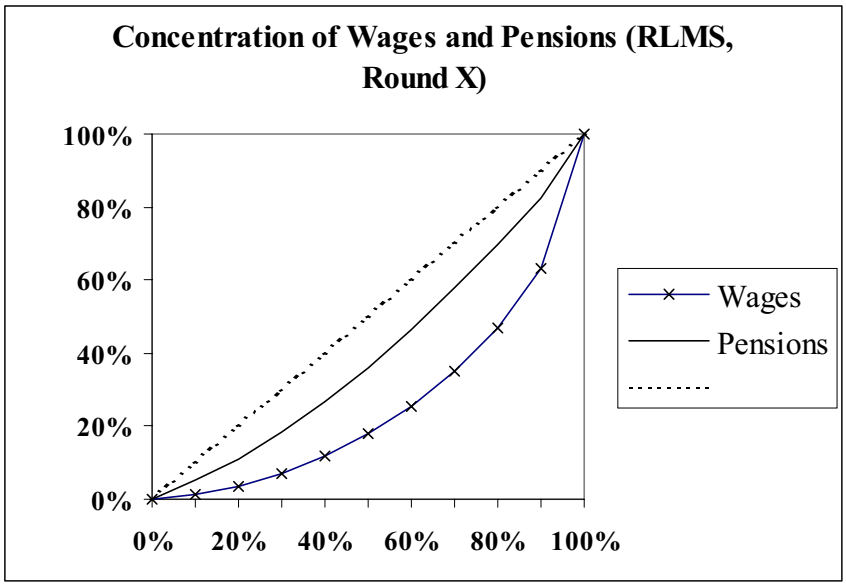
Some contribution to the incomes of aged is made by work remuneration. 15% of pensioners (mainly retired and disabled) were working as of end 2001 – see Tab. 8. According to the RLMS data wage income amounted to 7% of pension benefits in the 'purely aged' households (categories 1-3).

The second reason of not very high poverty incidence in the aged groups was a very low differentiation of pensions, as distinct from high variance of wages. This fact is illustrated

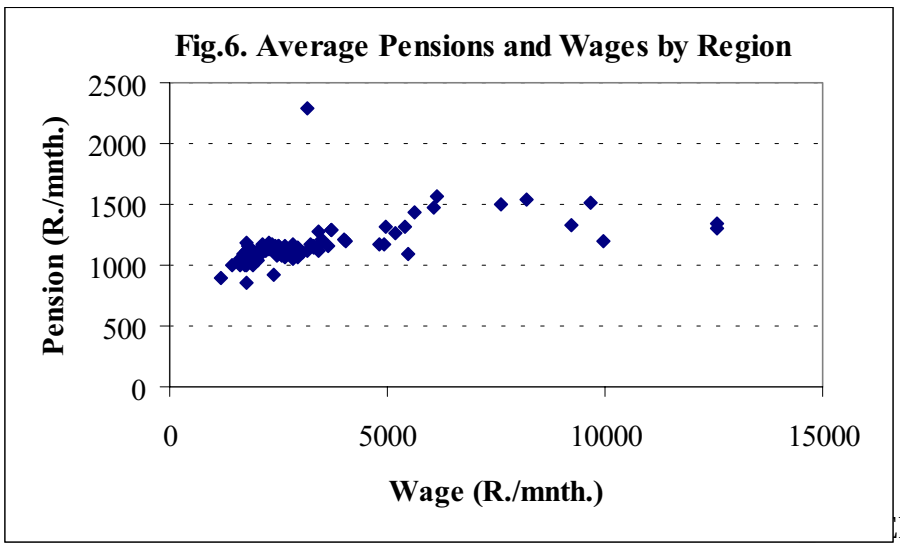
with Chart 5, comparing their differentiation by decile according to the RLMS-X data. The Gini index for wages amounted to 48.7, while for pension distribution this coefficient was as low as 19.6. Ratio of top to bottom deciles differed almost 10 times, amounting 31.5 for wages, and just 3.5 for pensions.

The Goskomstat gives even higher wage differentiation, estimating Gini index for wages in 2001 as 50.7, and top to bottom decile ratio as 39.6. The income differentiation was lying between that of wages and pensions: according to Goskomstat, Gini index and top to bottom deciles ratio amounted to 39.6 and 13.8 respectively in 2001.

This may be partially justified with the fact that in the past, when the currently retired paid pension contributions, wage had quite limited differentiation. Still keeping this situation for the future implies large-scale redistribution.



Variation of pension by region was also by far lower than variation of wages, as illustrated with Fig. 6.



Wages in the most rich region exceeded their level in the poorest region more than 10 times (their range varying from 36% of the all-Russia average level in Dagestan to 389% of that in the oil-extracting Khanty-Mansy Okrug), while ratio of highest to lowest pensions (if we disregard one 'outlier' region) amounted to just than 1.8 (75% to 137% of the average level). Ratios of average wages and pensions for top and bottom deciles of regions amounted respectively to 5.8 and 1.5. Concentration of wages by region was characterized with the Gini index 33.7 (with account for number of employed by region), or 30.8 (without account for employment), while Gini index for pensions was as low as 7.4 or 5.9 (with or without account for number of pensioners). This huge discrepancy could be hardly explained with migration of the pensioners into other regions on retirement. It is usual practice for retired to return from the Far North regions to their native area, but generally population mobility (especially for the retired) is relatively low.

Dependence of pension (*P*) on the wage level (*W*) by region proved to be relatively weak. It was characterized with a regression[3], explaining half of the observed variation (R^2 adjusted amounts to 50%):

$$P = 0.12 * W,$$
$$(t=9.6)$$

where both variables are presented as percentage deviation from their average levels. We found also that inter-regional variation of wages exceeded by far that of pensions: standard deviation was equal 68% of average for wages and just 15% for pensions. These findings confirm very weak dependence of pensions on wages.

Bringing regional differentiation of pensions in line to the current contributions (which are proportional to the wages) would require redistribution of 14% of the total resources of the pension system (taking into account number of pensioners by region).

The effect of inter-regional redistribution of pension benefits can be seen from the aggregated income indicators by different categories of regions. We have divided all regions into 4 groups

[3] As before, one outlier region is excluded from the sample.

depending on their cost of living and living standards. Regions were regarded as 'expensive' if cost of their subsistence basket exceeded the country average value. Regions with real (with respect to cost of living) per capita income above country average were labeled 'rich'. It should be noted that only 63 regions out of 88 have defined their regional subsistence levels and were used in this analysis. As one could expect, no regions fell into category 'cheap rich'.

Data presented in the Tab. 9 show that in the most prevalent 'Poor cheap' regions average pensions were by far more close to the country average level than wages. Taking into account relatively low cost of living real value of pensions exceeds the country average level in these regions. The reverse side of 'egalitarian' distribution of pensions shows itself in 'rich expensive' regions, where pensions are also relatively close to the country average, but with an opposite result: their real value turns to be very low in these regions. Moscow gives an example of this case, with average pension equal to just two third of the subsistence, though real (adjusted for cost of living) wages exceeded somewhat the country average level.

Table 9. Income indicators by categories of regions (% deviation from the country average)

Indicator	Regions		
	'Cheap Poor'	'Expensive Poor'	'Expensive Rich'
Subsistence level	-12%	25%	43%
Average Wage	-35%	14%	139%
Average Pension	-4%	6%	8%
Per Capita Income	-42%	-11%	162%
Wage-to-Subsistence Ratio	-26%	-11%	60%
Pension-to-Subsistence Ratio	10%	-10%	-18%
Income-to-Subsistence Ratio	-36%	-31%	78%
Share of regions in the given category in total	59%	33%	8%

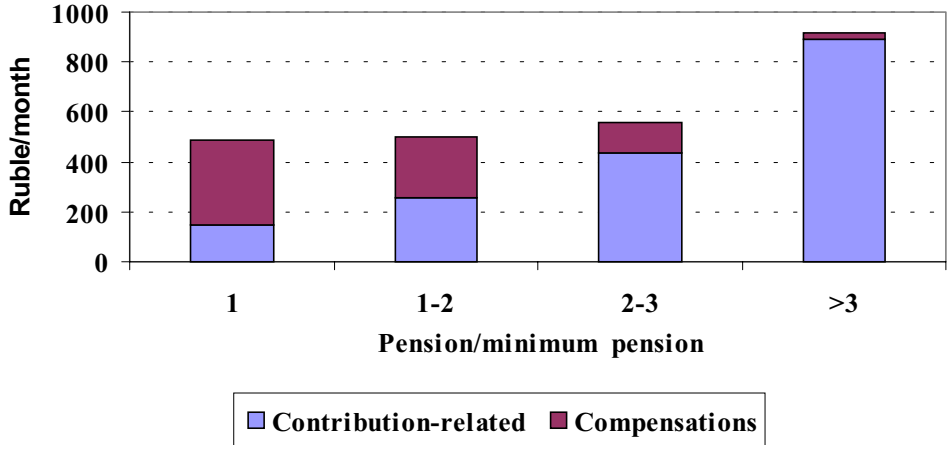
Summary figures of real value of pensions in different categories of regions are given in the Tab. 10. It shows that relatively low pensions are concentrated not in the cheap, but in the expensive regions. In other words, pension system protects aged from low local wages, but does not protect from high prices. We can suggest though that pensioners who live in rich expensive regions have more opportunity to work and get larger wage income. This is confirmed with the fact that share of working among the post-retired aged (males 60 to 65, females 55 to 60 years old) is higher in these regions than in the country in general.

Table 10. Distribution of regions with low pension by category

Indicator	Regions		
	'Cheap Poor'	'Expensive Poor'	'Expensive Rich'
Number of regions with low real value of pension (less than country average)	8	20	5
Number of regions with very low real value of pension (less than 85% of country average)	0	10	3
Share of regions with low real value of pensions in the category	22%	95%	100%
Share of regions with very low real value of pensions in the category	0%	48%	60%

Technically, small differentiation of pensions in the pre-reform period was explained, first, with limitations of the pension size: the ceiling for retirement pensions was just 3 times as large as the minimal pension. Even more important role was played here by compensatory pension benefits, introduced in the past to prevent rapid deterioration of pensions in the highly inflationary environment. These compensations were granted primarily to the poorer pensioners, so total pensions consisted of two components: one, linked to the past contributions, and second - compensations, negatively dependent on the first component. Share of compensations in the total benefits in the group with the lowest pension size (at their minimum level) amounted to 70% in 2000, while in the group with the highest pension (3 or more minimum pensions) compensations accounted for only 3%. This policy resulted in egalitarian distribution of pensions: total benefits in the groups, where first component was 1, 1 to 2, or 2 to 3 times as large as the minimum pension, were very close (see Chart 7). In other words, pension system was targeted at reducing poverty, but this implied large-scale redistribution, undermining role of pensions in labour incentives.

Chart 7. Composition of benefits by pension size (year 2000)



Intention to ensure acceptable minimal level of pensions required immense redistribution of funds by gender. Average wages obtained by females were 37% lower than that of males in 2001, while average pensions were just 10% lower. RLMS surveys revealed a bit higher inter-gender gaps both for wages (40%) and pensions (16%), but still pensions differed by far less than wages. In addition to that, number of retired females exceeds by far number of retired males, due to substantial distinctions in both retirement age and the average life duration (expected average age of women in the age 55 amounted to 22.5 years in 2001, while life expectancy for men in the age 60 amounted to just 13.2 years). On the other hand, number of employed males is somewhat larger than that of females. Women accounted for 64% of retired, and 48% of employed.

It is clear that these disparities in the gender weights in pension contribution and benefits implies large-scale redistribution. Suppose the current pensions, wages and number of employed and pensioners are remaining constant. Our estimates (see Tab. 11), based on the RLMS data on wages and Goskomstat figures on participation rates by age group, evidence that accumulated lifetime wages (and, correspondingly – pension contributions) of an average male were almost twice as large as that of an average female. On the other hand, total pension benefits obtained by females over the retirement period on average were 42% higher than that for males. This implies that 37% of contributions made by men were used to pay benefits to women, and 42% of benefits obtained by women were funded from men's contributions. Prohibiting any redistribution between genders would reduce pensions for women by 42%, and increase that for men by 59%. As a result a huge gender gap emerges: average pensions obtained by males exceed more than 3 times pensions obtained by women!

Table 15. Calculated pension contributions and benefits by gender

	Males	Females	Ratio Females/Males
Contributions:			
Average wage – RLMS-X (Rub./mnth)	3714	2234	60%
Length of service	34.6	29.6	86%

Overall wage income	1518	790	52%
Overall contributions used to pay retirement pensions (Rub. th.)	358	186	52%
Benefits:			
Average retirement pension – RLMS-X (Rub/mnth)	1411	1183	84%
Life expectancy at retirement	13.3	22.5	169%
Overall benefits (Rub. th.)	225	319	142%
Overall benefits in % of contributions made	63%	171%	273%
Average pension free of redistribution	2245	690	31%

Estimated impact of eliminating inter-gender redistribution are presented in the Tab. 12. One can see that overall poverty rate is not significantly affected, but its distribution by gender groups of aged changes dramatically, being almost eliminated for men and rising close to the actual general level for women. The overall poverty rate would slightly increase if inter-gender redistribution is eliminated.

Table 12. Impact of eliminating inter-gender redistribution on poverty rate

Household category	Actual rate	Rate with eliminated redistribution	Rate change
1	21.4%	15.3%	-6.0%
2	33.3%	9.3%	-24.1%
3	23.7%	40.1%	16.4%
4	46.5%	48.9%	2.4%
5	43.6%	43.6%	0.0%
All	41.4%	42.2%	0.8%

To summarize, we can conclude that the pre-reform situation with the social security system was far from being satisfactory, as average pensions were lying even below the subsistence level. But, on the other hand, recent trends in the social security system were positive (as in the economy as a whole). Did the system really need drastic reforms?

To answer this question one has to consider prospects of the Russia's pension system, which depend primarily on the anticipated macroeconomics and demographic characteristics.

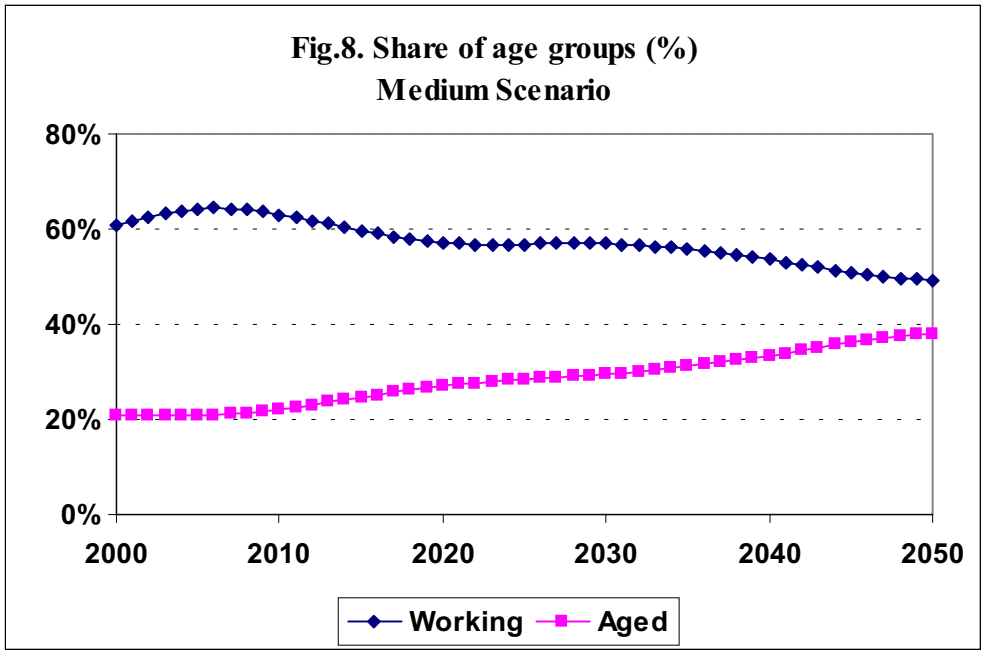
Demographic and macroeconomic trends

Demographic trends in Russia have been quite unfavorable over the last decade. Size of the permanent population has fallen over the period 1992 through 2001 by 2.9%. This process was mitigated in 1993-1995 with migration inflow from the NIS countries, which kept decline of population within annual rate of 0.1%. Subsequently population decline accelerated to 0.3% per year in 1997-1998, and 0.5% in 1999-2001. The long-term forecasts predict that these trends will continue over the forthcoming decades.

We built further analysis on demographic projections for the period till 2050, produced by the Center for Demography and Human Ecology. Unfortunately these projections are quite pessimistic, predicting sustained fall in population, with its speed increasing after the year 2015. According to the 'pessimistic' scenario permanent population will drop in the forthcoming 50 years almost by half (46%), 'moderate' scenario envisages its decline by one third (31%), and in the 'optimistic' scenario population falls by 'only' 17%. In the further analysis we will focus on the moderate scenario, which anticipates population decrease from 145 mln. in the end 2000 down to 100 mln. by the end 2050.

Still more important for the pension system is anticipated rapid aging of population. As shown in the Fig.8, share of aged population (men over 60 and women over 55) is growing in the medium scenario from 21% to 38%, while share of population in the working age is falling from 62% to 49%. As a result, old age dependency ratio (proportion of population in the retired and working age) is expected to grow 2.3 times, from the current 33% to 77%. This problem is common for most European countries (Feldstein, Siebert, 2002), but in Russia it is especially acute. The salient feature of the demographic trends in Russia is that they are explained by only partial recovery of the birth rate after its recent sharp decline, with a graduate increase of life expectancy at birth. The latter is projected to pick up from 59 years

for men and 72 years for women, to 66 and 78 years correspondingly by the year 2050. These projections underpin severe problems to be faced by the social security system in the future.



Fully realizing these problems, the government has initiated pension reform which started January 1 2002. The reform envisaged transition from the pay-as-you-go (PAYG) system to a three-pillar one, combining PAYG and funded elements. The key points of this reform can be summarized as follows:

- The new pension system includes base, insurance, and funded pillars. The size of the base pension does not depend on the past pension contributions. The insurance pension is paid from the current contributions (according to the PAYG principle) but depends on the past contributions of the pensioner. Finally, the third component will perform as a fully funded system.
- Contributions in the period prior to the year 2002 (for both employed and retired) are reflected in the 'pension capital', which depends on the duration of employment and relative wage level.
- Threshold for eligibility for the retired pensions have been loosened: in addition to reaching retirement age it is necessary to have 5 years of employment duration (instead of the previously required 25 years for men and 20 years for women).

- Pension system is funded with payroll tax. This tax is regressive, with initial rate 28% of the payroll. Actual effective rate of pension contributions amounted to 25% of the wage bill in 2001.
- Half of pension contributions will be used for base pensions. Long-term proportion of splitting another half into insurance and funded systems is 8:6 (effective since 2006), with gradual increase in the share of the funded component in 2002 to 2006.
- During the transition stage proportions of contributions to the insurance and funded systems will change over time depending on age. Men who are to retire in 10 years or earlier, and women who are to retire within the next 9 years, will not participate in the funded system at all. For those who are to retire in 11 to 24 years (men) or 10 to 19 years (women) the proportion will constitute 12:2. For those who were younger than 35 at the start of the reform this proportion would change in 4 years from 11:3 in 2002 to 8:6 in 2006 (and would remain then at this level).

We try to address below the following questions:

- What would be implications of keeping the PAYG system for the living standards of aged population?
- Who are the major beneficiaries of the reform and who is bearing losses?
- How large are benefits and losses of the reform?
- What is the expected impact of pension reform on poverty?

To answer these questions we need first macroeconomic forecast.

We compare pension values and distribution for various scenarios over the period 2002-2050. Projected rates of pension contributions reflect recent decision by the Government to cut social tax rates in 2005, as well as gradual decline of effective rates in line with growth of average wages (regressive scale being effective starting 2001). Effective average rate of pension contributions will fall then from some 24% of the reported wage bill to less than 20% of it.

The long-term projections were based on a model, describing capital and labour developments, and adjustment of wage levels to the labour productivity. The forecast of the labour supply assumed application of participation rates by age and gender groups observed in

2001 to the long-term demographic scenarios. In addition, the model assumed gradual decrease of 'shadow wages'.

More detailed presentation of the model can be found in Gurvich, 2002.

Overview of Results

The key conclusion of the projection is that production growth is slowing down by the end of the period under consideration. Its annual rate falls from almost 5% in 2001-2010 to around 3% in the 2030-s, and just 1.3% in the 2040-s. The fundamental reason for this is rapid decline of population and deterioration of its age composition. Correspondingly, labour supply drops by 40%, i.e. even more than population as a whole (which falls by 31%). The decrease of labour force becomes quite significant around 2015, and strengthens after 2030, reaching on average 1.5% per year in this period. Shortage of labour force becomes the most important restricting factor for production growth. As a result, though labour productivity is estimated to rise more than 7 times over the period 2001-2050, GDP volume may increase only 4.5 times.

A salient feature of Russian pre-reform conditions was relatively low level of wages. Our model envisages gradual approach of gross wages to the labour marginal productivity, in line with general principles of economic theory. As a result, share of compensations to employees in GDP is projected to go up, from 45% in 2001, to 50% in 2011, and further to 62% in 2050. We anticipate also, that share of hidden wages is falling from 35% in 2000 to 22% by 2050. Overview of the major findings is presented in the Chart 9, and Table 12.

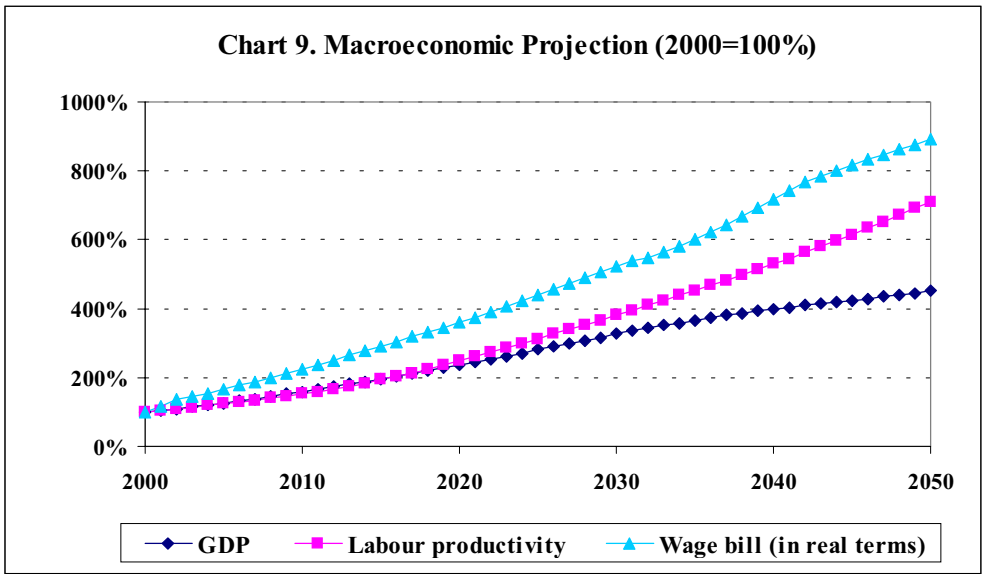


Table 12. Projected average annual growth rates

	2001-2010	2011-2020	2021-2030	2031-2040	2041-2050	2001-2050
Labour force	0.0%	-1.1%	-1.0%	-1.3%	-1.7%	-1.0%
Total number of employed	0.4%	-0.9%	-1.0%	-1.3%	-1.7%	-0.9%
GDP at constant prices	4.8%	4.0%	3.3%	2.0%	1.3%	3.1%
GDP per capita at constant prices	5.2%	4.5%	4.1%	3.0%	2.3%	3.8%
Labour productivity	4.4%	4.9%	4.4%	3.3%	3.0%	4.0%
Real reported wages	8.6%	5.9%	4.9%	4.6%	3.9%	5.6%
Reported wage bill	8.3%	4.9%	3.8%	3.2%	2.2%	4.5%

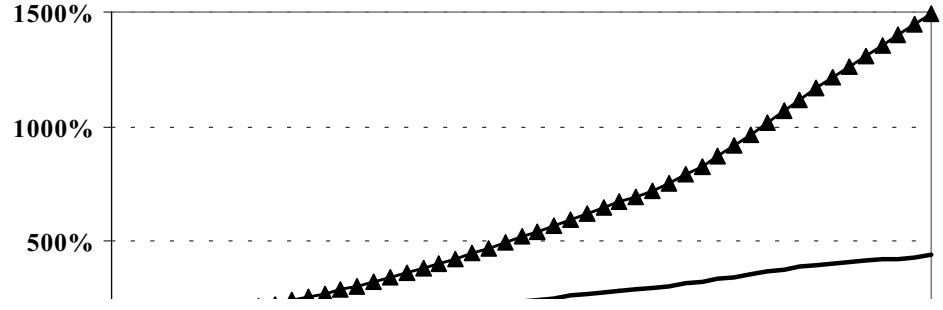
Implications of keeping PAYG pension system

Building on the macroeconomic forecast we have constructed possible performance of the PAYG social security system for the period 2002-2050. In this simulation we used shares of pensioners for each age-gender category derived from the RLMS-2001, and wage differentiation by age/gender from the same source. The planned decrease in the number of privileged pensions may modify these rates, but this effect will not change the overall conclusions. In addition it will be partially balanced by more loose minimum requirements to the employment length, though according to the RLMS data this may increase number of pensioners by only 2%. We assumed also that the same share of total pension system funds as in 2001 (6.4%) is provided by the federal budget.

It was found, first, that number of pensioners per one employee is increasing dramatically. Already high on the eve of pension reform (76% in 2001), it will start to grow, according to our projections, after 2010, will exceed 100% in 2023, and reach 158% by the year 2050 (if eligibility rules for getting pensions are not changed).

Total social security contributions in real terms were estimated and then distributed among pensioners according to the rules effective in 2001, on the eve of the pension reform. The projected trends are presented in the Chart 10.

Fig. 10. Projected Performance of the PAYG System in Real Terms (2000=100%)



Real value of average pension is projected to grow with an average rate 3.3%[4], speed of the growth gradually decreasing. Annual rate for the period 2001-2030 (for a man who is today at age 40, this covers range from the middle of his work period to the middle of his pension age) equals 4.0%, for the period 2011-2040 (which covers similar period for men who are now 30) it declines to 3.3%, and for the period 2021-2050 it amounts to 2.7%.

Trends in the average pensions are affected by three major factors, of which two are standard, and one relates to the expected elimination of structural distortions. The first one is a labour productivity, which is growing by 4.0% per year. Contribution of demographic factor is negative, as ratio of employees to aged pensioners is falling on average by 1.5% per year. Hence joint effect of these two factors would provide implicit annual rate of return of only 2.4%. But one more factor positively affects pension revenues: increase of wage bill as a proportion of GDP (both due to growing share of employees compensations and to falling weight of hidden wages). The reverse side of increased weight of wage bill in GDP is rising load of social security contributions: their ratio to GDP is increasing from 5.2% in 2001 to 7.1% in 2050. Impact of various factors to the implicit rate of return by period is presented in the Table 13.

Table 13. Impact of macroeconomic factors on growth of pension benefits

	2001-2030	2011-2040	2021-2050	2001-2050
Average pension	4.0%	3.3%	2.7%	3.3%
Labour productivity	4.6%	4.2%	3.6%	4.0%

[4] The year 2000 makes in many respects a convenient base to analyze long-term trends. But it is important to note that the government was restraining size of pension benefits in this year, the Pension Fund running substantial surplus. Canceling this surplus would raise pension benefits in 2000 by 20%. To eliminate effect of this discretionary policy we use for comparison adjusted average pension, corresponding to full use of pension contributions.

Number of employed per pensioner	-1.2%	-1.7%	-1.7%	-1.5%
Ratio of reported wage bill to GDP	1.7%	0.7%	0.7%	1.4%

Comparison of average pensions to wages and subsistence level proves that trends are quite unfavourable in this respect. Gap between pensions and average wages (which is already large by international standards) is projected to further increase, so that their ratio is falling to just 13% by 2050 (down from 32% in 2001). The real value of average pension is projected to restore to the level of 1990 only by the year 2013, and to exceed subsistence level by a factor of 2 by 2026.

Our estimates proved also, that the PAYG system would not ensure stable replacement rate in the long run. Suppose that on retirement each pensioner is granted pension equal to 55% of the pre-retirement wage for men and 60% for women, and subsequently size of all pensions is kept constant in real terms. The social security system could afford somewhat higher pensions than the level corresponding to this replacement rate in the period 2001-2015, but then anticipated revenues of the pension system fall more and more short of the amount required to keep the initial replacement rate. By the year 2050 shortage exceeds half of necessary funds. This is an additional evidence of inevitable deterioration of the social security in the future in case of keeping PAYG system.

What general conclusion can be made on the prospects of the current social security system? Its viability is evidently limited in the long run. Average pensions are expected to grow gradually, but, on the other hand, growing gap between pensions and wages, inability to keep the replacement rate, and very slow recovery of average pensions make the PAYG system unacceptable in a long run.

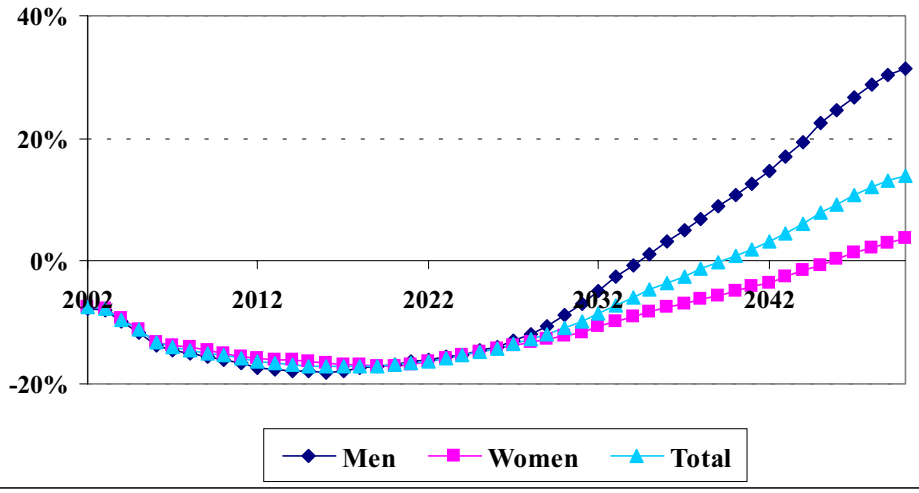
Analysis of the reformed pension system

The next step to make is analysis of the mixed social security system, which has been introduced in 2002. It is important to note that pension reform was designed as fiscal-neutral. Part of resources which otherwise would be used on a pay-as-you-go basis will be invested and used to fund future pensions, but no redistribution between resources of the social security system and other resources of the general government is not envisaged by the reform.

It is important to note that we did not suggest any impact of the reform on macroeconomic parameters, though some models predict positive impact on investment and growth (Kuznetsov, Ordin, 2002).

Our simulation assumed that payments from the funded components were distributed over the expected life period at retirement, which was derived from the demographic forecasts.

Fig. 11. Impact of reform on average pensions (% change vs. PAYG)



Superposition of the pension reform patterns, projected age composition of employees, and wage differences by age evidences, that average share of pension contributions going to the funded component will grow from 7% in 2002 to 17% in 2012, and will stabilise at 21% since 2025. No pensions will be paid from the personal accounts in the period 2002 to 2012, hence lower contributions for basic and insurance pensions imply proportional reduction of benefits for pensioners. On the other hand, beginning in 2012, additional benefits will be obtained from the funded component. Still, according to our projections, total amount of these benefits compensates for losses only after 37 years from the start of the reform.

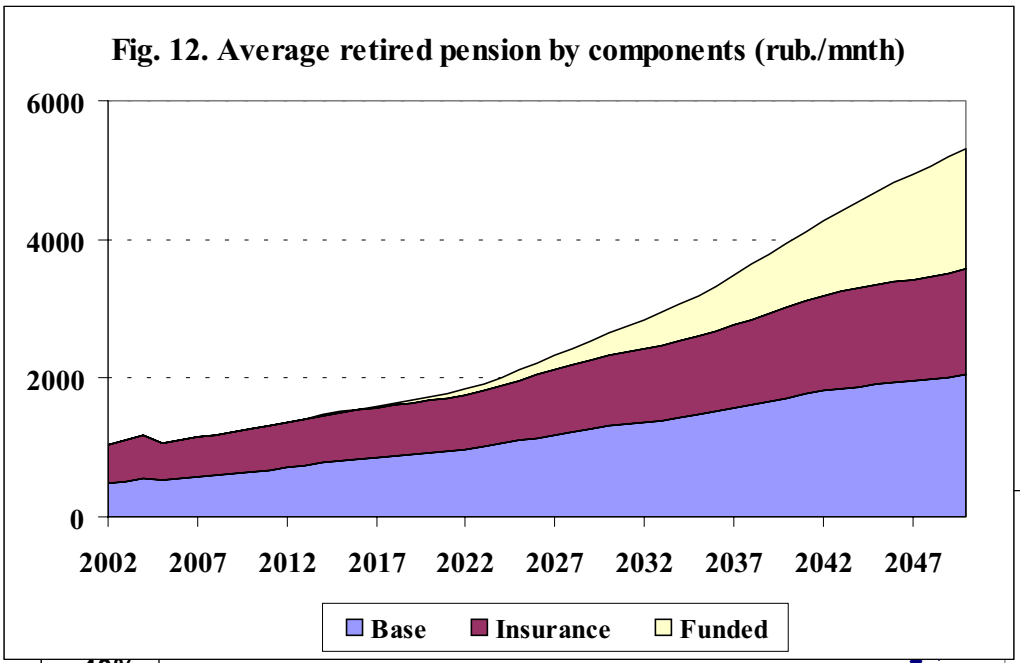
The largest negative overall impact of reform on average pension is anticipated in the period 2010 through 2024, when losses of benefits from the base and insurance components is already close to maximum, while funded pensions still play minor role. Our projection evidences, that the average pension in this period is 15-17% lower than if the PAYG system would be kept. After the year 2038 pensions obtained from the funded component of the social security system overweigh losses of the PAYG components, and advantages of the

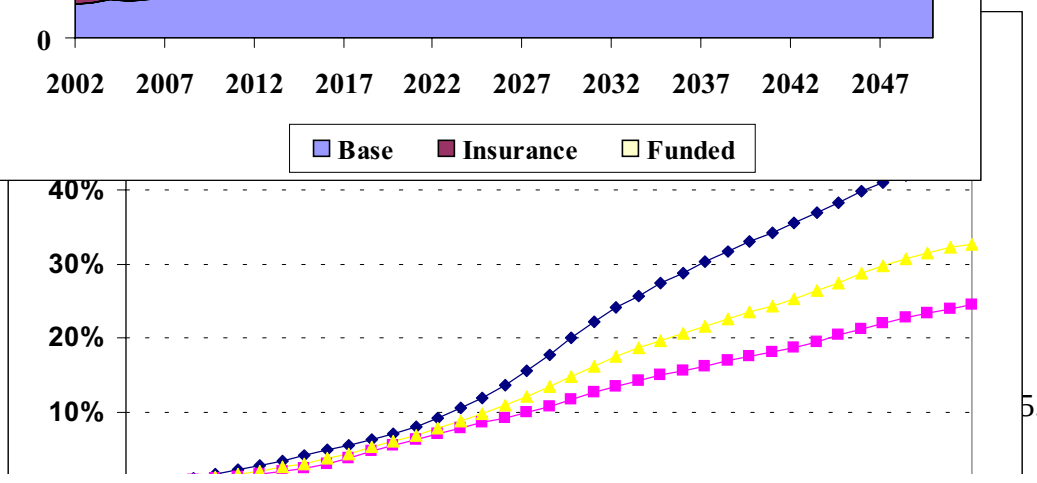
mixed system become more and more significant. Growth rate of average pensions exceeds that for the PAYG system 1.5 to 2 times at this stage. Still, the difference between size of average pension is not substantial by the year 2050: average pensions in the mixed system are expected to exceed that of the PAYG system by 14%. Annual growth rate of the average pension for the period 2001-2050 rises from 3.3% ensured by the PAYG system to 3.6% ensured by the mixed system, and this advantage is increasing with years.

Worth noting is substantial difference in these trends by gender: average pension is increasing in 50 years 7.1 times for men as compared with 5.8 times for women. The evident explanation is elimination of subsidies in the funded pillar and its downsizing in the insurance pillar. The gender gap is growing as importance of funded benefits is increasing (See Fig.12).

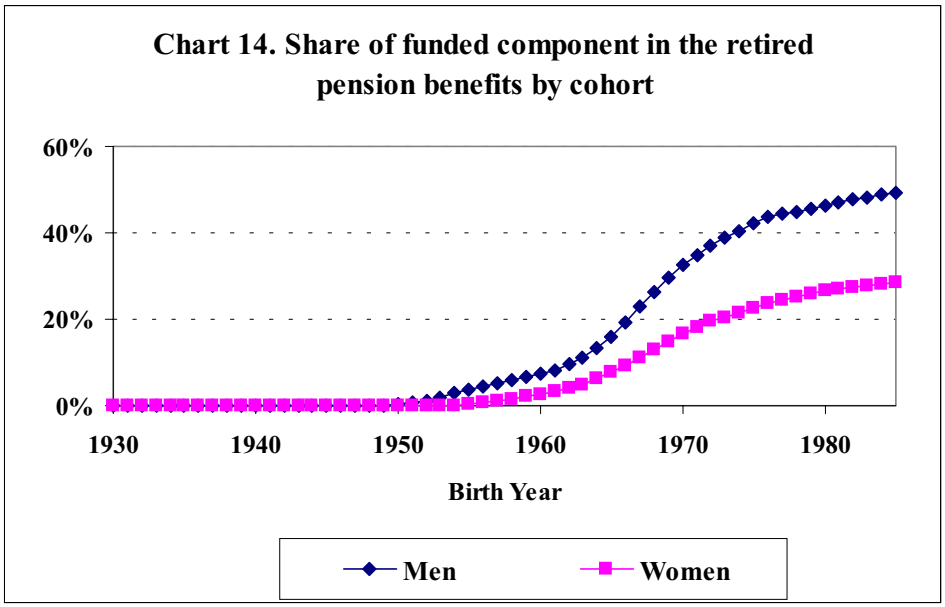
Changing rates of contributions to various components of the pension system lead to differing role of various pillars. The lowest growth rate (2.1% per year) is projected for the insurance pension. Its share in the total benefits will decline to just 29% by 2050. Base pension will grow per 3.0% per year, its share reaching 39% by 2050. As one can see at the Fig. 12 and 13, role of funded component becomes noticeable only after 2022, when its contribution exceeds 5% of total pensions received. By the year 2050 this component already accounts for third of pension benefits, and its growth rate reaches. As one could expect, this share is by far higher for men (44% in 2050) than for women (24%). Similar conclusions can be obtained if we look at the role of funded component by birth year/gender cohorts (Fig. 14).

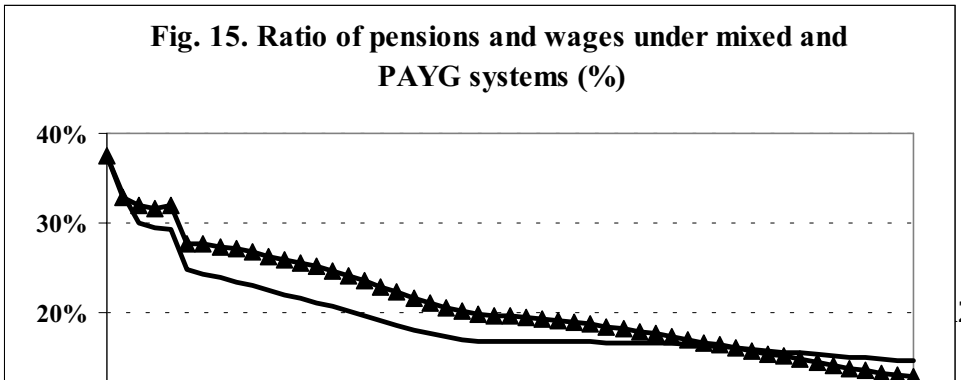
Fig. 12. Average retired pension by components (rub./mnth)





Is the gap between pensions and wages getting smaller? As one can see at the chart 15, at the first stage (covering the initial 20 years of the reform) their ratio drops even faster than in case of PAYG system. At the next stage the reformed system ensures almost stable proportion between pensions and wages, but their ratio is still quite low, standing at 15% in 2050.





We turn now to analysis of distributional impact of the pension reform. The major distributional effects include:

- Intergenerational redistribution related to introduction of the funded component. This entails also intertemporal shifts in pension size.
- Modified relationship between pensions and past wage and employment records. This may affect significantly extensive redistribution by wage level, by gender, and by region, pertinent to the pre-reform social security system.

We start with the immediate effect on the pensions for the newly retired. Their pensions consist of the base (PB), and insurance (PI) components, that are granted to all aged persons with duration of employment at least 5 years. The base pension does not depend on the past contributions, while the insurance pensions depends on the past length of employment (L), and wage level in proportion to the overall average wage (WR).

The size of the new pensions in a slightly simplified form (disregarding some special cases) can be represented as follows:

$P = PB + PI,$

$PI = Max\ [(P_0\text{-}PB)*LC, P_{min} - PB],$

$P_0 = WB * WR * r,$

$LC = \min(L/LS, 1),$

r = 0.55 if L<LS, or: r = 0.75 if L>LS+20, or: r = 0.55 + (L-LS)*0.01 otherwise.

WR equals ratio of wage of the retired W_t to the overall average wage in the same period. The retired can take as a period for calculating WR either two last years of the employment or any

straight 5 years in the past. LS is a standard employment length, equal to 25 years for men and 20 years for women, PB (base pension), P_{min} (minimum size of pension), WB (base wage) are parameters set by the government with presumption that they would be adjusted in the future with inflation and with regard to the pension fund resources.

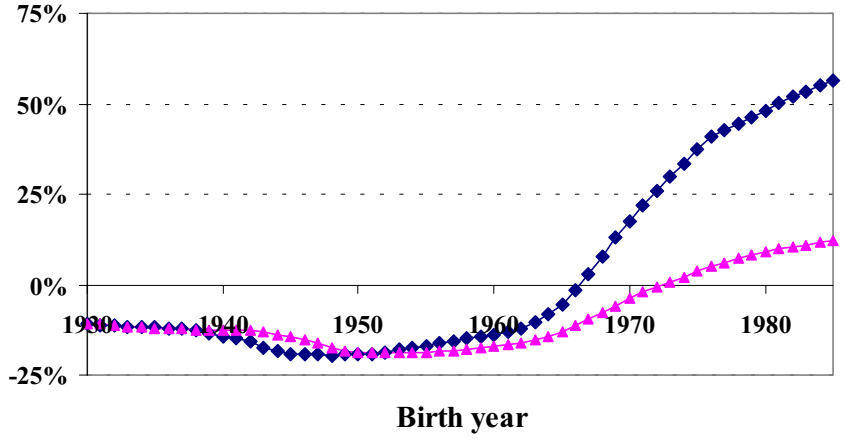
The initial size of the base pension PB and minimum pension P_{min} were set as of January 1 2002 at 36% and 53% of the average pension at that moment, and 39% and 57% of the subsistence level for pensioners.

Analysis of the rules presented above shows that, as before, pensions can vary only in a very narrow range. The highest possible pension (in a standard case) is only 2.3 times larger than the minimum pension. Next, we have simulated distribution of pensions set according to the new rules, building on the RLMS distribution of the pre-retired by wage and duration of past employment. Gini index for the calculated distribution of new pensions turned to be 0.180, i.e. remained practically unchanged as compared with the pre-reform system (when it was estimated as 0.177). Almost one third of pensioners (31%) are expected to get the minimum pension. Ratio of pensions obtained by women and men remains practically unchanged: it is estimated as 86% as compared with 84% actually observed in the RLMS. We can conclude thus, that the PAYG elements of the reformed pension system in a short run have distributional patterns very similar to that of the pre-reform system.

We turn now to discussion of other distributional aspects of the pension reform. All of them require dynamic rather than static analysis.

First, we can estimate impact of the reform on intergenerational distribution. This is done by comparing present value of total pension benefits obtained by various cohorts under the PAYG and under the reformed social security systems (only pensions for retired are taken into account in this analysis). The results for cohorts defined by gender and birth year are presented in the Fig.16.

Fig. 16. Gains/Losses in NPV from pension reform by cohort



One can see, that all cohorts of men born before 1967, and all cohorts of women born before 1973 are losers, while the subsequent generations get gains, which are increasing with birth rate. It means that generations that will not participate in the funded system, or will pay there only 2% contributions lose from the pension reform.

The largest relative losses in NPV (17-19% of NPV) are incurred by cohorts of men born in 1943-1955, and cohorts of women born in 1948-1961. This conclusion is quite expected, as corresponding cohorts will not get funded pensions (or it will be negligible), and will get less benefits from the base and insurance pillars, because part of contributions is shifted away from these pillars after reform. In other words, the major losers are the last cohorts not participating in the funded social security system, and first generations participating in it. They will not benefit from the funded component, and will get lower base and insurance pensions throughout their retirement period.

Men born after 1981, involved into the funded social security system from the start of their employment, increase NPV of their benefits from the social security system by more than half, and scale of gains is increasing by birth year. Gains obtained by women are more moderate, not exceeding 16% for generations under consideration.

We can conclude thus that pension reform incorporates substantial redistribution from the generations who are currently in the retired and pre-retired age, in favour of younger generations.

It is important, next, to examine implications of pension reform by gender. Fig. 11 and 16 above evidence, that long-term gains from the pension reforms differ much by gender, being relatively moderate for females. Gender distinctions in average pensions, which are currently insignificant, increase to almost 60% by 2050. These distinctions are related primarily to the funded component (benefits from two other components, as demonstrated above, keep similar

distributional patterns). Projected funded pensions received by males in 2050 exceed that received by females almost 3 times!

Lower benefits obtained by women from the funded component can be explained by combination of two facts. First, women accumulate less funds during their employment period, having lower wages and shorter length of employment (due to both lower participation rate and earlier retirement). Say, funds accumulated by males born in 1980 by the moment of retirement exceeded more than twice funds accumulated by females born in the same year. Second, women have much larger life expectancy at retirement (due to both younger retirement age and longer life) – hence their funded benefits are distributed over larger period. As a result, gains for females from introduction of the funded pensions overweigh their losses from lower non-funded benefits only after 2045, and their gains by the end of projection period are remaining moderate (just 4% as compared with the purely PAYG system).

This result also could be expected. Indeed, as mentioned above, PAYG system in Russia involved large-scale redistribution from men to women. In the reformed social security system PAYG components keep the same redistribution patterns, but account for decreasing share of benefits. Degree of redistribution is declining as role of funded component is growing.

Next step of our analysis included estimation of reform impact on poverty. To this end we have constructed projected incomes of each household from the RLMS-X survey. They were calculated as follows:

$R^t = W_0\, I^t + P^t + R^0\, J^t$

Where:

R^t – household incomes in the year t,

W^t – wage income in the year t,

P^t – pension income in the year t,

R^t – other incomes in the year t,

I^t – projected growth of average wage in the year t,

J^t – projected growth of GDP volume in the year t.

Pension benefits under the PAYG system were obtained as

$P^t = P^0\, K^t$,

K^t being projected growth of average pension size in the year t.

More complicated procedure was applied for the reformed system. We assumed that in a long run variation of insurance and funded pensions reflects that of wages. Current differentiation of wages is similar to that observed, say, in the USA, therefore we assumed that it may remain roughly the same in the future. Our next assumption was that current pensions reflect past contributions of pensioners, though have very 'narrow' distribution. Accordingly we supposed that for each person size of his future insurance and funded pension would correspond to the same point, in the distribution, where his current pension was lying.

Let some person is obtaining pension p1, and share of pensioners with the same or lower pension is currently equal to *b*. Then we find a point w_b in the current wage distribution, such that share *b* of employees obtain wages equal or less than w_b. Denote $r_b = w_b / w_{av.}$ ($w_{av.}$ being the average wage). Then projected insurance and funded pensions for the year t (PI^t, PF^t) are taken as:

$$PI^t = r_b \, PI^t_{av.} \, , \; PF^t = r_b \, PF^t_{av.}$$

Adding directly projected size of base pension we come to the total pension obtained by a pensioner.

Table 14 presents estimated forecasts of the poverty rates by household category. It shows that incidence of poverty in the aged households is expected to deteriorate shortly regardless of the incumbent pension system. Over the next few decades poverty rates of single aged will exceed the overall rates. The reform adversely affects living standards of pensioners over the first 3 decades after its initiation (as mentioned above our projections do not account for possible positive impact of reform on macro parameters). Living standards deteriorate substantially in all categories of aged, with the greatest impact on single aged. Their poverty rates become by far higher than the overall rates by the year 2030. After this point pensioners are gaining from the reform, and poverty in aged families practically comes to zero.

Table 14. Projected poverty rates under PAYG and reformed pension systems (%)

Household category	Pension system	Year					
		2001	**2010**	**2020**	**2030**	**2040**	**2050**
1	PAYG	21.4	13.7	8.1	5.1	2.7	1.9
	Reformed		20.7	12.2	6.3	1.1	0.4
2	PAYG	33.3	22.2	13.0	7.4	3.7	3.7
	Reformed		27.8	22.2	9.3	1.9	0.0

3	PAYG	23.7	21.6	14.0	10.6	6.7	5.5
	Reformed		24.6	17.9	10.6	4.0	1.5
4	PAYG	46.5	22.6	10.8	5.6	3.6	2.3
	Reformed		26.5	11.5	5.5	2.8	1.5
5	PAYG	43.6	17.9	7.9	4.5	2.8	2.1
	Reformed		17.9	7.9	4.5	2.8	2.1
All	PAYG	41.4	19.0	9.0	5.2	3.2	2.3
	Reformed		20.7	9.8	5.3	2.7	1.7

To summarise, our analysis evidences, that the current social security system in Russia badly needs modification, not being able to ensure acceptable level of pensions in a long run. The suggested mixed system may improve projected performance of the social security after a transition period. We have found, that the reformed pension system allows to stabilize ratio pension/wage, and enhances relationship between pensions and past pension contributions, increasing labour incentives. This proves efficiency of transition to a funded social security system.

Estimated costs of transition to the mixed system can be characterised as rather high. It is desirable to take some measures to restrain losses for the most vulnerable cohorts.

We have found, that the reform does not fully resolve some important problems. First, gap between pensions and wages remains too large, and replacement rate – too low. Next, difference of pension magnitude by gender is expanding.

Our analysis evidences that realization of the pension reform makes its logic by far less clear than one could think judging by the overall approach. At the first glance, there is clear distinction of functions by component of the reformed pension system: base pension should ensure minimum guaranteed level of benefits, insurance component provides moderate dependence of benefits on the past contributions within PAYG mechanisms, and funded component is fully linked to the personal contributions and provides higher return. But actually the current level of the base pension is too low to ensure socially acceptable guaranteed benefits: its size may reach the subsistence level only by the year 2020. As a result minimal living standard is ensured with setting minimum pension, i.e. is divided between the base and insurance components. But this makes weaker dependence of pension benefits on past contributions. Funded component carries the major role of creating labour incentives by linking personal efforts with future benefits. But this effect is undermined with its ‘virtual’ nature, as the first benefits from this component are to be obtained only in 10 years.

In other words, additional measures may be required to improve social security. They may include:

1. *Raising age of retirement* (which is low by international standards),
2. *Raising contribution of women to the funded system*,
3. *Increasing in future share of contributions to the funded component* (at the cost of other components).

Raising retirement age increases GDP growth rates due to higher labour supply, and improves performance of both PAYG and funded components of the pension system.

The most straightforward way to prevent critical deterioration of benefits received by women would be raising their retirement age to that of men (i.e. 60 years if the latter is kept constant, or even to 62 years, if retirement age is raised for men too). According to our estimates this may increase pension benefits for women by 20 to 25% (due to larger accumulated funds at retirement and shorter retirement duration). The reverse side for women is that in this case they would enjoy less redistribution within the PAYG components of the social security. Still, there is no alternative to raising retirement age for women.

An alternative approach to amelioration of social security system would be cutting number of pensioners by applying more strict eligibility rules. The most straightforward way to do this could be prohibiting pension benefits for employed (as mentioned above, the latter account for about one sixth of pensioners). Our analysis evidences, that this measure would not affect significantly living standards of aged and their labour supply. Suppose that pensioners had to choose between pensions and work – we can assume that they choose the larger of the two sources of income. Working pensioners bear then substantial losses (848 Rub./month, or 25% of their total wage and pension income), but this does not noticeably increase poverty, as losses are born by group with relatively high income: total wage and pension income of working pensioners exceeds more than twice (by 113%) this indicator for all retired. On the other hand, a larger share of working aged (79%) would continue working as their wage incomes exceed pensions.

More fundamental modifications may be discussed in relation to the role of insurance component. As share of the funded pension benefits will grow, specific functions of the insurance component will become vague. Our view is that at least since the moment when

funded benefits reach the size of insurance benefits (our forecasts evidence, that this may happen in some 35 years from the start of reform), funded component may more and more take function of linking pension with labour records, while base pensions will be large enough to ensure minimum guaranteed benefits. Break-down of pension contributions may be shifted since that time from the insurance to the funded component, possibly with gradual decrease of the total rate. By the end of the period under consideration the state social security system may have only two components instead of the current three.

Our view is that pension system needs amendments at the further stages. The base pension may reach the level of the current minimum wage (in real terms) in just 3 years. It makes sense to combine since that time base and minimum pensions. At the same time limitations on past wages reflected in the pension should be loosened (the ceiling may be raised, say, from 120% to 200%).

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