

PENSION REFORM IN RUSSIA:
Design and Implementation

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PENSION REFORM IN RUSSIA: Design and Implementation

I. Introduction and Summary

1. Introduction

1. The recent pension reform introducing a multi-pillar pension system signals a major shift in pension provision in Russia, from a defined benefit pension scheme to a defined contribution pension system. The defined contribution system is comprised of (i) a notional defined contribution (NDC) pay-as-you-go pension scheme, (ii) a mandatory funded second pillar, and (iii) a basic benefit that will meet the distributional objectives of the pension system. The funded part of the Russian pension system has, at least initially, the structure of a provident fund with external asset managers (that is, workers will not have a choice of managers), and is operated by the Pension Fund of Russia (PFR).

2. This shift to a multi-pillar pension system has also occurred in several transition countries, including Poland, Hungary, and Croatia, as well as in many Latin American and in some OECD countries, including Italy and Sweden. Some of these countries, including Poland, Latvia, Italy and Sweden have adopted an NDC scheme as the first pillar of their pension system.

3. The reform intends to address several problems found in the old pension system: (i) very complex and overlapping benefit formulas and generous eligibility conditions, including early retirement for many occupations, (ii) mixed distribution/insurance/savings objectives in the benefit formula which, combined with a high tax rate of 28 percent of wages, reduced incentives for individuals to contribute to the system, distorted labor markets, and increased incentives to retire early, and (iii) growing financial burden from a declining number of contributors and increasing number of pensioners, a result of increasing layoffs, tax avoidance, growing unemployment, and the aging of the population.

4. The first objective of the reform is to reduce the complexity of the pension system through a simple benefit formula and transparent eligibility conditions. The second objective of the reform is to increase an individual's incentives to contribute and work longer in order to improve the fiscal solvency of the pension system. Finally, the objective of the funded scheme is to increase the pension benefit, while deepening capital markets and promoting economic growth.

5. This paper reviews the new Russian pension system and finds that it faces four main risks in achieving these objectives: adverse incentives in the design of the pension system, fiscal insolvency, mismanagement of pension assets, and weak administrative capacity for implementing the reform. The paper concludes that overcoming these risks is critical for successful implementation of the reform program and provides policy options for reducing these risks.

6. This paper is organized in four sections according to the four main risks faced by the pension system: Section II evaluates the design of the pension system; Section III discusses the fiscal implications of pension reform; Section IV addresses the financial market requirements for the funded pillar and the final section, and Section

V, discusses the administrative challenges facing the pension system. The main results and recommendations of the note are summarized in this section (Section I). Three annexes accompany the paper: a description of the previous pension system (Annex I); the simulation results (Annex II); and a description of the model used for forecasting the fiscal impact of the reform (Annex III).

2. The Main Risks Facing Pension Reform

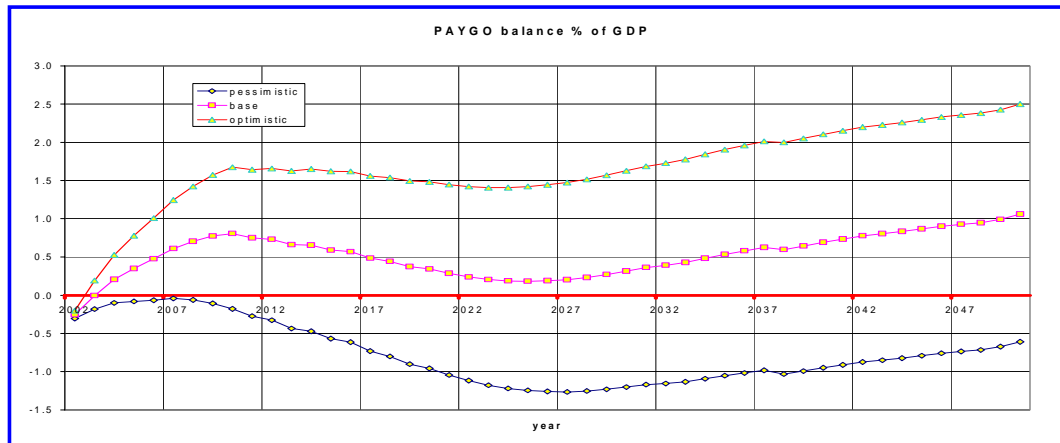
A. The Design of the System

7. The design of the *first* pillar poses significant challenges for achieving the efficiency objectives of the pension reform. Many features of NDC reforms that increase a worker's incentives to contribute to the scheme and work longer and therefore also reduce the fiscal costs of the pension system have not been adopted in Russia. Unlike standard NDC schemes, in Russia's NDC scheme: (i) the pension benefit does not reflect actual life expectancy and the retirement age (55 for women and 60 for men) is unchanged, (ii) the notional rate of return is very low and contributions continue to have a very large tax element, and (iii) the recognition of acquired rights does not create incentives for continuing to contribute to the system.

8. The successful implementation of the *second pillar* chosen by Russia also faces considerable risks. First, the provident fund type model adopted by Russia requires the key implementation agency of the reform, the Pension Fund of Russia, to have adequate governance and to be fully transparent and accountable to the public, so that safekeeping of pension assets can be ensured. Transparency, governance, and accountability are particularly important in the management of individual accounts and the selection of asset managers. Second, the use of the provident fund model may also compromise the objective of the Government to provide higher pensions through the second pillar. International evidence suggests that the returns to pension assets provided by this system tend to be much poorer than a 'worker choice' system in which there is greater contestability in the market for management of pension assets. While lower returns are often justified because of lower administrative costs of a provident fund type model relative to a worker choice based second pillar, international evidence suggests that administrative costs of the former model are not always lower in practice.

9. Finally, most provident type models also invest heavily in public bonds. This is a good 'holding' strategy until financial markets develop, particularly for countries which have well functioning Government securities markets. However, if continued indefinitely—as is often the case—this strategy tends to create Government dependency on these funds and lower yields, undermining the risk diversification and capital market development objectives of the reform. Russian law allows workers, over time, to shift the management of their assets and accounts to the private sector, providing competition for the management of the funds. However, this poses yet

Figure 1a. Pension System (NDC+ Basic) under Three Macro-Economic Scenarios (as % of GDP)



Source: Pomazkin/Martineau (2002)¹

another challenge. Shifting fund and account management to the private sector, and particularly to the non-state pension funds, will require financial safeguards (see below) not currently present in Russia. Thus, the provident fund model chosen for the second pillar and the weakness of financial and capital markets pose serious risks for the successful implementation of the second pillar in Russia.

B. Fiscal Sustainability

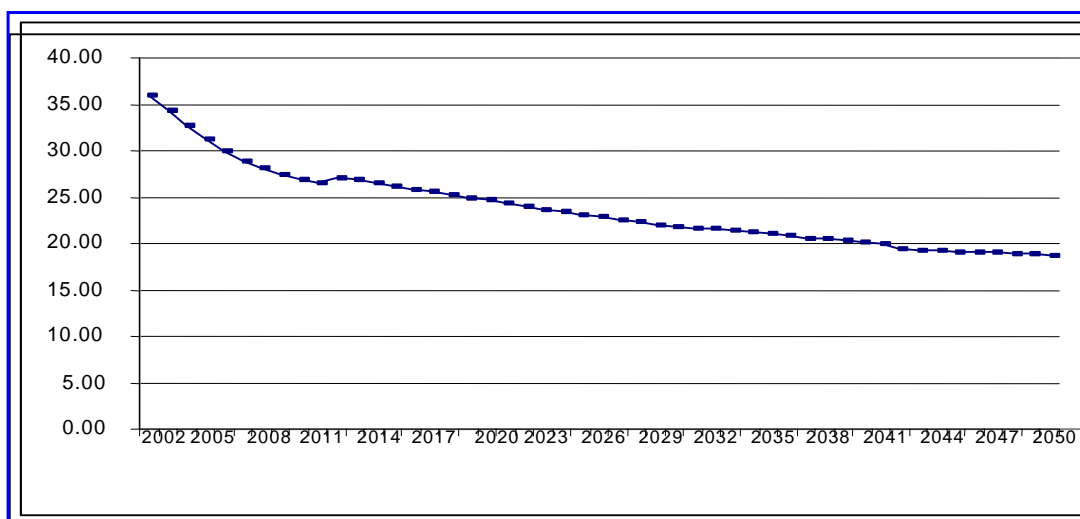
10. The fiscal sustainability of the pension system was assessed using a pension financing forecasting model and three macro-economic scenarios: the base case, pessimistic and optimistic. The scenarios differ according to their assumptions about productivity growth, inflation and rates of return on the funded accounts, as well as labor force participation rates and unemployment rates. The basic forecast includes moderate macro-economic forecasts for these variables, while the optimistic and pessimistic forecasts represent more favorable, and less favorable macro-economic developments than the base case.

11. These scenarios show that the pension reform is fiscally sustainable with the base/optimistic economic assumptions and even generates some surpluses under these two scenarios. In the base case, after a short deficit period, the surplus grows to over 1 percent of GDP in the outer years of the projection period (Figure 1a). However, there are three caveats to the fiscal sustainability of the pension reform.

- *The overall fiscal sustainability of the reform will be jeopardized if economic and productivity growth falter, as in the pessimistic scenario.* In this case, the pay-as-you-go system will be continuously in deficit and significant fiscal transfers will be required to balance the system.
- *The overall fiscal sustainability of the pension system occurs only if the surpluses of the basic benefit scheme are used to finance the deficits of the NDC scheme.* While the basic benefit scheme realizes surpluses over entire projection period, reaching 2

¹ Fiscal projections were undertaken based on a pension system forecasting model developed by Dmitri Pomazkin (2002) with the assistance of Jean Noel Martineau. The full description of the model and results are attached as Annex 2.

Figure 2a Full system Replacement Rate (Base Case Scenario) (% of average wage)



Source: Pomazkin/Martineau (2002)

percent of GDP in the base case at the end of the projection period, the NDC scheme is projected to realize deficits over the same period (reaching almost 1 percent of GDP at the end of the projection period). The surplus of the basic benefit scheme occurs because the price indexation of the basic benefit further drives down basic pension expenditures relative to revenue. The deficits of the NDC reflect two factors: the generous initial notional capital provided to all workers who switch to the NDC scheme; and the decline in the Russian population. If the surpluses of the basic scheme are used by the Government to finance higher pension benefits or other expenditures, then the fiscal sustainability of the pension system will be jeopardized

- *The fiscal solvency of the Russian pension system under the base case and optimistic scenarios is achieved through falling pension replacement rates (the ratio of average pensions to average wages).² Under base case macro-economic assumptions, the overall system replacement rate falls from 36 percent to 24 percent in 2012, and further to 19 percent at the end of the projection period (Figure 2a). (In OECD systems, pension system replacement rates vary, ranging from 35 percent (U.S) to 49 percent (Finland).) The fall in the basic scheme replacement rate occurs because the basic benefit is a fixed amount indexed by price growth, and therefore grows more slowly than wages. Falling replacement rates in the NDC scheme are the result of the low notional yield on worker's accumulations in the scheme and price indexation of the benefit, both of which contribute to a benefit growth that is slower than wage growth. The declining replacement rates in the pension system may pose a significant political problem for the Government over time. The political pressure will likely be higher under the base case/optimistic scenarios because of the rising surpluses in the basic scheme.*

12. How can replacement rates be increased? Replacement rates could be increased to more acceptable levels without compromising fiscal solvency if the actual life expectancy at retirement is included in the NDC formula and the retirement age of workers is increased over time. If retirement ages were gradually increased in Russia,

² The replacement rate calculated in this study is the ratio of the average pension to the average wage. Replacement rates can also be calculated as the average pension of a cohort divided by the average wage of that cohort at retirement. The direction of the results is not changed if the latter measure is used, but the replacement rate is a little higher.

the dependency ratio would fall, and the replacement rate could rise to approximately 34 percent.³ Retirement ages in Russia are much lower relative to OECD norms and even relative to reforming transition countries such as Hungary (62/62, for men and women respectively), Bulgaria (60/65) and Poland (60/63). Life expectancy at retirement age for the Russian population is not very different than that found in other transition countries that have undertaken pension reform.⁴ Thus, raising retirement ages and reflecting actual life expectancy in the NDC formula would help increase replacement rates of the pension system.

C. Financial Market Requirements

13. The successful implementation of the second pillar depends on three factors: (i) the ability of financial and capital markets to productively absorb the flow of funds from the second pillar, (ii) the ability of individuals to obtain a reasonable rate of return in the second pillar, and (iii) the safekeeping of pension assets. Achieving these goals requires macro economic-stability and the initiation of a long term reform of capital and financial markets. It also requires a core set of solvent banks and licensed custodians; an adequate government debt management strategy (because managers initially will be heavily invested in bonds) and some basic elements of financial infrastructure and corporate governance (correct valuation of assets, reliable information about participating institutions, and protection of minority stakeholders).

14. While Russia has achieved a measure of macro-economic stability, its financial and capital market infrastructure is still weak. The core financial market requirements to launch and maintain a successful multi-pillar pension reform are mostly absent. The Government's ability to guarantee a reasonable return on individual savings, and adequate safeguards for private sector management of pension assets are therefore very limited. The successful implementation of the second pillar will require a large number of reforms in financial and capital markets in Russia. These reforms will also need to include the development of an effective supervisory agency for pension funds.

15. Most countries under-going pension reform have circumvented financial sector weaknesses, including the limited capacity of the financial sector to absorb second pillar assets, by initially restricting investments to mostly Government securities, until core financial market conditions are in place. In Russia, the slow pace of reform, the proposed limits on private sector participation, and investment of pension assets in bonds issued by the public sector means that the absorptive capacity of financial markets is not an immediate concern. However, unlike other countries undergoing pension reforms, a well functioning Government securities market is not in place in Russia to circumvent financial market weaknesses.

³ Raising the effective tax rate or the number of contributors is not likely to have a major impact on the financial conditions of the pension system.

⁴ The low life expectancy of the population in Russia is often cited as one reason for Russia not to increase its retirement age, but life expectancy at age 60 for men and women respectively in Russia (14/19) is not much lower than that found in other transition countries, where retirement ages have been increased to improve the fiscal solvency of the pension system. For example, the life expectancy at 60 for men and women respectively is 16/20 in Hungary 17/21 in Poland; 15/21 in Latvia, and 15/19 in Bulgaria.

16. An alternate strategy to circumvent financial and securities market constraints is to invest part of the pension assets abroad. This strategy is being followed in Russia. The Duma has recently agreed that an increasing share of pension assets (up to 20 percent) can be invested abroad. However, to circumvent constraints in Government securities and financial markets, limits on foreign investments should be much less restrictive than currently proposed by law.

D. Limited Administrative Capacity

17. The final, and perhaps most immediate challenge, to the reform program is ensuring that the administrative capacity of the country is sufficient to implement the reform. The reform poses three basic challenges for administration of the pension system. First, tracking each worker's lifetime contributions to the system and the returns on the accumulated contributions will require the Russian Pension Fund to maintain much more information on the work history of each individual worker and to maintain that information for a much longer period of time than under the old system. Second, the introduction of the funded component will require the agencies handling contribution collection and pension payment to become more accountable to the Russian people for their financial actions.

18. Finally, dividing the responsibility for contribution collection and data management complicates the reform by requiring effective collaboration on a continuous basis of two independent agencies of government in order to reconcile data and financial flows, a difficult challenge for any government under any circumstances. Linking these two data sets is particularly important in the new system, under which workers are not to be credited for deposits to their individual funded account unless their contributions are actually transferred to the pension fund.

3. The Way Forward

19. The challenges and risks to the successful implementation of Russia's pension reform means that policy makers will need to pay attention to the following issues:

A. Improving Incentives and Distributive effects

- *Tightening the link between contributions and benefits in the NDC scheme.* The current valorization of pension accumulations (price, or even less) and indexation of benefits in the NDC scheme creates a large tax wedge between what individuals contribute and what they obtain at pension age. This wedge, together with a generous recognition of notional capital, reduces incentives to contribute to the NDC scheme. A closer link between contributions and benefits through an adequate notional yield, the use of the actual life expectancy and an increase in the retirement age will improve incentives in the system and allow benefits to be increased without compromising fiscal solvency and would allow a reduction in this tax wedge.
- *Improving the transparency and accountability of the provident fund model.* This can be achieved by (i) asking PFR to charge a reasonable and transparent fee for asset management functions, (ii) contracting out the asset management of the second pillar to an international asset manager through international competitive bidding, and (iii) ensuring adequate and regular over-sight of PFR functions in managing individual accounts and handling of second pillar assets.

- *Ensuring that adequate budget is set aside to index pensions.* Maintaining the real value of both basic and NDC pensions that is encoded in the law should be observed in practice to prevent poverty among pensioners.

B. Ensuring Fiscal Sustainability

- *Fiscal sustainability of the overall pension system can be achieved at reasonable replacement rates if* (i) actual macro-economic performance achieves the levels of the base case of favorable scenarios; (ii) The Government transfers budgetary resources to cover the deficits of the NDC scheme and (iii) the retirement ages are increased and if, the actual life expectancy at retirement is used in the NDC benefit formula. Alternatives such as increases in payroll taxes, improvements in compliance, and improvements in fertility rates are not sustainable or realistic in the medium term.
- *Ensure that sufficient resources are set aside to maintain real value of pensions.* The basic schemes will maintain the real value of pensions if adequate resources are included in the budget to ensure price indexation of benefit.
- *Coping with high payroll taxes is a remaining problem.* Ensuring that contributions are more strongly linked to benefits in the pay-as-you-go system will help to alleviate some of the distorting effects of high payroll tax rates.

C. Ensuring Sound Investment, Management, and Safe-Keeping of Pension Assets

- *Ensuring the volume of bond holding is consistent with the overall government debt management strategy.* Of primary importance, given that pension assets are initially being held in government securities, is ensuring that the increasing volume of bond holdings by the Pension Fund of Russia is consistent with the overall government debt management strategy. The Government should also ensure that bonds purchased with pension monies pay market interest rates. Special pension fund bonds should not be issued at below market rates of interest. Effective over-sight of the Pension Fund of Russia in its management of pension fund assets and accounts should be introduced.
- *Increasing the limits on foreign investment of pension assets.* Given that Government securities markets are weak, one option for Government is to make the limits on foreign investment of pension assets far less restrictive and to increase that share faster than proposed by law.
- *Ensuring that core financial conditions are in place.* Before private pension funds are allowed to manage pension fund assets, it is very important that Russia should have the following conditions in place: (i) continued macro-economic stability; (ii) a core set of solvent banks; (iii) a core group of licensed custodians; (iv) stringent entry requirements for private asset managers to participate in the management of second pillar assets; (v) effective supervision of private-sector management of funds and accounts; and (vi) basic financial infrastructure and corporate governance (correct valuation of assets, reliable information about participating institutions, and the protection of minority stakeholders).
- *Strengthening financial and capital markets.* It is necessary to design and implement a long term strategy for developing and strengthening financial and capital markets to complement the pension reform.

D. Improving Administrative Capacity

- *Creating an accurate, integrated, national database for tracking the pension credits and accounts of individual workers.* This requires (i) developing the software modifications needed to adjust the Pension Fund's current earnings record system, (ii) overcoming telecommunications and other barriers to making the system a national system, (iii) increasing the processing and storage capacity of the Pension Fund's information systems, and (iv) developing and implementing operating procedures at both the Pension Fund and the Tax Ministry that will assure accurate and efficient operations.
- *Developing a modern financial management system.* This system is important for (i) tracking the movement of funds through the pension and tax system, (ii) generating reports on the financial condition of the pension system and audits of annual financial statements, (ii) ensuring the accuracy of accounting and internal control systems to manage funds and generate accounting statements and (iii) covering the fiscal operation of the pension system, including collection, investment function, and payment.
- *Instituting regular issuance to each individual worker of an annual statement.* An annual statement showing pension contributions credited to the worker in that year and the current balance in the worker's funded account is important for improving accountability and increasing the transparency of the pension system.
- *Strengthening of the payment functions of the Pension Fund.* The PFR must undertake successful upgrades of its staff skills and equipment and conclude, with all regional governments, all agreements necessary to meet its new payment functions.
- *Improving the coordination of collections of data and contributions.* Ensuring coordination of functions among the Treasury, the Tax Authority and the Pension Fund on the collection of data and funds, and instituting procedures for reconciliation of differences in data and fund flows in the two agencies are key factors for improvement.
- *Developing an implementation plan.* According to international evidence, from Sweden and Poland, indicates that the successful implementation of a reform as complex as the Russian pension reform requires the development of an implementation plan which would allow good planning, effective coordination, and realistic implementation timeframes.

II. The Design of the New Pension System

1. The pension reform has changed the basic parameters of the pay-as-you-go pension system, from a defined benefit scheme to a defined contribution system. The eligibility conditions and benefit structure of the pay-as-you-go system has changed, a funded system has been introduced, a new occupational scheme is being created, and a new role for private pensions (or non-state pension funds--NPFs) has emerged. This section describes these changes, highlights their incentive impact and their new regulatory and supervisory requirements, and compares them to pension systems in other transition countries.

1. Eligibility Conditions

2. All individuals will now be covered by the new multi-pillar system. The only exception is workers over 50 years of age, who will not be allowed to participate in the funded system.

3. Eligible workers will still pay 28 percent of their payroll toward their future pensions.⁵ Of this, 14 percent of their contributions will finance the basic system. The remaining 14 percent will be divided between the funded system and the NDC system, with the shares depending on the age of the worker, with the shares changing over time. Individuals 35 years or younger will initially contribute 3 percent of their salaries to the funded system (11 percent to NDC) increasing to 6 percent (8 percent to NDC), while those between 35 and 50 will contribute only 2 percent (12 percent to NDC). The small share of contribution to the funded pillar will mean a more gradual growth of contributions in the funded system.

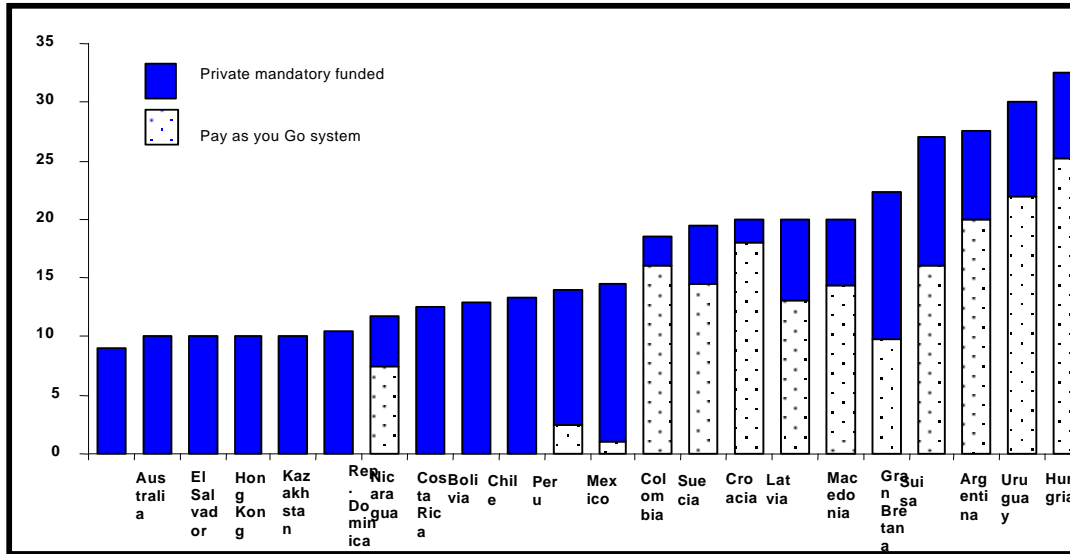
Table 1: Features of Multi-Pillar Proposals in Selected Transition Economies

	Starting date	First pillar	Projected pension fund assets in 2020(% GDP)	Workforce in funded pillar (2000)	Switching strategy
Hungary	January 1998	PAYG DB	31%	45%	Mandatory new entrants Voluntary others
Poland	January 1999	NDC	33%	70%	Mandatory < 30, Voluntary 30-50
Kazakhstan	January 1998	Guaranteed minimum	30%	100%	Mandatory for all workers
Latvia	July 2001 (NDC January 1996)	NDC	20%	72%	Mandatory < 30, Voluntary 30-50
Croatia	January 2002	PAYG DB	25-30%	60-70%	Mandatory <40, Voluntary 40-50

Source: The authors, an expanded and updated version of the table in Palacios, Rutkowski, and Yu (1999).

⁵ The contribution rate is capped at RB41,560 per worker per year, limiting the progressivity of the system. ⁵The new law has broadened the list of periods during which an individual is not making contributions, but which will nevertheless be included in the contribution periods for their pension.

Figure 1. Contribution Rates for Public and Private Pension Schemes in 24 Countries with Mandated Private Pension Schemes (%)



Source: Robert Palacios; Note: the contribution rates above are for publicly managed systems, dark for publicly mandated second pillar and spotted for the first, or pay-as-you-go, pillar.

4. In other countries that have introduced funded individual accounts, the size of the mandatory second pillar varies, but most countries have chosen to redirect a much more substantial part of the contributions to the new accounts than does Russia (see Figure 1). In general, funded systems in which workers have a choice of asset managers have fixed costs that make going below a 4 to 6 percent contribution rate cost-ineffective. In Russia, the initial lack of worker choice may reduce costs, making the gradual increase in contributions cost effective.

5. The age cohort that is mandated to participate in the system also varies across countries (see Table 1). However, unlike Russia, the mandatory participation of age cohorts in these other countries is often much more restricted, for instance to younger workers, in order to manage the fiscal costs of the transition.

6. The age at retirement in Russia has not changed as a result of the reform. It remains age 55 for women and 60 for men. In contrast, most countries that reform their pension systems have increased the retirement age to improve the fiscal solvency of the system. In Latvia, Croatia, Hungary, and Poland, retirement ages are being gradually increased, often by half a year every year, to 62/62 in Hungary, 60/65 in Bulgaria, and 60/63 in Poland. In addition, in some of these countries, such as Poland, the effective retirement age is also being increased through a phase-out of early retirement options.

7. *Why not raise the retirement age?* The reason for not changing the retirement age given by the reformers is the political difficulty of taking this action in Russia. However, it should be noted that increasing retirement ages was politically difficult in all countries that underwent pension reform. It was eventually overcome by very gradual increases in retirement ages (usually half a year every year); by grandfathering existing workers, or, as in the case of Latvia (see below) through workers realizing that pension benefits would be very low unless retirement was delayed.

8. Another reason often advanced for the continuation of low retirement age in Russia is the low life expectancy of its population. However, the life expectancy at age 60 for men and women respectively in Russia (14/19) is not much lower than that found in other transition countries. For example, the life expectancy at 60 for men and women respectively is 16/20 in Hungary, 17/21 in Poland, 15/21 in Latvia, and 15/19 in Bulgaria.

9. *Early retirement pensions.* The right to early retirement pensions for specified categories of workers continues in the new system. The law envisages 15 categories of workers eligible for early retirement pensions if they worked on specific listed jobs for not less than half of a required period as of January, 1, 2003. The right to early retirement pensions is also preserved for about 13 categories of individuals who were eligible under pre-reform legislation for the so called length-of-service pensions. (Among these categories are mothers having five or more children, workers in the North, teachers, and health service personnel). The continued eligibility of these categories will raise fiscal costs. However, the reformed pension system will now mitigate this cost by providing a lower benefit to individuals who retire early (see below).

10. *Minimum contribution periods.* The minimum contribution periods are now much reduced: a minimum of five contribution years is required to become eligible for benefit (and minimum benefit), as compared to 20/25 years required for women and men respectively under the old system. However, as noted above, now the level of benefit received will also be commensurately lower if an individual retires earlier (see discussion on benefit structure below).

2. Benefit Structure

11. The benefits in the new system will be derived from the two main pillars of the pension system: pay as you go and funded. (Box 1)

The Pay-As-You-Go System

12. The pay-as-you-go benefit is composed of the notional defined contribution benefit (from the NDC scheme), and the flat benefit, from the basic benefit scheme. The pay-as-you-go benefit is subject to a minimum. If an individual's total pension (basic + NDC) is lower than RB660, the pension will be topped up after retirement. Of this amount, RB450 will represent the basic pension, and will be indexed according to the rate of increase of the basic benefit. The remainder, or NDC, part of

Box 1. Pension Benefit in Russia

The pension benefit is specified in the formula below.

$$P = BP + PC/T + FP$$

In the first half of 2001

BP = 450rbl.

P (average) = 1210 Rubles

P >= 660 rubles, the minimum pension

P - pension, in rubles;

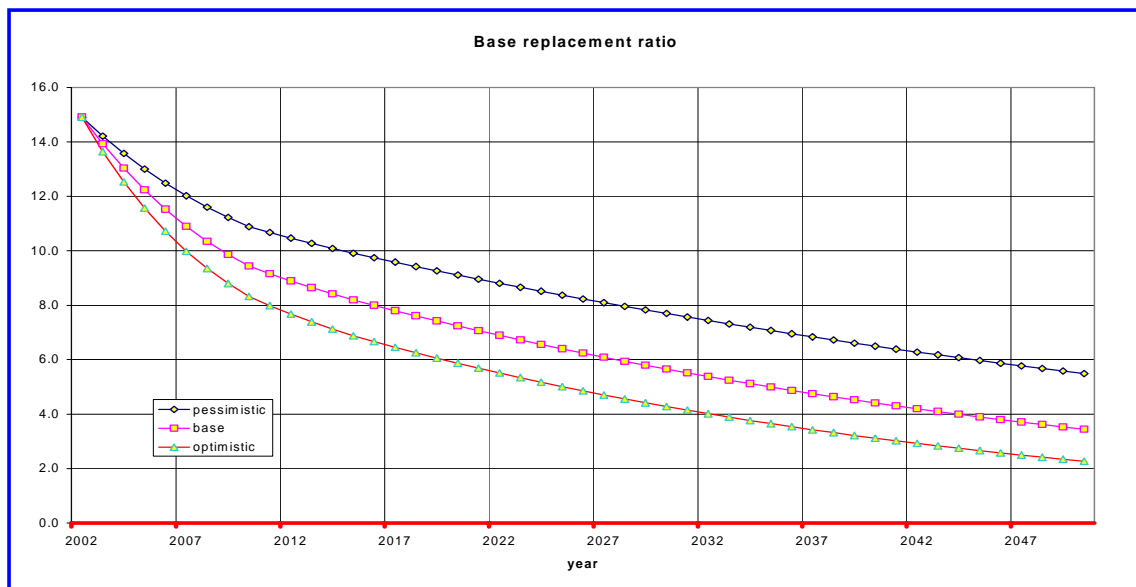
PC - pension capital, in rubles;

BP - basic part of pension, in rubles.

an individual's pension will be indexed to the rate of increase of the NDC pension. The supplement, or top up, will not be indexed.⁶

13. *The basic benefit.* The flat basic benefit represents the redistributive part of the pension system. It is currently set at RB450 for all workers, but there are exceptions. For example, the flat benefit is higher for disabled individuals of 80 years or older (the highest possible established basic pension is RB1350). The basic benefit will be indexed to changes in price, to be determined by the government depending on the fiscal situation.

Figure 2. Basic Scheme Replacement Rate



Source: Pomazkin/Martineau (2002).

⁶ Individuals with five contribution years will therefore be eligible for this minimum benefit, but its value will decline over time.

14. *The basic benefit replacement rate.* The replacement rate of the basic benefit will steadily fall over time, from the current 14.5 percent to 8 to 10 percent in the next ten years, and so on, to between 2 and 6 percent over the next 50 years (depending on the macroeconomic scenario used—see below). The decline in benefit is the result of the indexation of the base benefit to price growth (Figure 2).

15. The decline in the replacement rate will reduce individual incentives to contribute to the basic benefit system, as the benefit is mainly redistributive. However, the price indexation of the basic benefit to price will allow pensioners to protect their benefit against erosion by inflation, provided that adequate provisions are made in the budget for inflation adjustment of basic pensions.

16. *The NDC Benefit.* Many features of NDC pension benefit that increase a worker's incentives to contribute to the scheme and work and therefore also reduce the fiscal costs of the pension system have not been adopted in Russia. Unlike standard NDC schemes, in Russia's NDC scheme the pension benefit does not reflect actual life expectancy and the retirement age (55 for women and 60 for men) is unchanged; the notional rate of return is very low and contributions continue to have a very large tax element; and the recognition of previously acquired rights does not create incentives for continuing to contribute to the system. We discuss each of these features in turn.

17. *Life expectancy at retirement.* The NDC pension benefit is equal to the total individual accumulations (based on payroll contributions) at the time of retirement, PC, divided by a constant, T. T is initially set at 12 years and will increase to 19 years over time. The value of T has a minimum: it cannot fall below 14 years. In standard NDC systems (see Box 2), such as Poland and Latvia, T is a *variable* (with no minimum threshold) that equals the average unisex life expectancy at retirement. Using the actual life expectancy at retirement allows the NDC scheme to pass the longevity risks to workers, reducing the fiscal costs. Also, in contrast to Russia, most countries do not have a minimum for T because this reduces an individual's incentive to work longer. Working longer reduces T (and increases PC), and thereby raises the pension benefit.

18. The current value of T established in Russia is well short of the current life expectancy at retirement age of either sex. Although 19 years is close to the current average of male and female life expectancies at retirement, it will likely be lower than the life expectancy at retirement by the time it is fully phased in. A value of T that is lower than the life expectancy at retirement passes the longevity risk to the government raising fiscal costs. A minimum threshold on T also limits the potential gains of working longer for Russian workers. Establishing a value of T equal to the life expectancy at retirement is therefore important for increasing incentives to contribute and reducing the fiscal costs of the system.

19. To ensure that workers do work longer, most countries also increase the retirement age at the time of NDC reforms. It may happen, as in the case of Latvia, that despite incentives to do so in the NDC system, individuals retire at the legal retirement age. If life expectancy at this retirement age goes up—as it did in the case of Latvia—then the NDC benefit can fall below acceptable levels. Therefore, to

Box 2. The NDC System

The *notionally defined contribution pension* system (NDC) is a pay-as-you-go system that has six main features (based on Gora and Palmer, 1999):

1. Contributions are based on a fixed percent of individual earnings (collected by a payroll tax).
2. These contributions are kept in a virtual individual 'account, which earns a rate of return (from close of preceding period) based on the growth of the sum of paid contributions. Information on accounts is periodically provided to workers.
3. The total benefit is the annuitized accumulated account values at the time of retirement, or A.
4. The annuity, or yearly pension benefit, P, is calculated by dividing the accumulated capital, A, by G, the unisex life expectancy at the age of retirement ($P=A/G$); [$PC=A$; and $G=T$, in the Russian formulation above].
5. The annuity is indexed to either wages, or pensions or some combination of the two.
6. The system creates technical demographic reserves from contributing large pension cohorts to finance their pensions in the future.

The NDC scheme is different from a typical defined benefit (DB) schemes in several respects. First, DB schemes mix insurance and redistributive objectives. DB schemes do not normally link benefits directly to contributions. (It should be noted, however, that DB schemes may be constructed so as to completely link contributions to benefits as well). For example, the benefit is based on fewer years than life earnings (for instance, a 20 to 30 year rule for acquiring benefits) or benefits are based on the best 'x' years or last 'y' years. These rules discriminate against persons with long working careers; help individuals with a strong earnings profile; and encourages early exit. Therefore, DB schemes create a tax wedge between contributions and benefits, and also have unintended redistributive effects. In contrast, the NDC scheme strongly links contributions to benefits: individuals who work and contribute longer obtain higher benefits. This strong link between contributions and benefits avoids some of the unintentional re-distribution issues noted above. Rather, redistribution objectives are served through a minimum pension or other minimum guarantee. The linkage also allows individuals to obtain higher benefits without compromising fiscal solvency of the system.¹

Second and related, DB schemes often utilize very complex formulas. This is because the schemes combine explicit redistributive objectives in the formula. In contrast, the NDC formula is very simple and transparent, making it easy for individuals to understand their rights. This transparency can make it more difficult for governments to change the parameters in an ad hoc fashion relative. However, in countries where governments are more prone to intervene, and where political systems are less mature, the NDC system may be subject to the same type of intervention as a DC system.

Finally, the NDC system passes the longevity costs from the pension system to the individuals. As the longevity of the population, or G, increases, the average pension, or P, falls, reducing fiscal costs. Individuals obtain lower pensions. However, the system provides individuals with the flexibility of working longer and obtaining a higher benefit to counter-act the effect on benefit of higher longevity of the population. The adoption of higher retirement ages at the time of NDC reforms ensures that individuals will work longer than otherwise, to stem the decline in benefit.

reduce fiscal costs of the reform and ensure that benefits do not fall to unacceptable levels, it is important to both increase the retirement age and use the actual life expectancy at retirement age in the NDC formula.

20. *Initial capital.* The initial capital, or acquired rights in the old system, is much more generous in Russia compared to other countries. In Russia, individuals will be able to enter into the new system with a substantial credit for early working history. The initial capital is based on an individual's average earning over the last year (2000-2001) or best year of any five years of service, and credits all individuals entering the new system with a 20/25 (female/male) work history.

21. As currently structured, the initial capital reduces an individual's incentive to continue to contribute to the system. Its generosity also pushes the full costs of the very generous recognition of the workers' acquired rights in the old system to the NDC system. Both features reduce the fiscal solvency of the NDC system by hampering the ability of the NDC system to pay benefits commensurate with contributions.

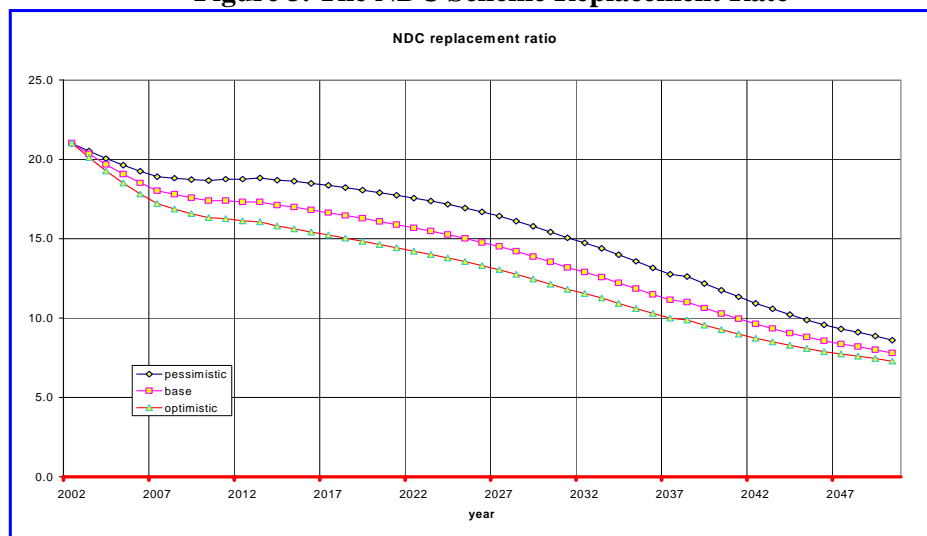
22. In other countries, the generosity of the initial capital is carefully controlled to reduce the fiscal costs of the reform. In many of these countries, the initial capital is used to control the flow of workers who join the new system, thereby reducing the fiscal costs of the reform. Specifically, the initial capital is set low so that only those workers (often younger workers) join whose long-term benefit gains under the new system outweigh the loss of capital accumulated under the old system.

23. *Valorization (indexation of the accumulations in the system).* NDC account balances will be indexed to change in the ratio of total wages to total beneficiaries (but not less than the amount by which prices increase). This measure will grow more slowly than the average wage growth whenever the ratio of workers to beneficiaries declines, which is what is expected to happen over the next several decades. Thus, over time, account balances will be valorized at price, far less than the growth rate of contributions. This valorization will impose a heavy tax on contributions of workers, reducing their incentives to contribute to the system. This excessive tax (also found in the basic benefit scheme, as noted above) reduces an individual's incentive to contribute to the system. On the positive side, the price (plus) indexation of both pay-as-you-go benefits helps preserve the real value of pensions over time.

24. Other countries where the NDC has been introduced also tax worker contributions, but this tax rate is far lower than in Russia. Poland levies a tax on NDC rate of return of 25 percent (to offer advantages to funded schemes); Latvia uses the growth of contributions; Italy uses GDP growth. GDP growth may be a good proxy for contribution base growth in the long run, but can give rise to financial instability in the short run. In Sweden, a balancing mechanism is followed to ensure the NDC will be financially stable in the long run.

25. *Indexation (indexation of the retirement benefit).* Benefit indexation in Russia will also follow the growth in the ratio of total wages to total beneficiaries (but not less than the amount by which prices increase). In transition countries, benefit indexation is often done on the basis of price, or some combination of prices and wages. In the US and

Figure 3. The NDC Scheme Replacement Rate



Source: Pomazkin /Martineau(2002).

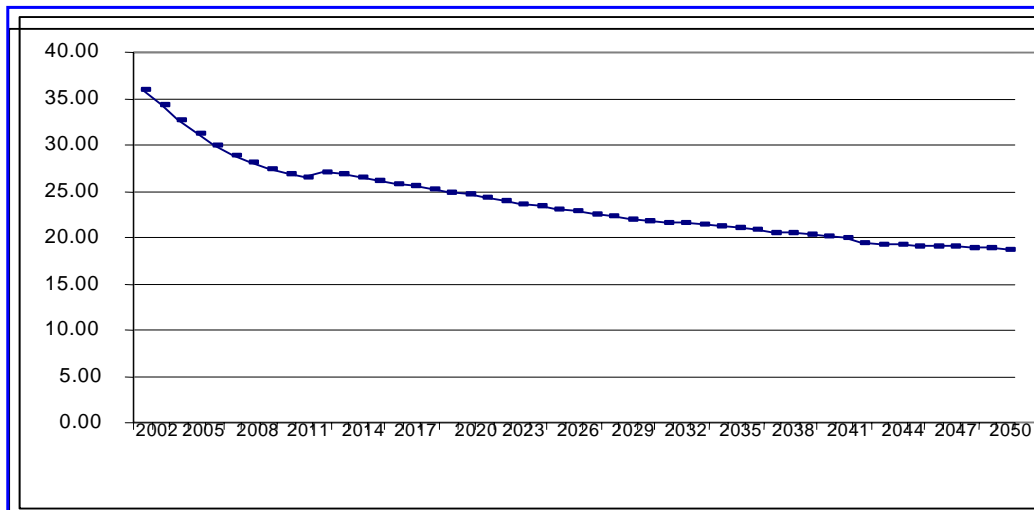
Sweden, benefits are indexed to prices only. In Sweden, the annuity is front-loaded—set at a higher level initially, to reflect an assumed level of real growth in the country.

26. *NDC replacement rate.* As in the case of the basic benefit, the average NDC replacement rate also falls over time, though less steeply than the base pension. Specifically, the NDC replacement rate falls from 22 percent to between 16 to 18 percent in the next 10 years, then falls further to less than 10 percent over the projection period. (Figure 3). This is because both the accumulations and benefits in the NDC system are also largely indexed to price and because the NDC contribution rate is lower for younger workers. Initially, the decline of the average replacement rate is lower than in the base pension because the initial cohort retiring under the NDC system retires with accumulated initial capital, which provides a generous pension (and has not been indexed for long with respect to price) (Figure 5).

27. If the entire reformed pension system (NDC, basic and funded system) is included, the system replacement rate will fall from 35 percent to 19 percent by the end of the projection period (Figure 4). Therefore, under the assumptions of the model, in the medium term the reformed system will not provide an adequate replacement rate—in the 30 to 40 percent of average wage range—to individuals contributing to the system.

28. Low and declining replacement rates are not likely to be politically sustainable. The Government may therefore be forced to raise the minimum pension, or change the indexation mechanisms (perhaps back to wage or mix of wage and price), which will have a more positive impact on pensioner welfare but will raise fiscal costs. In some sense, this ad hoc increase in pensions would be worse than one that would be more predetermined, because it may be done without evaluation of long-term impact

**Figure 4. Full System Replacement Rate (Base Case Scenario)
(% of average wage)**



Source: Pomazkin/Martineau (2002).

of political action.⁷ However, as in the case of the basic pension, it should be noted that the price indexation of benefit will preserve the real value of the NDC pensions.

The Funded System

29. The benefits from the funded system are determined by the model chosen for this system, the investment strategy adopted, and the chosen payout option.

30. *The Provident fund model.* The funded part of the Russian pension scheme will have the structure of a provident fund with external-asset managers. The law entitled "On Mandatory Pension Insurance" establishes the framework for the new pension system and establishes the Pension Fund of Russia (PFR) as the agency that will run the mandatory pension scheme. The PFR will bear the full responsibility for collecting information on workers, managing the individual accounts, and crediting contributions and returns on the assets. However, the version of the draft law "On Investments to Finance the Funded Part of Labor Pensions in the Russian Federation" (here called the investment law), defining how the funds will be invested, allows in the version approved in first reading by the Duma for non-state pension funds (NPF) to participate in the mandatory pension scheme in cases and under conditions to be defined in a new Law. The draft law envisages that NPFs will be allowed to participate starting in 2004.

31. The amounts to be invested will be transferred by the PFR to external-asset managers through a depository institution for their investment. To invest the funds, external asset managers will be hired to provide the service against a fee. Both the asset managers and the depository institution will be selected through a bidding process arranged by a specialized federal body. As pension assets are the property of

⁷ There are other distributional effects of the system, of course. The system is favorably disposed toward women and away from men because of the lower female retirement age, and also because women have longer life expectancy.

the Russian Federation, not of the workers, it is the government which will authorize the federal body to manage them on its behalf through the asset managers. The law does not address the issue about fees the PFR will charge to perform these new duties.

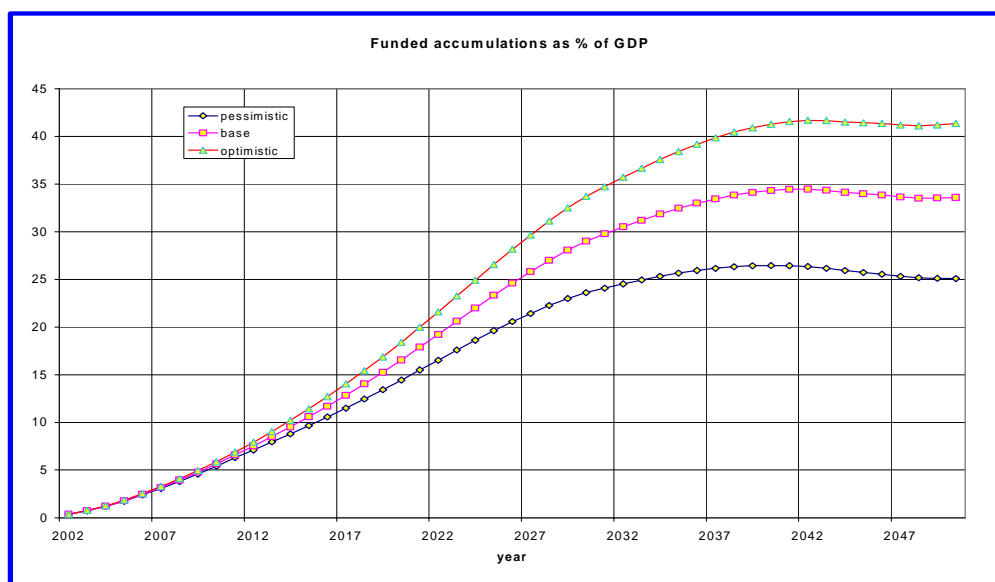
32. Compared to other reforms among transition and European countries, in an overall sense the Russian reform is less radical than that of such countries as Poland and more similar to those of countries such as Sweden. First, the amount of contributions diverted to the funded pillar is smaller in Russia than in the former countries. The advantage of this arrangement is that there will be very few new players in the pension and financial systems and the introduction of the new system is simpler. The cost is that the potential benefits in terms of capital market development and economic growth are also more limited. Specifically, lower benefits may obtain because the limitations on investments will lead to lower yield (and even higher risk).

33. Second, unlike other countries such as Hungary and Poland, the pension fund is the main implementation agency for the second pillar. It will perform functions of asset management (until money can be contracted out), including selection of asset managers (until individual choice is introduced); accounting and record keeping; collection; and benefit payout functions. Most countries (with the exception of Hungary) have chosen to consolidate some aspects of second-pillar operations with the operations of the first-pillar agency, or its tax authority. The variety of options range from collection functions allocated to the first-pillar agency, to using it to allocate these contribution among second-pillar funds, to being an alternative record keeper, to being an exclusive record keeper and information agent for fund participants. The advantages of a single agency are considered to be lower transactions costs for employers, lower marketing costs for funds, and greater information barriers between employers and funds, and funds and individuals.

34. However, the disadvantage is that such agencies, particularly if they are also public, are less able to resist often subtle political pressures to invest funds in a manner not in the best interest of participants. There is also the risk that the public will perceive that the fund enjoys a special guarantee of performance or a minimum return (more explicitly being proposed for Russia). On the whole, it is considered wiser not to conflict the role of the state as a supervisor with management of a pension fund. Therefore, most transition countries—where institutions are also in a fledgling stage—have consolidated some functions into a single agency, but have also opted for a worker choice model, where individuals choose the asset manager and assets are managed and in some cases records also kept by the private sector. Hungary and Poland are examples.

35. For countries that have concentrated all functions in a public agency, even in developed countries (such Singapore or Ireland), international experience suggests that this agency should be transparent in its functions, fully accountable to the public,

Figure 5. Funded Accumulations as % of GDP



Source: Pomazkin (2002).

and should have very close supervision of its functions. Thus, the Russian reform will be successful to the extent that the PFR is transparent regarding its functions and transactions on behalf of the public. It also indicates that moving to a worker choice and private-sector asset management model, as is proposed to be introduced in Russia, is a more optimal design for the second pillar (assuming financial and administrative conditions are met—see sections below).

36. *Investment of assets.* The government resolution Number 165 of March 18, 2002, “Provisions of Pension Asset Investment,” specified that for the following six months or until the investment law is effective and workers have a choice of asset manager and/or fund, the contributions are supposed to be invested in government bonds denominated in rubles or eurobonds. Valuation of the assets in the individual account is to be done monthly, and accounts will be credited according to the value of the assets at the moment the contribution is made. The Central Bank of Russia will be the asset manager for government securities denominated in rubles and the Foreign Economic Bank will be the asset manager for those denominated in eurobonds. By the time the asset managers start operating, the funded component is expected to have accumulated about €1 billion.

37. During the initial years, accumulation of contributions to the funded scheme will grow slowly. The accumulated funds will be transferred to the asset managers once they are licensed and operational. Preliminary estimates are that by March 2002 RB3.2 billion (US\$110 million) had accumulated. During 2002, expectations are for contributions of RB35 billion to pension savings accounts, and Russia’s state-supervised pension savings are expected to total RB80 billion by 2004. The pension savings accumulation will reach a peak of about 35 percent of GDP by 2040 (Figure 5). The returns from the funded system will increase replacement rates in outer years, raising the overall replacement rates of the system to levels described in Figure 4 above.

38. Investment is supposed to be mostly passive, that is in indexes, both for local and foreign investment. Currently there is no appropriate index investment instrument in Russia. A newly created Investment Commission will help create adequate indexes based on ratings of instruments and of companies. The Investment Committee will also define the benchmarks to monitor the performance of the investment managers. The law does not envisage minimum return guarantees for the funded component because the government is providing benefit guarantees through the basic pension and the NDC component. Provided that the index is well constructed (see detailed discussion in the financial requirements section below) the absence of a return guarantee should lead to improved returns and easier supervision.

39. *Benefit payout arrangements.* Under the current law there will be no choice or competition in the provider of the funded benefits. PFR will also pay all benefits of the pension scheme, including those of the funded pensions. PFR will pay the funded portion of the pensions by annually requesting a withdrawal on the accumulated funds. Based on this request the relevant federal body will approve a transfer from the asset managers to the federal budget that transfers them to PFR.

40. The calculation of the pension benefit from the funded account will be similar to the calculation of the NDC benefit, with two major differences. The monthly benefit from the funded account will also be derived by dividing the account balance at retirement by a demographic factor, like the T factor in the NDC portion. The value of T for purposes of computing this portion of the pension benefit is to be set in a future law and need not be the same as the value used for the NDC component. If the value of T is fixed for the pensioner, the benefit will take the form of a variable rate annuity.

41. An initial reading of the law indicates that pensions from the funded account will be adjusted each year based on the yield of the assets held in the account, as well as to changes in the life expectancy of each cohort. Then the benefit will take the form of a phased withdrawal, spanning the lifetime of the worker.

42. Programmed withdrawals confer longevity risk on the individual and can lead to very low pensions when the assets are diminished by an unexpected long life, creating uncertain and potentially large liabilities for governments. The payout or pension phase also involves risks for the accumulated pension assets. In the absence of choice and competition, the level of benefits could be affected by ad hoc (artificial) adjustments in the value of T used in the pension calculation. In the Russian case, the phased withdrawal option then places both the investment and the longevity risk of the funded pension with the worker, without offering a choice in benefits or investments.

43. Most European transition countries have opted for mandatory annuities. However, this option also faces some problems, such as timing: when should accumulations be converted to annuities? It is often difficult to get workers to purchase annuities in a down market. Some countries, such as the UK, allow individuals grace periods in which they can defer the purchase of annuities. There are also adverse selection costs involved in the annuity. If the purchase of annuities is

not mandated, only the relatively long-lived may choose to buy annuities. Proposed solutions include single annuity pools or forcing successive cohorts to participate in group annuities. However, these options only exist in theory, and have not been specified or tested. In Russia, of course, the absence of market for annuities would complicate their adoption as the best payout option.

3. Occupational and Private Pensions

Occupational Pensions

44. A new Occupational Pension Law will be issued that should address early retirement. New Occupational Pension Funds have the objective of financing the early retirement period before the regular pension sets in. They are intended to be a DC scheme, will be only for new entrants into the labor force, and are expected to start in 2003. Employers will make an additional contribution to an NPF for the occupational pension scheme. If they do not choose an NPF, then the occupational scheme of the PFR will be the default option. There are supposed to be two levels of additional contributions, hard work with 5 percent and very hard work with 12 percent additional contribution. The level of hardship of the work will be determined by a special commission. Some workers have the option to renounce the early retirement benefit in exchange for a higher salary.

Private Pensions

45. The NPF supervisor published data on investments made by NPFs as of the end of the first quarter of 2002. A number of NPF violated the investment limits, although many did so with permission from the supervisor. NPFs have a large share of their assets invested in company promissory notes that are not traded, have a high risk, and are not even listed among allowed investments. The NPF inspectorate data shows that the majority of NPFs did not comply with investment principles such as diversification of risk and higher security of investment. A number of funds invested up to 100 percent of assets into one class of assets; some NPFs overloaded their portfolio with government securities and others overloaded in bank deposits. NPFs were also breaking the limits on investment into shares, often concentrating in shares of the parent corporation.

46. *Asset management.* There is a potential for large losses in the assets managed by NPFs. The assets of the NPFs are used to buy annuities. There is the possibility for the worker of withdrawing the funds but with heavy penalties. For example withdrawing contributions before three years leads to the loss of 30 percent of contributions and all returns. Valuation of assets of NPFs is required only once a year by the supervisory body. The current NPF law does not require segregation of the assets of workers from those of the fund manager. The scheme is similar to insurance companies that establish reserve funds. Introducing segregation of the assets now is complicated because these NPFs already have members who are vested or entitled to pension benefits after five years of contributions. The segregation of assets in the occupational pension funds is required to avoid the loss of savings in the case of company bankruptcy.

47. *Changes in legislation.* Following up on the draft pension investment law that allows the participation of NPFs in managing part of mandatory contributions, the participation of NPFs will be specified through amendments and regulations to the current NPF law. These amendments will tighten the requirements for an NPF license in general and specify even tighter requirements for the management of mandatory contributions, while also providing for a transition to existing NPFs to adjust to the new requirements. Plans are that licenses to manage funds from mandatory contributions will require three to five years of credit history and asset management. About 10 to 15 current NPFs are expected to fulfill the new requirements. Other decisions include how NPFs will invest contributions--through insurance companies, asset managers, or mutual funds. Allowing workers a choice in the affiliation to a funded pension plan will require a transition period for the current members of NPFs to sort out such issues as credit, previous contributions, valuation of assets, and illiquid or missing assets.

48. In general, major changes are required to the NPF legislation to make it suitable for the new pension system that is envisaged by the government. The old NPF legislation had a Defined Benefit (DB) pension system in mind which lacks a large defined contribution (or DC) component, as proposed by the mandatory funded component of the pension law and occupational pension law. Some elements of the old law might be used for a DC scheme, correctly or broadly interpreted, but many elements of the law will need to be adjusted so that it is consistent with the DC scheme of the mandatory component and of the occupational pensions.

49. *Supervision.* A key issue in the participation of NPFs is their regulation and supervision. The NPF supervision unit is located in the Ministry of Labor. The unit has been very active and is still developing its supervision capacity. Since 1995, 190 licenses for NPF have been revoked, of which 51 were revoked in 2001 and 25 are currently suspended waiting a supervisory decision. Among recent improvements was a better coordination with other supervisory bodies, such as the Federal Securities Commission. In light of recent changes in international financial-sector supervision, an issue that will have to be decided by the government is whether the supervision of NPFs should be consolidated with other supervisory bodies to achieve economies of scale in the supervision and to make it more independent of pressures by NPFs.

4. Summary and Recommendations

- *Designing the first pillar poses significant challenges for achieving the efficiency objectives of the pension reform.* Many features of NDC reforms that increase a worker's incentives to contribute to the scheme and work and therefore also reduce the fiscal costs of the pension system have not been adopted in Russia. Unlike standard NDC schemes, in Russia's NDC scheme the pension benefit does not reflect actual life expectancy; the notional rate of return is very low and contributions continue to have a very large tax element; and the recognition of acquired rights does not create incentives for continuing to contribute to the system. Addressing these issues requires

-- *Increasing the retirement age and) calculating benefits based on actual life expectancy at retirement will help redress these problems.* These measures will help to raise pension replacement rates, improve the fiscal solvency and political

sustainability of the pension reform, and reduce labor market distortions caused by the high payroll tax for pensions.

-- *Ensuring that adequate budget is set aside to index pensions will protect workers' futures.* Maintaining the real value of both basic and NDC pensions that is encoded in the law should be observed in practice to prevent poverty among pensioners.

- *Implementing the second pillar successfully also requires surmounting certain risks.*

--*The Provident Fund Model.* This model, adopted for the first few years in Russia can provide low returns, and create a dependency on Government bonds, if continued indefinitely. It also requires considerable governance and transparency of the Pension Fund of Russia. Ensuring transparency and accountability of the provident fund model is therefore vital. This can be achieved by asking PFR to charge a reasonable and transparent fee for asset management functions; contracting out the asset management of the second pillar to an international asset manager through international competitive bidding; and ensuring adequate and regular oversight of PFR functions in managing individual accounts and handling second-pillar assets.

--*The Worker Choice Model:* Russian law allows workers, over time, to shift the management of their assets and accounts to the private sector, providing competition for the management of the funds. However, this poses yet another challenge. Shifting fund and account management to the private sector, and particularly to the non-state pension funds, will require financial safeguards (see below) not currently present in Russia.

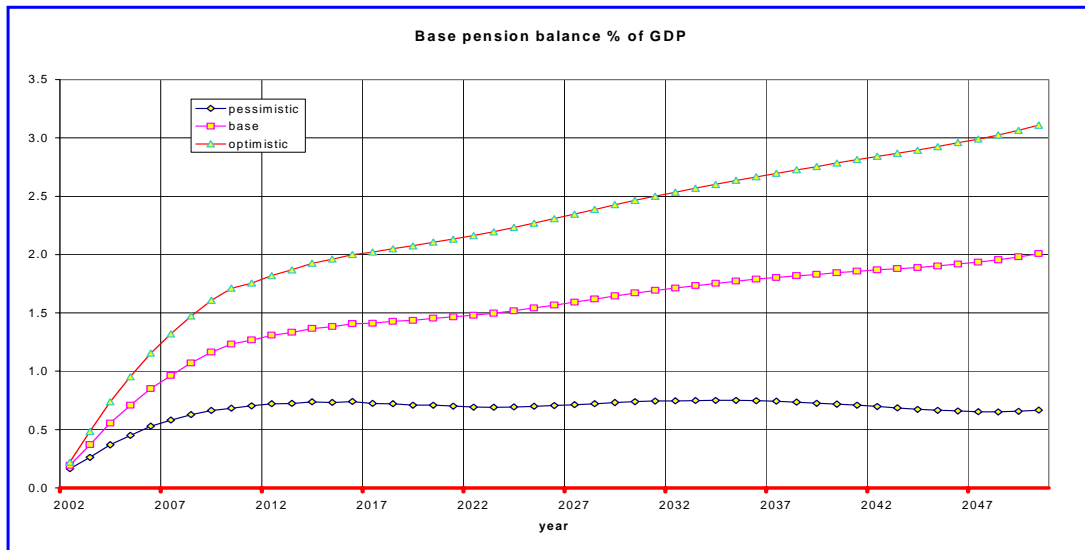
III. Fiscal Sustainability of the Reform

1. As noted above, the design of the new pension system has implications for the financing requirements of the reform. In particular, a shift to a multi-pillar system places a burden on the financial resources of the first-pillar pension system. This shift diverts contributions away from the first pillar to the second pillar and reduces the resources required to finance the continuing obligations of the defined benefit pay-as-you-go system. Second, the initial capital provided to contributors, as well as the aging of the population, will also force up costs of the system. Price indexation instead of wage indexation of pensions will drive down costs. What is the result of these divergent forces on the fiscal balance of the system?

2. The fiscal consequences of reform are assessed under three macroeconomic scenarios described below in Table 2. The scenarios differ according to their assumptions about productivity growth, inflation, and rates of return on the funded accounts, as well as labor participation rates, unemployment rates. The basic forecast includes moderate macroeconomic forecasts for these variables, while the optimistic and pessimistic forecasts represent more favorable and less favorable macroeconomic developments than the base case. The demographic assumptions are those developed by Andreev (2000).

Table 2. Scenarios Used in Assessing Fiscal Impact of Pension Reform										
Base Case										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Real Productivity Growth Rates	4.0%	4.0%	3.5%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Inflation Rates	15.0%	14.0%	12.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Real Rates of Return on Funded Accounts before Expenses	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
Unemployment Rates	9.0%	8.8%	8.4%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Labor Participation Rates	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%
Wage Growth in Excess of Productivity	2.0%	1.9%	1.7%	1.1%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
Optimistic Case										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Real Productivity Growth Rates	5.0%	4.7%	4.1%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Inflation Rates	14.0%	12.8%	10.4%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Real Rates of Return on Funded Accounts before Expenses	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
Unemployment Rates	8.0%	7.6%	6.8%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Labor Participation Rates	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%
Wage Growth in Excess of Productivity	3.0%	2.8%	2.5%	1.7%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Pessimistic Case										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Real Productivity Growth Rates	3.0%	2.8%	2.4%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Inflation Rates	18.0%	17.0%	15.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Real Rates of Return on Funded Accounts before Expenses	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Unemployment Rates	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Labor Participation Rates	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%
Wage Growth in Excess of Productivity	1.0%	0.9%	0.8%	0.5%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%

Figure 6. Base Pension Balance as % of GDP



Source: Pomazkin (2002).

1. Fiscal Balance of the Basic Pension System

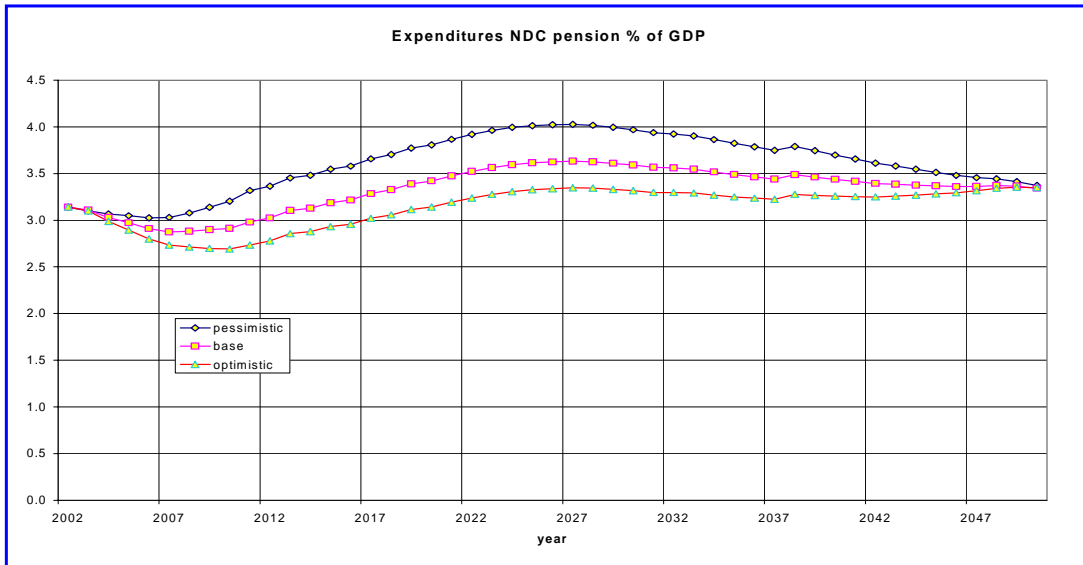
3. The fiscal developments of the basic pension system are very favorable (Figure 6). Under all three macroeconomic scenarios, expenditures fall monotonically as a share of GDP because benefits are indexed to price. The indexation overcomes any upward pressure on expenditures exerted by the growing number of pensioners in the system. Under each scenario, revenues also increase over time as a share of GDP, as wages grow (slightly above productivity growth) and as the wage bill to GDP ratio increases (as a result of growing formalization of the economy). Therefore, the surplus of the system (revenues less expenditures) as a share of GDP increases over time.

4. The greater the surplus, the more favorable the macroeconomic conditions in the country. The surplus of the system could be used to raise replacement rates in the system or to reduce tax rates. However, as we show below, it may in all likelihood be used to contribute to deficits in other parts of the pension system: that is the NDC.

2. Fiscal Balance of the NDC Pension System.

5. The financial situation in the NDC system is far less favorable. First, the revenues to the NDC system do not increase at the same rate as the base system (14 percent of payroll). This is because part of the contributions of the NDC are diverted to the funded system in the early years of the transition to the new system. Revenues of the NDC system only start to increase much later into the projection period, once the transition to the new system is complete in year 2015 and the contribution rate to the NDC stabilizes.

Figure 7. NDC Expenditures as a % of GDP

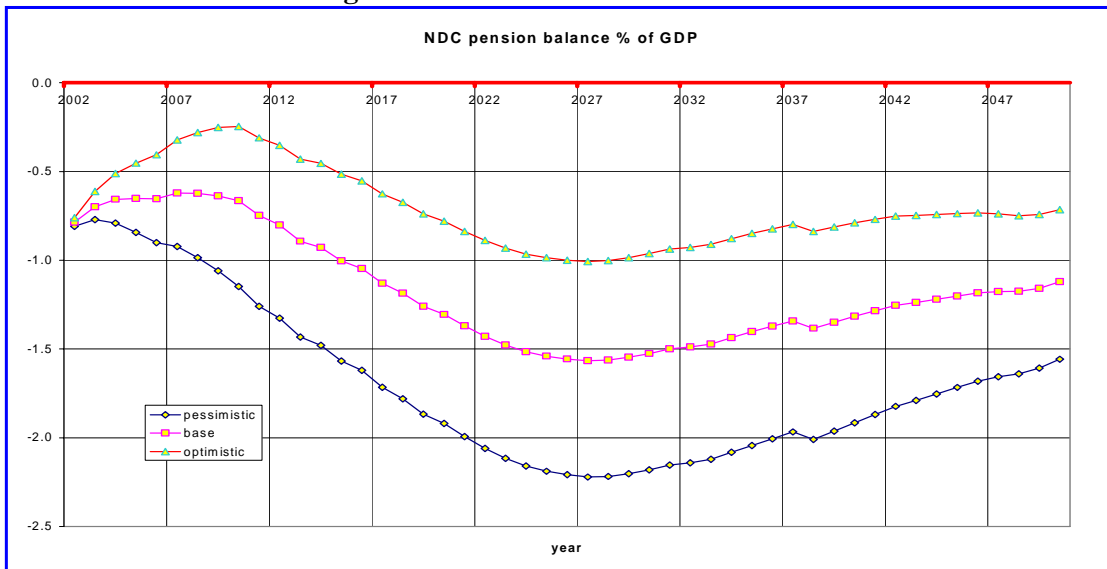


Source: Pomazkin (2002).

6. At the same time, the expenditures of the NDC system also do not fall monotonically (Figure 7). Instead, they have a slightly inverse U shape. They fall slightly in the initial years, and rise thereafter, falling only at year 2027, towards the end of the projection period. The expenditures of the system are driven by increasing benefits accruing to retired pensioners, and the increase in the number of pensioners over time.

7. In particular, in the next five years, retiring cohorts are mainly retiring under the old system and their benefit expenditures are not very high. This is in contrast to cohorts retiring after them who have acquired considerable initial capital and are very little affected by the accumulation indexation of the new system. It is these cohorts, and the gradual increase in the diversion of NDC contributions to the funded pillar,

Figure 8. NDC Balance as a % of GDP



Source: Pomazkin (2002).

that drive up pension costs in the medium term. In the later years, expenditures fall again with the retirement of currently young cohorts who have not acquired any initial capital from the old system and receive pensions mainly from the NDC system.

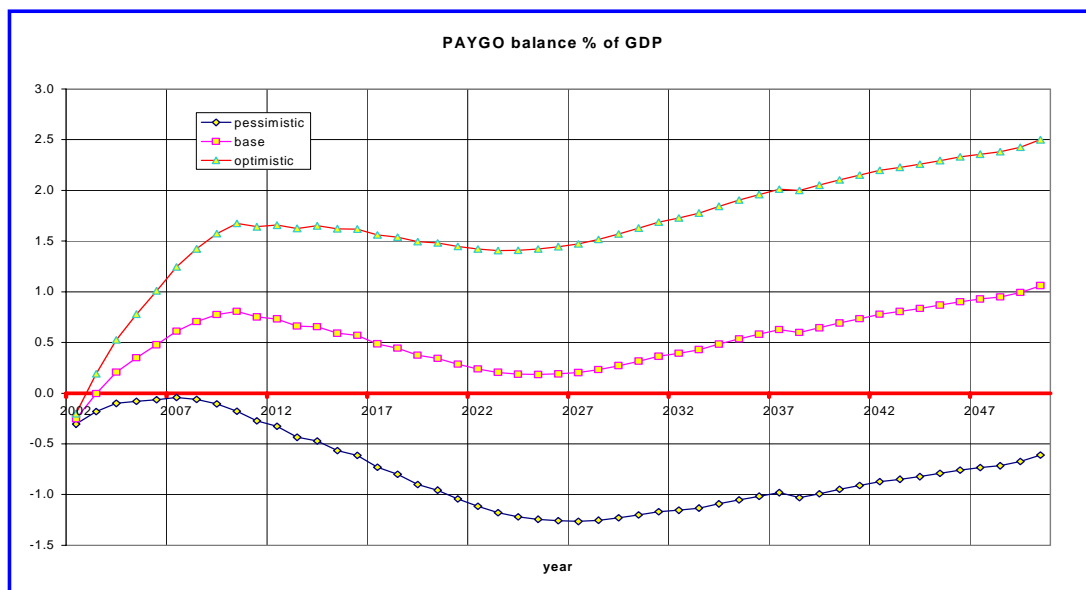
8. Both these trends, together with a declining population, contribute to a deficit in the NDC system throughout the projection period, indicating that it is not financially sustainable by itself (Figure 8). In the base case, the deficit is stable for most of the next decade, but rises sharply as cohorts with initial capital retire, and starts to fall only as later cohorts retire. The deficit remains in all macroeconomic scenarios, though of course it is larger, reaching 2.5 percent of GDP in the pessimistic case and, smaller, or 1 percent of GDP. in the favorable scenario. This shows that the transition to the new system, the increasing dependency ratio, and the high initial capital provided to current cohorts switching to the new system will create a fiscal imbalance in the NDC system, under all macroeconomic scenarios.

3. Fiscal Balance of the Public Pay-as-You-Go System (Basic plus NDC)

9. The overall pay-as-you-go system has a surplus in the base case and optimistic scenario, but runs a deficit throughout the projection period, in case of the pessimistic scenario (Figure 9). In the first two cases, the overall surplus in the system is realized because the surplus in the basic pension is enough to offset the deficit in the NDC pension system during the entire projection period. It is only in the pessimistic case, the deficits in the NDC system are too large to be compensated by the surplus in the base pension system, though the fiscal situation starts to improve in outer as the expenditures of the NDC system fall.

10. There are some major caveats. First, the surpluses occur because of very low replacement rates in the system (Figure 4 above). Second, the system will be in balance only if the treasury indeed transfers the surpluses from the basic pension to the account of the NDC system. Finally, if the economic condition worsens, the proposed reform program will not be fiscally sustainable.

Figure 9. Pay-As-You-Go Balance as % of GDP



Source: Pomazkin (2002).

4. Declining Replacement Rates

11. As noted above, the replacement rates produced by the system are low--that is, base-case replacement rates go down from about 36 percent in 2002 to 19 percent in 2050. The main reason for such a depreciation is, of course, the indexation of pension levels, which is set at prices for the base pension and half of the wage growth for NDC. In the base scenario, the average annual wage growth amounts to around 2.9 percent. At that rate, price indexation will reduce replacement rates--that is, pension relative to wages by about 75 percent.⁸ Similarly, half wage indexation will reduce pension value relative to wages by about 50 percent.⁹

12. However, it is clear that the system has the capacity of producing higher replacement rates since there are surpluses. Under the base scenario, these surplus reaches over 1.1 percent of GDP in 2050. These surpluses could be used to raise replacement rates.

13. By how much can replacement rates be increased while keeping the system in balance? Unfortunately, not much. Simulations from the model show that under the base case, the replacement rate that can be sustained by the system (so that it remains in balance) is between 28 to 29 percent in the next 10 to 15 years, but falls over time to 21 percent.

14. What would be the fiscal impact on the system of sustaining a 30-percent replacement rate from now to the foreseeable future? Projections show that the system could sustain a small surplus till 2015 while maintaining a 30-percent replacement rate. However, maintaining this replacement rate would cause surpluses to turn to deficits after 2015, reaching as high as 2 percent of GDP. Alternately, if the increase in replacement rate to 30 percent is financed by an increase in the payroll tax rate, it would take a 15-point increase in the contribution rate in the base case to keep the system in balance over the long term. Thus, an increase to a 30-percent replacement rate, perhaps the minimum that should be guaranteed by the pension reform (especially with quite high rates of contribution), is possible in the medium term, but only at the cost of long-term fiscal deficits or significantly higher contribution rates.

15. How else can the replacement rate be increased? Let us consider the basic equation representing the financial condition of a fiscally balanced pay-as-you-go system (time = t) :

$$P/w = t(e/b)$$

Where p/w = replacement rate and e/b = the dependency ratio.

This formula shows that the replacement rate could be increased by raising the effective contribution rate (t), or increasing the dependency ratio (e/b). Let us look at the first factor-- the effective contribution rate. This rate depends mainly on the nominal contribution rate, the collection rate, and wage under-reporting. At 28 percent, the total nominal pension system contribution rate is already very high, and

⁸ [1 - 1/(1.029)⁴⁸]

⁹ [1 - 1/(1.0145)⁴⁸]

cannot possibly be increased. Similarly, at 95 percent, the collection rate may only be marginally improved. Thus, there is limited room for increasing the effective contribution rate.

16. The second factor is the dependency ratio. The numerator, or number of effective contributors to the system, depends mainly on population growth, labor participation, employment rates, and evasion/exemption rates. With the exception of evasion, the pension system has no control over these factors whatsoever, as they are external. The most powerful of these factors is population growth. Unfortunately, the current population trend in Russia is negative. The population projections used in this note anticipate that Russia's population will fall by a third by 2050. Government policies may have some impact on long-term labor participation and employment rates, but the potential long-term impact on the number of effective participants is quite small--perhaps 5 percent at most for each of these factors under the best circumstances. Since there is no hard data on evasion, it is impossible to make a final judgment on this factor, except to say that one should not expect an eventual reduction of the evasion rate to have more than a marginal impact on the financial condition of the system. Finally, adding exempted groups back into the system would not help, since exempted groups like the military have their own systems which are in all likelihood in no better shape than the general system and would need to be taken into account one way or another. Moreover, one must assume that consolidating exempted groups into the main system would not be politically feasible.

17. The denominator of the dependency ratio, or the number of beneficiaries, could also be reduced, in order to raise the replacement rate. This is already being done to some extent through the phasing out of early retirement pensions--but the number of privileged pensions still included in the reformed system could be further reduced over time. However, the impact of eliminating even all remaining privileged pensions would only marginally increase the replacement rates. Some streamlining of the numbers of disability and survivor pensions could perhaps be done, but the potential impact here is probably insignificant. The main reduction in the number of beneficiaries would have to come through a fall in the number of eligible old-age pensioners, by increasing the retirement age.

18. In most countries, as in Russia, increasing the retirement age has been a contentious issue. However, if workers are confronted with low benefits in the future, they are likely to choose working longer and contributing to the system. This is particularly true if the retirement age is gradually phased in over time.

19. What would be the impact of the system on phasing in higher retirement ages in Russia? Assume a slow phasing in of retirement ages that would increase retirement ages for both men and women, and equalize them in 2040. As noted above, no transition country has as yet equalized retirement ages for men and women. This is only an example to illustrate the impact of increased retirement ages on the system

Table 3. Changes in System Dependency Ratio and Affordable Replacement Rates with Retirement Age Changes

Year	System Dependency Ratio			Affordable Replacement Ratios		
	60/55	60/60	65/65	60/55	60/60	65/65
2002	0,61			0,31		
2020	0,72	0,60		0,25	0,30	
2040	1,01		0,64	0,21		0,34
2050	1,24		0,76	0,21		0,33

Source : Martineau (2002).

dependency rate, and the financial balance of the system, assuming that Russia meets OECD standards by 2040.

20. Table 3 shows that an increase in the retirement age would have a negative effect on the dependency ratio (the number of pensioners to contributors). This in turn would create a surplus in the pension system, and allow for an increase in replacement rates. In particular, if all the surplus was used to increase replacement rates, the replacement rates could increase to about 34 percent from the currently projected 21 percent by the end of the projection period

5. Summary and Recommendations

- *Fiscal sustainability of the overall pension system can be achieved at more reasonable replacement rates if* (i) actual macro-economic performance achieves the levels of the base case of favorable scenarios; (ii) The Government transfers budgetary resources to cover the deficits of the NDC scheme and (iii) *the* retirement ages are increased and the actual life expectancy at retirement is used in the NDC benefit formula. Alternatives such as increases in payroll taxes, improvements in compliance, and improvements in fertility rates to increase the replacement rate are not sustainable or realistic in the medium term.
- *Ensure that sufficient resources are set aside to maintain real value of pensions.* The basic schemes will maintain the real value of pensions if adequate resources are included in the budget to ensure price indexation of benefit.
- *Coping with high payroll taxes is a remaining problem.* Ensuring that contributions are more strongly linked to benefits in the pay-as-you-go system will help to alleviate some of the distorting effects of high payroll tax rates.

IV. Financial Sector Developments

1. The introduction of funded pension plans has major long-term implications for the functioning and growth of Russia's financial markets. The steady accumulation of long-term financial resources from Russia's multi-pillar pension system will place enormous pressure on the Russian financial market to productively absorb and safeguard pension assets. At the same time, the reform will also provide an opportunity for the development of long-term savings instruments, with potentially beneficial impact on investment and economic productivity.

2. To realize these benefits of reform, several important conditions should exist: first, a strong and lasting commitment by the government to maintain macro-financial stability; second, financial market conditions, including absorptive capacity, trust and transparency, safekeeping of assets, and allocation of capital and diversification of risk; and third, an effective regulatory and supervisory agency. While Russia has achieved a measure of macroeconomic stability, its financial market and security market, as well as effective regulatory structures, remain weak, creating significant risks for reform. The slow accumulation of pension assets in Russia, however, reduces the pressure on absorption of funds.

1. Macroeconomic Conditions

3. In this note the macroeconomic conditions will not be further elaborated, except to say that the ability of a pension system, funded or not, to provide an adequate income for workers after retirement depends to a large extent on a strong and reliable macroeconomic situation. Pension systems will not do well when threatened by an unpredictable tax environment, erratic inflation, and/or volatile legal and property rights. Funded pension systems are particularly vulnerable in the early stages because government securities constitute the bulk of financial instruments held by the pension funds. In Russia, the underdevelopment of contractual savings can be attributed to episodes of high inflation and macroeconomic instability and an inadequate regulatory framework. High inflation undermines the predictability of operations of pension funds and insurance companies. Indexed instruments may mitigate the problem, but indexation mechanisms often break down in high inflation. The success of a pension reform depends critically on having an adequate store of value in which to invest the workers' money.

4. Broad fiscal balance is important because it is often the single most important source of high and accelerating inflation. One difficulty is that the introduction of the funded pension component will put pressure on the public sector deficit during the transition period. Pension payments will continue to be made, while some of the payroll taxes from active workers will be diverted to the new funded component. The Russian reform is a gradual one and the fiscal situation is currently under control, but it could still require fiscal adjustments to avoid instability in the future. The reform of the pension system could create new contingent liabilities for the government because the provident fund structure creates expectations of a government guarantee in case there are losses in the pension fund and if a minimum return guarantee is issued for the publicly managed pension accounts.

2. Financial Market Conditions

5. *Trust and transparency.* Market participants must have trust in the system that is handling their savings. The main role of capital and financial markets in the introduction of a funded pension scheme is to ensure transparency of transactions. This role has to be performed at all development stages of markets. As markets become more advanced, with a wider scope of participants, this role just becomes more complicated and sophisticated.

6. The development of a funded pension system hinges on the confidence that members of the pension system have that their pension savings will be invested safely while obtaining adequate returns. It is worth noting that lack of trust in the Russian financial system has stimulated the development of a number of activities—such as use of barter and non-cash payments, which have only recently diminished, and reliance on insecure and inefficient savings forms (mattress savings and capital flight).

7. To develop trust in the funded pension system, a concerted, broad-based, and sustained effort is needed to instill trust in banks, asset managers, and other financial intermediaries. While financial system stability depends on the soundness of the policy and supervisory framework provided by the authorities, it also depends on market participants perceiving it to be in their best interest to build trust and good reputation so as to maintain their access to financing. In building greater trust, special attention will need to be paid to maintaining the confidence of the weakest participants in the financial system—be they retail depositors or minority share owners, who are the great mass of members in the funded pension system.

8. Allowing for foreign investment of a substantial part of Russian pension funds could increase confidence in the new system. The knowledge that their savings are not hostage to the whims of the local market would increase worker's confidence in the system. Different countries have different shares of the pension portfolios invested abroad: the UK has about 30 percent, Ireland 37 percent, Austria 20 percent, Belgium 35 percent; the USA only about 11 percent; France 5 percent; Germany 6 percent; and Japan merely 7 percent--there, however, the option for foreign investment is allowed even if pension-fund managers do not fully use it. In Russia, the limit for investments abroad will grow to 20 percent of the portfolio by 2010. But circumventing financial market problems means that this threshold could be increased further.

9. *Banking.* A central requirement with introducing funded pension systems is to ensure that banks can be trusted for safekeeping of assets. Sound banks are important because funded pension systems usually hold bank assets until they are able to allocate most of their funds to longer-term investments. During the early years of the new pension system, a large share of assets will be held in diverse bank deposits because of the limited scope of available assets. Therefore, weak banks threaten the overall survival of the pension system by diminishing its assets and more importantly by undermining the confidence in the pension system. Indeed, if Russian depositors do not entrust banks with their savings, and cannot regard them as sound custodians of their securities, it is difficult to envisage how other parts of the financial system that are necessary for a funded pension system—such as capital market institutions—will prosper.

10. The growth of trust in the private banking sector requires the development of banking infrastructure, thereby contributing to an improved enabling environment. This is a challenging task but it is possible. In Chile in 1982, one year after the pension reform, a major banking and economic crisis led to a 14 percent drop in GDP. The crisis was followed by deep reforms of the banking system that helped achieve a strong financial sector and a successful pension reform.

11. Russian authorities will need to take measures to improve the institutional infrastructure for intermediation by private agents to unrelated third parties. One of the expected impacts of the funded pension system is the availability of long-term loanable funds. However, on the whole, banks—be they domestic or foreign—are reluctant to expand the scope of lending given the weak protection afforded to them as creditors and the bad experiences with recent spikes in inflation. Reforms that improve the standing of creditors and a better track record on inflation will be required to achieve this impact of the pension reform. Other measures to improve banking infrastructure include improving the rights of private parties as creditors, strengthening the protection of creditors in troubled corporations by establishing reliable and expeditious corporate bankruptcy and workout practices, and laying the foundations for capital market development. Corporate governance, such as accounting rules, financial disclosures, and minority stockholders rights are very important (as evidenced in Kazakhstan) and can become one of the critical shortcomings of pension reform. Progress in all of these areas will require time. Therefore, as in the case of pension reform, the faster and earlier these measures are taken the quicker their impact will be perceived.

13. *Private incentives for information disclosure.* Because banks play a very important role for the new pension system, close banking supervision and the prohibition to place pension funds with insolvent banks are required. However, markets, including specialized pension-fund managers, principally those who enter into a creditor relationship with a bank, will also monitor and discipline banks if they have the ability and the incentive to do so. The ability to monitor banks depends mainly on the reliability and scope of information available (investment management skills are also important). To improve information on the banking system for market participants, authorities in some countries recently have put in place extensive disclosure requirements backed up by enhanced liability (New Zealand is an example); require mandatory ratings by at least two private rating agencies for banks to be able to receive resources from the pension system among others (as in Chile and Bolivia); and have in place an on-line reporting system (as in Argentina). Beyond information, creditors need incentives to monitor, in the form of the assurance that they will be allowed to suffer losses, something that is not easy in the case of the pension system

14. Resolving all of Russia's banking problems in its more than 1,000 banks is beyond the scope of the pension reform. Therefore, the focus of the complementary reforms could be on a core of sound and efficient banks for handling contributions, short-term investments, and other payments. The extensive administrative reforms to the pension system require an efficient delivery mechanism involving the banking system. Quick and efficient provision of these services would be furthered by opening the market to foreign entry and encouraging technological and know-how transfer. The same applies to custodial services. Custodial services are particularly important

because they require sophisticated computer systems, efficient record keeping and reporting facilities, and large financial resources. Russia has over 40 licensed custodians, but most do not qualify to service pension funds. A core of adequate custodians should be licensed to provide services to pension funds. In general, competition and contestability in the provision of financial services will be key to the success of the implementation of the proposed reforms.

15. *Efficient allocation of capital and diversification of risk.* There are two key functions of financial markets that are particularly relevant for pension reform. The first is allocating capital efficiently. Financial intermediaries gather information about firms and investments, and allocate resources, choosing the best entrepreneurs and technologies. The second is facilitating the pooling, diversifying, and hedging of risks. More liquid markets encourage greater long-term investments; and risk diversification encourages investment in higher-return projects, thus improving returns on savings for pensions. Even the least developed financial system provides these functions, though not as well as those in more advanced countries. Pension funds benefit from the improved performance of these functions because it makes it easier to deliver the highest risk-adjusted return to participants.

16. There are several ways to achieve adequate performance of these functions, because there is not one single path to financial sector development. The adequate provision of these functions depends mainly on some basic elements of financial infrastructure, including the quality of the information, the ability to enter into and enforce contracts, and the incentives for parties to adhere to those contracts and behave prudently. The infrastructure for a stable financial sector also must deliver a sound evaluation of the assets of the institutions and current and reliable information on the activities of the institutions, and should have clear rules for the allocation of losses in the case of default of an institution. These fundamental elements of financial infrastructure are also key for the pension system.

17. *Quality of asset managers.* Currently there are 53 asset managers licensed by the Federal Securities Commission to manage investment assets, unit investments, mutual funds, and pension funds. Of the asset managers, the oldest is five years old and the newest are only months old; only five are international companies. Only half of the licensed asset managers are active, and 14 of them manage 96 percent of all assets. To remove inactive or weak asset managers, the Federal Securities Commission has doubled the minimum capital requirement for asset managers to RB5 million (US\$160,000) as of August 1, 2002. The Federal Securities Commission is planning additional measures to improve the quality of asset managers, including specifying measures that take into account capital to assets under management.

18. *Absorptive capacity.* While the accumulation of sufficient assets is key to sustain reasonable pensions, in the case of Russia this accumulation is likely to be slow. Therefore, the pressures on the financial market are likely to be less than those that prevailed in other countries and the financial market requirements could be lower. The contributions to the funded pension scheme start at only 2 percent of salaries for workers between the ages of 36 and 50 and at 3 percent for those under 36 years of age. The rate of contribution is supposed to increase over time and reach 6 percent of salaries. This rate of contribution is relatively low in international comparison, particularly for a country that also has relatively low salaries.

Table 4. Publicly Managed Pension Fund Portfolios in 34 Countries, 1980s and 1990s

Country	Year	Govt. Bonds/ Loans	Mortgages/ Housing Bonds	Shares/ Equity	Real Estate/ Other	Total
		Fixed Deposits	<i>percentages</i>			
Canada (CPP)	1991	100	0	0	0	100
Egypt	1995	100	0	0	0	100
Pakistan	1981	100	0	0	0	100
Sri Lanka	1997	100	0	0	0	100
Switzerland	1997	100	0	0	0	100
United States	1997	100	0	0	0	100
Yemen	1996	100	0	0	0	100
Colombia	1982	100	0	0	0	100
India	1995	100	0	0	0	100
Venezuela	1981	100	0	0	0	100
Niger	1980	96	3	1	0	100
Senegal	1980	93	6	1	0	100
Jamaica	1987	91	9	0	0	100
Tanzania	1996	90	0	0	10	100
Rep. of Korea	1997	89	3	3	6	100
Rwanda	1980	82	4	5	8	100
Ethiopia	1996	80	0	0	20	100
Costa Rica	1987	79	15	0	6	100
Burundi	1981	78	9	6	8	100
Peru	1988	76	7	0	17	100
Kenya	1994	73	0	11	16	100
Uganda	1994	68	8	1	23	100
Japan	1995	63	17	19	0	100
Malaysia	1996	63	21	15	1	100
Togo	1981	59	1	3	37	100
Morocco	1994	58	32	7	3	100
Cameroon	1989	57	40	2	1	100
Mauritius	1996	56	0	2	42	100
Jordan	1995	52	25	17	6	100
Philippines	1995	44	38	10	8	100
Tunisia	1990	43	30	0	27	100
Sweden	1996	42	40	0	18	100
Sudan	1982	26	58	0	16	100
Ecuador	1986	10	83	3	3	100
Mean		75	14	3	8	100

Source: Palacios and Pallares (2000). Note: Provident funds in bold.

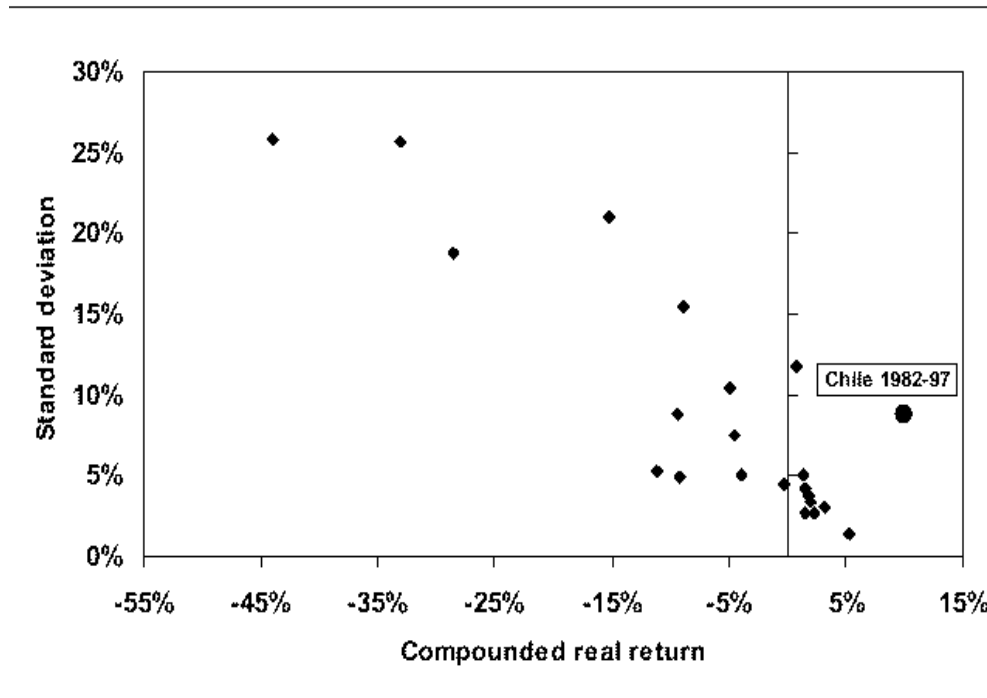
19. Another reason for lower financial sector requirements in the case of Russia is that the Investment Law could limit the participation of the private sector in the management of contributions to the funded pension system. There is the risk that the investment provisions of Resolution Number 165 might become permanent, either because of problems in the implementation of the Investment Law or by design. This risk is not far fetched because international experience suggests that publicly managed funds on average invest 75 percent of their assets in public debt and many invest only in public debt (Table 4).

20. There are other factors that could limit the participation of the private sector in the funded pension system and the financial sector requirements. First, for those workers who do not choose an asset manager in the funded system, the likely default choice is the conservative portfolio of the PFR. Second, the idea of providing a government minimum-return guarantee for the funds left in accounts of the PFR and not for those in NPF is gaining strength. A minimum real rate of return of 2 percent per year is envisaged for these accounts. If a minimum return guarantee is provided

only to the PFR accounts, it is likely that 90 percent of the workers will keep their accounts in the PFR. This will limit the amount of funds managed by NPFs and absorbed by the financial markets- to about US\$200 million a year. These amounts are very small relative to Russia's market capitalization of over US\$40 billion. and will therefore likely have a small impact on capital markets. In addition, a substantial part of the funds managed by the NPF will go into the banking system that has deposits of about US\$30 billion. and can easily absorb the contributions managed by the NPF. These flows are even lower than Bolivia's flows of about US\$260 million a year that have been easily absorbed by their financial and capital markets.

21. The flow and the stock of contributions managed by NPF will grow over time because of the increase in the contribution rate, growth in the number and salaries of workers contributing to the funded scheme, and because workers will realize that a guaranteed portfolio in government bonds yields a much lower return than a diversified portfolio and will switch to a NPF. As noted earlier, international experience with publicly managed pension fund portfolios is very negative with low or negative rates of returns and high-risk portfolios, and that is an important reason why these funds do not have a guaranteed rate of return. (Figure 10). In Russia, the return on government bonds continues to be negative in real terms because of the scarcity of financial instruments in the face of a high demand for them. Negative returns will not only damage the image of the funded pension system but together with the minimum return guarantee could generate an important fiscal liability if the guarantee is triggered. Unless foreign investment of pension funds is allowed at a faster pace, negative rates of return on government bonds could persist for some time. To limit the problems of the minimum return guarantee, the time period to calculate the guarantee should be a long one (at least five years). This way, short-term

Figure 10. Annual, Compounded, Real Returns and Volatility in 22 Publicly Managed Pension Funds (different time periods, 7 to 40 years).*



Source: Author's calculations based on data in Palacios and Pallares (2000).

fluctuations will not trigger the guarantee. By the time workers start joining in greater numbers, the NPF and the accumulated contributions that NPF manages are large, the Government of Russia will have to create the financial market conditions for the success of the reform.

22. ***Portfolio selection.*** The efficient allocation of capital to its highest return requires efficient choice of assets. Russia proposes to invest pension funds in both equity and public debt.

23. ***Passive investment of assets.*** Russia's pension reform envisages requiring pension fund asset managers to invest passively. The pension investment law mandates that at least the investments in equity will have to be in a market index. The rationale for this decision is market efficiency, net of transaction costs. Most of the empirical evidence about the superiority of index funds comes from the USA. The application of index funds for pension investment in other countries requires some particular construction for the index as well as a market mechanism through which index funds can be made more viable.

24. The Russian capital market will need to adopt some new mechanisms and policies to ensure that valuation of assets is adequate because the index simply reflects these valuations. This involves a large agenda that includes inter alia enterprise and bank accounting and disclosure reforms, corporate governance reforms, and upgrading securities market laws, regulations, and supervision.

25. The use of an index fund will have a negative impact on capital market development. Part of the impact of the introduction of a funded pension scheme is to promote the development of capital markets if it is accompanied by the right complementary reforms and by the participation of new participants with strong investment skills that generate and disseminate information about arbitrage possibilities. The impact of the pension fund external-asset manager, both on capital markets and on the risk adjusted return of the funds, is bound to be limited if it is restricted to passive investment.

26. The construction of the index into which the pension funds will be invested is critical and should be left to a specialized independent entity of international repute. Otherwise the Investment Committee would be subject to defining the index and setting the benchmarks in a way that leads the pension funds to satisfy the current needs of the government or other influential entities at the expense of future pension benefits.

27. The construction of the index is bound to be an ongoing process that will reflect developments in Russia's capital market and economy, as well as improved efficiency in the information about issuers of stock and bonds. The price of shares will be very sensitive to being included or excluded from the index, meaning the process will lead to ongoing conflict. The plan to use corporate ratings in addition to financial ratings in the construction of the index is a creative way to address some of the current information weakness. But it should be subject to periodic evaluation to assess its results, especially because corporate ownership transparency is a problem in Russia and this should affect the ratings. Currently there are three corporate rating agencies in Russia; one agency is just now launching a national credit rating.

28. *Government securities.* International experience shows that to circumvent financial market problems during the first years (a process that could amount to decades), most of the pension fund investments are in government securities. The Russian reform shows signs of following the same pattern. However, unlike other countries initiating pension reforms, the government's securities market is very weak. Therefore, first on the agenda for developing the capital market is reform of the market for government securities. The government securities market is a key component of any capital market, as it provides a safe benchmark return, against which the return on more risky assets can be assessed. Key aspects of the reform process are having in place an adequate and clear *debt management strategy* for the consolidated domestic and foreign debt of the Russian Federation; and a *transparent debt issuance policy* as well as communication channels with market participants with a view to tailoring issues to suit market preferences and thereby reduce debt service costs. Issuing debt instruments specially designed for pension funds would be detrimental to the development of the market for government securities, because it would reduce its depth and liquidity, and for pension fund members because it would lower their returns.

29. Over the long term, excessive and continued reliance on government securities would be undesirable. It would slow down the development of capital markets and reduce the impact on savings of the pension reform. It also would increase the pension system's risk of insolvency. Governments facing fiscal difficulties find it tempting to expand the money supply and drive up inflation to reduce the real value of government bonds. The scope of available instruments for investment of pension funds needs to be expanded as quickly as possible. This will require major reforms of financial markets in Russia, some of which have been noted above.

30. One option for dealing with limited securities and financial markets is to allow pension fund asset managers to invest a larger proportion of their assets than currently planned in major mature international markets. Investments abroad are a key aspect of ensuring competition and contestability for the use of the pension funds and thereby promoting the rapid development of a sound pension sector. While this would have a minor and temporary negative impact on the balance of payments, it would enable the desired quality of portfolio assets to be maintained. It would protect the value of the funds of the contributors. It would not constitute capital flight, as the deferred consumption represented by pensions would eventually be spent in the national territory. Investments abroad would need to be managed on behalf of the pension funds by reputable international investment management firms with some sort of guarantee against fraud.

31. *Supervision.* The condition of an effective regulatory and supervisory agency is being addressed by the creation of a Specialized Federal Agency. Most Latin American countries and some transition countries, such as Poland, Croatia, and Bulgaria, have opted to create a separate supervisory agency as opposed to using the existing supervisory agency. The argument for a separate agency is to ensure full focus of supervision efforts on pension funds, to the exclusion of everything else. The Baltic countries have opted to use the existing regulator, largely for economy-of-scale reasons.

32. The supervisory agency for the new pension scheme should be developed from the start of reform. The tasks of the new agency will initially be to ensure that only the

most qualified asset managers, out of the over 45 that are currently active in Russia, participate in the bidding process to select the asset managers for the pension funds, and to evaluate the foreign asset managers that participate in the bidding process. Over time, the agency will have to fully develop its other functions. Under the modern approach to financial regulation, the new agency will most likely use the services of external private accountants, auditors, and custodians to carry out its work. Use of international expertise provided by foreign regulatory agencies and international consultants will also contribute to the effective discharge of its functions.

33. The supervisory agency initially enforces regulations by relying on the reputation of the pension funds asset manager. The requirements to bid for management of the pension funds could be very strict and the managers would have to comply with service targets. Having only a few participants in the market could be considered a threat to competitive behavior. However, an international bidding process for the management contract, as in Bolivia, could also result in competitive fees and adequate service. This approach could also help address the problem of related parties in Russia. Although this recommendation contradicts the plans of Russia's Federal Securities Commission to have a single type of licensing for all asset managers, whether they are mutual funds or pension-fund managers, because these are mandatory contributions from the worker, the government is more likely to have to respond for any losses that might happen.

34. By the time the market for pension fund management is open, the regulatory agency should be prepared to fulfill five areas of responsibility: first, institutional control (licensing, marketing and advertisement, disclosure of information); second, financial activities, including collection processes, custodianship, asset valuation, return calculations, and investment limits, while collecting and cross-checking information from institutional actors; third, regulating and monitoring membership issues during the accumulation period (that is, the process of becoming a member or switching funds), including maintaining a strong complaints department and resolving complaints of participants; fourth, oversight of benefit payments--determining procedures for benefit payments, regulating annuities (some of this onus could result with the insurance regulator) and maintaining ongoing supervision of benefit payments; and fifth, analysis and planning. The regulatory agency should be politically independent, with clear regulatory and supervisory powers; authority to impose penalties and withdraw licenses; well-trained staff; and adequate budget.

3. Summary and Recommendations

Successful implementation of the second pillar requires the following:

- *Ensuring the volume of bond holding consistent with the overall government debt-management strategy.* Many countries have tried to circumvent financial market readiness by initially holding pension assets solely in government bonds. This is also likely to be the case in Russia. Of primary importance is ensuring that the increasing volume of bond holdings by the Pension Fund of Russia is consistent with the overall government debt management strategy. The government should also ensure that bonds purchased with pension monies pay market interest rates. Special pension fund bonds should not be issued at below market rates of interest. Effective oversight of the Pension Fund of Russia in its management of pension fund assets and accounts should be introduced.

- *Increasing the limits on foreign investment of pension assets.* Given that government securities markets are weak, one option for government is to make the limits on foreign investment of pension assets far less restrictive and to increase that share faster than proposed by law.
- *Ensuring that core financial conditions are in place.* While Russia has achieved a measure of macroeconomic stability, Russia's financial market are still weak. Before private pension funds are allowed to manage pension fund assets, it is very important that Russia should have the following conditions in place: first, continued macroeconomic stability; second, a core set of solvent banks; third, a core group of licensed custodians; fourth, stringent entry requirements for private asset managers to participate in the management of second-pillar assets; fifth, effective supervision of private-sector management of funds and accounts; and sixth, basic infrastructure and corporate governance (correct valuation of assets, reliable information about participating institutions, and the protection of minority stakeholders).
- *Strengthening financial and capital markets.* It is necessary to design and implement a long-term strategy for developing and strengthening financial and capital markets to complement the pension reform.

V. Administrative Capacity

1. The final and perhaps most important challenge to the reform program is ensuring that administrative capacity in the country is sufficient to implement the reform. Three parts of the reform have significant administrative implications: the new notional insurance benefit; the new funded benefit; and the shift in collection and payment responsibilities. The basis for benefits under the pay-as-you-go portion of the program will gradually shift to the worker's full career, and the calculation will involve tracking each worker's lifetime contributions to the system. This change will require the Russian Pension Fund to maintain much more information on the work history of each individual worker and maintain that information for a much longer period of time than under the old system.

2. Administering the new advance-funded component of the pension program will increase the importance of speed and accuracy in processing individual worker information, so that funded account balances accurately reflect each worker's actual contributions. It also increases the volume of data that the pension agency will have to process regularly and store in the account records of each individual worker.

3. The introduction of this advanced-funded component also fundamentally changes the relationship between the pension administrators and the Russian people. In the past, pension entitlements were set in law and, at least in principle, not affected by the financial operations of the pension agency. This will now change. Under the reform, a worker's future pension is directly affected by the efficiency, effectiveness and integrity of the contribution collection and pension payment agencies. If the new pension system is to have legitimacy, these two agencies will have to become more accountable to the Russian people for their financial actions.

4. The shift to the Tax Ministry of the responsibility for collecting contributions and to the Pension Fund of the responsibility for paying pensions may be wise social

policy in the longer run, but it comes at an awkward time in the implementation process. In principle, the change in collection responsibilities could improve the efficiency of the whole process of collecting taxes and social charges and reduce the burden on enterprises of discharging their fiscal responsibilities to the state. In practice, however, the shift in collection responsibility will make implementation of the reform much more difficult. For one thing, changing the roles at this moment disrupts the activities of the Pension Fund and the Tax Ministry at a time when the pension reform requires them, particularly the Pension Fund, to absorb new responsibilities. For another, dividing the responsibility for contribution collection and data management will complicate the reform by requiring effective collaboration on a continual basis of two independent agencies of government, a difficult challenge in any government under any circumstance.

5. The change in the pension benefit and financing structure increases the importance of effectively linking the Tax Ministry's records on each enterprise's contribution payments with the Pension Fund's records on each individual worker's earnings and pension contributions. Linking these two data sets would have been desirable under the previous pension system, as it provides a powerful tool for promoting compliance with the contribution requirements. It becomes even more important in a system under which, presumably, workers are not to be credited for deposits to their individual funded account unless their contributions are actually transferred to the pension fund and invested in the common account.

1. Systems Development

6. Perhaps the greatest single implementation challenge will be the development at the Pension Fund of an *accurate, integrated, national* database that tracks the pension credits and account balances of each individual worker. One aspect of this is developing the software modifications needed to adjust the Pension Fund's current earnings record system; a second is overcoming the telecommunications and other barriers to making the system a national system; a third is increasing the processing and storage capacity of the Pension Fund's information systems; and a fourth is developing and implementing operating procedures at both the Pension Fund and the Tax Ministry that will assure accurate and efficient operations.

7. The Pension Fund has already implemented a system for recording individual worker earnings credits. That system falls short of what will be needed in the future, however. For one thing, it lacks the capability to systematically cross-check the information reported about each worker's earnings with the actual pension contribution payments made by the employer. This link must now be added to the technical capabilities of the system and to the operating procedures of the two agencies involved in collecting contributions and collecting earnings information.

8. Because of the division of responsibility between the Pension Fund and the Tax Ministry, the two agencies will have to develop automated methods for transferring data from one to the other and protocols for reconciling discrepancies in the information contained in each database. Based on experience elsewhere, they are likely to find at the beginning that the employer reports to the respective agencies do not agree for over 10 percent, perhaps substantially more than 10 percent, of the reporting enterprises. Some enterprises will have reported more earnings than are implied by the contributions they paid, others will have reported fewer earnings.

Each enterprise must be contacted to determine the nature of the mistake--for instance, whether they forgot to include a worker in one of their reports, used the wrong figure for earnings in one of the calculations, or underpaid their contributions. This reconciliation process will be an ongoing workload for the two agencies. Over time, the percentage of reports with errors will fall, but probably not below 2 to 5 percent. How fast and how far it falls will depend on how effective the two agencies are in working with each other and how effective they are in working with the employer community to inform that community about reporting procedures and requirements and to develop streamlined methods for receiving employer reports and exchanging data.

9. The Pension Fund's current data system does not have the capacity to process the additional information that will be required under the reform, to link it to the pension payment systems, to move it geographically from one part of the country to the other and to execute the various responsibilities assigned to the Pension Fund. The Pension Fund also currently does not have sufficient capacity to store the information that it will need to make pension calculations under the reformed system.

10. The primary database used to store individual worker earnings and contribution information is actually spread across some 88 different locations corresponding to the different subjects of the federation. Efficiently processing data through such a decentralized system requires high-capacity telecommunications links between each of the data centers. For instance, when workers begin to select asset managers, data will have to flow quickly between the regions and the center to track fund movements to the asset managers and post investment results to each worker's account. The Pension Fund does not now have sufficient telecommunication capacity to implement these elements of the reform in such a distributed data system. As it procures new hardware to increase its processing and storage capacity, the Pension Fund will also have to evaluate whether the current data architecture represents an optimal approach to discharging its new responsibilities.

11. A second major challenge will be the introduction of a modern financial management system to track the movement of funds through the pension and tax systems and generate regular reports of the financial condition of the system. The basic purpose of the financial management system is to give the Russian people a reasonable assurance that their pension contributions are being used in the manner intended and that the funds being invested to support their future retirement are being handled properly. The new system ties future pensions to the financial results of the pension system's operations much more closely than did the old, making it more important for the general public to know the financial status of the system. Moreover, the adoption of a provident fund model requires significant improvement in trust, transparency, and accountability of the Pension Fund of Russia.

12. Building public confidence in the financial integrity of the pension system will probably require establishing a new procedure of issuing regular financial statements to the public, generated according to international accounting standards. A private Russian accounting firm with links to one of the major international accounting firms should audit an annual financial statement. That firm should be asked to attest to the accuracy of the statements, including the adequacy of the accounting and internal control systems used to manage funds and to generate the accounting statements. The statements should cover the fiscal operations of the pension system, including the

collection function, investment function, payment function, and any other operations of the Tax Ministry and Pension Fund.

13. The Pension Fund now complies with the accounting requirements established for Russian government agencies and is audited by the government's Audit Chamber. These standards and audit procedures and the reports that are issued under them are probably not sufficient to provide the assurance that the Russian people deserve about the uses to which that their funds have been put. International accounting standards have developed over the years for the precise purpose of providing both top-level managers and absentee owners an accurate picture of the financial status of the enterprise. They are far from perfect, but they will vastly improve the quality of the information given to the real owners of the new Russian pension system, the millions of workers who are paying into it to provide for their own future retirement.

14. A third major administrative challenge under the new system will be the regular issuance to each individual worker of an annual statement showing the pension contributions that were credited to the worker that year and the current balance in the worker's portion of the funded account. As soon as is practical, the statement should also show the cumulative credits that the worker has been given over his lifetime under the pay-as-you-go portion of the system. Such a report will form an essential link between the workers and the pension system, informing the workers of their current entitlements, helping to assure them that the moneys being paid into the system on their behalf are generating the future pension promises that are intended, and providing workers with a mechanism for informing the pension agency of any errors in their accounts so that the errors can be corrected in a timely manner. Annual individual reports are also an important part of the financial management system just discussed, as they provide one more avenue for assuring that all monies entrusted to the pension agencies are handled properly.

2. Institutional Development

15. The systems development challenge facing the Ministry of Taxation and the Pension Fund is complicated by the institutional changes that are occurring simultaneously. The Ministry of Taxation has assumed a new set of responsibilities. It is now responsible for the collection of pension contributions and, whether it likes it or not, a new set of responsibilities in connection with the reconciliation of contribution and collection data. In addition, the Pension Fund has lost the activity that provided its major institutional focus for the first decade of its existence—the collection of contributions--and acquired a major new responsibility—paying of pension benefits--all within one year of the effective date of the pension reform. Major institutional changes such as these are a substantial barrier to introducing the administrative improvements needed for successful implementation of the pension reform.

16. The Pension Fund must implement a major institutional change at the same time it implements the new law. The basic mission of the Pension Fund changed abruptly in 2001, when its major activity shifted from collecting pension contributions to paying pension benefits. Responsibility for collecting pension contributions was shifted to the Ministry of Taxation. Previously, the Pension Fund had been responsible for paying pensions in all or a portion of 27 subjects of the Federation. A

presidential decree issued in 2001 shifted payment responsibility in the other 62 subjects of the Federation to the Pension Fund.

17. Taking over the payment function in the rest of the country complicates the implementation of the reform by competing for the attention of the agency's leaders and for the Pension Fund's administrative resources. It requires the Pension Fund to negotiate agreements with the regional governments of each of the subjects covering the transfer of a portion of the staff and equipment previously housed in these governments' social protection offices. The Pension Fund must find new space and acclimate its new staff. In most cases, the newly acquired staff arrive with obsolete information technology equipment that calculates pensions using one of 33 different and incompatible software programs and that is incapable of meeting the data-processing requirements of the reformed pension system. The fund would have to acquire and install new equipment, introduce new operating procedures, and retrain the staff, just to keep the current pension system going. The requirements associated with introducing the new pension system are in addition.

18. As of the beginning of 2002, when the pension reform became effective, three subjects of the Federation had not yet reached agreements for the transfer of payment responsibilities, including Moscow City.¹⁰ In other areas, agreements had been reached but the actual transfer had not yet occurred. In all of these areas, the implementation of the pension reform is likely to take longer and involve more difficulties because of the need to implement the organizational change simultaneously.

19. At least in its first year, the shift of responsibility for collecting pension contributions to the Tax Ministry has had a negative impact on aggregate collections. The Tax Ministry reports that aggregate pension collections in 2001 were RB470 billion, which is a 7 percent increase over the amount collected by the Pension Fund in 2000. However, the Goskomstat estimates that total wage payments in Russia rose by some 40 percent and that nominal gross domestic product increased by 24 percent between 2000 and 2001. The Goskomstat figures suggest that pension contributions should have risen by a good deal more than 7 percent, if the first year's effort by the tax authorities was as effective as the last year's effort by the Pension Fund.

20. The Russian government is assuming that increases in compliance will help finance the costs of the transition to funded accounts. It will need to monitor closely the aggregate collection experience at the Tax Ministry to assure itself that the first year's experience reflects only a transitory, start-up problem and not a trend.

3. Coordination of Functions: Data and Funds

21. The shift in the responsibility for collecting pension contributions has greatly complicated the administration of the pension system, and the current arrangements may ultimately prove to be unworkable. One problem is that while responsibility for collecting contributions was shifted to the Pension Fund, responsibility for collecting employee-specific data was not. This kind of pension reform can succeed only if the

¹⁰ Moscow City provides its residents with a supplemental pension payment financed from its own resources. The Pension Fund and the city government have to work out how to transfer responsibility for paying the supplement along with the responsibility for paying the other pension benefits.

data and the contribution money are well coordinated, but they now will flow through separate channels and coordination will be difficult at best. A second problem is that the Pension Fund retains certain responsibilities associated with contribution collection that are poorly coordinated with the responsibilities of the Ministry of Taxation. A third problem is that the law governing the collection of any arrears appears to significantly disadvantage both the insurance and funded portions of the pension program.

22. Under the new procedures, enterprises are to pay pension contributions monthly through deposits to three separate accounts, one for the 14 percent social tax, one for the contribution to the insurance portion of the benefit and one for the funded portion of the benefit. The allocation between the latter two depends on the age of the individual on whose behalf the contribution is being made. Enterprises report their aggregate payments quarterly to the tax authorities. Their final report for a calendar year is due March 30 the following year, and the tax authorities generally take up to three months to check the accuracy of these final reports. Thus, the tax authority is not in a position to certify an enterprise's contribution payment amount until the middle of the following year.

23. The tax authority receives no information about individual employees of the enterprise and therefore has no way of knowing how the aggregate amount reported for an enterprise's workforce compares to the aggregate amount of the enterprise's payments or whether the division between the insurance account and the funded account is accurate. Reconciliation of the individual data with the aggregate financial flows is the responsibility of the Pension Fund.

24. It is unclear at this time how effective the reconciliation process will be, but it will be slow. Information on individual employees is to be filed with the Pension Fund twice a year. In principle, contributions should not be credited to either the insurance or the funded account of a worker until the Pension Fund knows that the contributions were actually paid and that the proper division was made between the insurance account and the funded account. It will not know this, however, until it receives the final report from the tax authorities, some six months after the end of the year in question. The Pension Fund can make provisional allocations to workers accounts based on unverified employer reports, but will have to adjust these allocations when it receives the actual information on contribution payments. Such an arrangement can be implemented fairly easily in the insurance part of the program, since errors can easily be corrected retroactively. For the first few years, provisional allocations could also be made into the funded portion, since retroactive corrections would also be fairly easy as long as all contributions are held in one common account. A problem arises, however, when workers begin selecting different account managers. Forwarding money to individual account asset managers based on provisional allocations could be far more problematical when this occurs, as retroactive adjustments may alter the intended allocation of assets among account managers.

25. Reconciling the contribution receipts with the individual worker information is likely to be a difficult process, at least until new data-processing equipment and operating protocols can be developed. At present, there are no protocols about how this process will be executed. There are no mechanisms for automated transfer of information between the tax and pension agencies; the information apparently will be transferred by exchanging paper copies of forms. The process will be complicated by

the fact that the tax and pension agencies use different sets of numbers to identify enterprises. It is not clear what role, if any, the tax authorities will play when the reports do not match and the enterprises must be contacted to try to resolve differences. The first reconciliation of tax and pension data will involve the 2001 data and begin this April. It should be closely monitored by the Russian government to try to resolve as many problems as possible before the 2002 reconciliation is undertaken

26. Although the Ministry of Taxation is now responsible for collecting the social tax, its role with respect to the contributions to the insurance and funded portion of the new pension system might better be described as a receiving and accounting service. Responsibility for actually enforcing these two contributions still rests with the pension fund.

27. In principle, the Ministry of Taxation is to report to the Pension Fund whenever an enterprise is late in making its contribution payments. The Pension Fund is then to go to court to obtain an order to force payment of the contribution. The information flow did not work smoothly during 2001, so that the Pension Fund often was not aware that contributions had not been paid and no enforcement actions were taken. On February 4, 2002, the two agencies signed an agreement designed to improve the information flow from the tax agency to the pension agency, allowing the latter to try to collect late pension contribution payments. It is too early to know whether this agreement will solve the problem. Under the best of circumstances, however, the process will suffer from the same weaknesses noted earlier with respect to contribution reconciliation, namely the lack of a common enterprise numbering system and of automated data transfer capabilities.

28. One aspect of the current collection arrangement is particularly problematical from the perspective of the financial condition of the pension program and the adequacy of future pension benefits. Under current law and procedures, enterprises are liable for a 28 percent social tax from which they may deduct the 14 percent that is to be allocated to contributions to the insurance and funded portions of the pension. If an enterprise is late in making any part of its 28 percent payment, the tax authorities are permitted to seize any balance in its bank account and take other direct actions to collect the payment. All such recoveries by the tax authorities go to the budget as part of the social tax, however. None goes to the other two parts of the pension system.

29. When enterprises are in arrears, it is up to the Pension Fund to try to collect the overdue pension contributions. It can only initiate action when it finds out about the arrearage from the tax authorities, and its collection powers appear to be limited to initiating court proceedings. The arrangements raises serious doubts about the extent to which arrears in pension contributions will ever be resolved in a manner that allows workers to get credit in their insurance and funded accounts for their employer's payment. The Russian government should closely monitor the impact of this arrangement to make sure that workers covered by the pension system are treated fairly.¹¹

¹¹ If the Pension Fund is successful in collecting back contributions, the enterprise is allowed to deduct any payments from future liabilities under the social tax. Thus, if the court process is successful, another data exchange will be necessary so that the Pension Fund may inform the tax authorities of the future deduction.

4. The Critical Role of Implementation Planning

30. Two countries in the region, Poland and Sweden, have recently implemented pension reforms similar in structure to the Russian Reform. As with the Russian reform, these other two reforms introduced a benefit and financing package that combined a pay-as-you-go, notional defined contribution element with an advance-funded, individual account element. Neither of these countries attempted to shift responsibilities for collection of pension contributions and the payment of pension benefits from one agency to another at the same time as they were introducing the reform of the benefit structure. Also, neither of the other countries attempted to implement this kind of reform when the responsibility for collecting contributions was assigned to a different institution than the responsibility for processing individual data. In these respects, the implementation challenges are greater in Russia than in either of the other two countries.

31. In Poland, the pension reform experienced significant implementation problems that caused many beneficiaries to lose a portion of their entitlements and undermined the credibility of the reform. The problems arose because Polish policymakers were misled by the implementation agency about its readiness to process collections and collection information on the date that the new reform took effect. Poor implementation capacity meant that the contribution collection process lacked adequate controls. As a result, the implementation agency did not know if enterprises were paying the proper amount. The information systems could not handle the data processing requirements, so that the agency did not know which workers should be credited with the contributions that were collected or which asset manager should be receive the funds. Polish authorities have had to spend several years trying to straighten out the situation.

32. The administrative structure that the Russian reform seeks to establish is more complicated than that adopted in Poland. In addition, in many respects the Russian Pension Fund is a weaker institution than the social insurance agency in Poland, if only because its mission has changed so fundamentally and so recently. For these reasons, the Russian reform runs a high risk of experiencing the same sort of administrative problems as the Polish reform; indeed, the Russian reform has the potential for even greater problems than experienced in Poland.

33. Successful implementation of a reform as complex as the Russian reform requires good planning, effective coordination, and realistic implementation timeframes. At this point, it is not clear that the Russian reform has any of these. The implementation process thus far has been characterized by poor coordination, at least between the two major implementing agencies, as evidenced by the difficulties involved just in obtaining an agreement to inform the Pension Fund of the existence of arrears. The implementation timeframes established in the legislation are arbitrary and unrealistic. The insurance portion of the new benefit took effect within a month of the enactment of the legislation. The target date for the implementation of worker choice appears to be two years hence, implying that the Russian pension fund will be able to design, procure, install, and test the necessary data-processing capacity in two years. This is far less time than was required to write and test software that Sweden needed to implement its reform. It is unclear whether a comprehensive plan exists that lays out the schedules, lists the resource needs and implementation dependencies, and assign clear responsibilities for each step of the process.

34. The next step in the implementation of the pension reform should be the preparation of a comprehensive and realistic implementation plan, covering all of the parties that will have to work together to make the reform a success. As a first step in developing such a plan, the pension and tax agencies should agree on a common strategic vision of the system they are trying to create. Since the agencies will have to work together to implement the reforms, it is important that they agree from the beginning on their goals. What are the operational characteristics of the pension system that they hope to create? How is responsibility for operating the system, particularly in reconciling contributions and earnings information, to be divided between the two agencies? What changes in each organization will be necessary to achieve their objective? What other changes will be needed? The lack of a common vision is a frequent source of problems when more than one organization is involved in implementing a new program. Even where responsibility for implementation is entirely within one organization, the articulation of a strategic vision by the organization's leaders will improve the odds for a successful implementation by allowing all those within the organization to understand the strategic direction that management is pursuing.

35. As a second step, the two agencies should develop a detailed implementation plan. This plan should outline the entire sequence of steps that will have to be taken to put the reform in place. To avoid the kind of mistakes that plague program implementation around the world, the plan should include:

- *A statement of all of the internal and external dependencies in the implementation process.* For example, in what order must each step in the process be completed? What decisions need to be made by the leaders of either agency, leaders of other agencies and ministries, or the Duma in order to complete the implementation? Which tasks can be undertaken before these decisions are made? Which must await the decisions? The plan needs to make the entire sequence of events clear so that all will understand the consequences of delay at any point in the process.
- *A detailed and realistic time line.* The plan must contain realistic estimates of the time required to complete each step and measurable milestones suitable for determining whether project implementation is on time. Policy leaders need to be informed about the total time that will be required for implementation and the consequences to the time line of delays in any of the critical steps in the implementation process.
- *Estimates of the administrative resources.* The plan needs to estimate the costs of such factors as building systems capacity, financing outreach to employers, and training the employees of the respective agencies. The agencies cannot be expected to implement reform without the necessary resources.
- *Assignment of the responsibility for completing each step in the process to a specific individual.* If the project falls behind schedule or if adjustments to the plan are needed, it is important to identify the parties that are accountable for progress and will be responsible for implementing any changes.

36. One of the common causes of delay in implementing major social programs is the emergence of issues that were not anticipated at the time the implementation plan

was developed. These unforeseen issues are particularly troublesome when they cannot be resolved by the implementing agencies alone, but require the intervention of higher-level government officials. The implementation of the Russian pension reform will be a complex undertaking at best, requiring the cooperation of at least two major government agencies. For this reason and to help address any unanticipated policy issues emerging after the implementation plan has been developed, the government should take an active role in overseeing the implementation process. The strategic and implementation plans should be reviewed and approved by the government. A designated official there should meet regularly – perhaps once each month – with the officials responsible for program implementation in each of the operating agencies to review progress and deal with emerging issues.

37. Perhaps the greatest threat to any implementation effort comes from unrealistic time lines and inadequate program testing. Complex pension reforms can require anywhere from two to five years to implement fully. Political and policy leaders usually do not appreciate the complexities of the implementation process and, anxious to demonstrate progress to their constituents, pressure administrators to implement reforms quickly. (The temptation seems to be particularly strong where these same political and policy leaders have themselves spent three to five years debating the policy issues and cannot understand that the implementation process can take just as long as the policy development process.) On more than one occasion and in more than one country, implementation disasters can be traced to policymakers who established unrealistic deadlines and administrators who made unrealistic promises about the timeframe required to implement the reform.

38. A closely related problem arises when last-minute changes are made to the policy contours of the program. Officials in charge of program implementation must be as realistic about the impact of last-minute changes on the implementation schedule as they are of the timeframe required when the original schedule is drawn up. Policymakers have to be told when a last-minute change will seriously disrupt the implementation schedule, and require delaying previously scheduled effective dates.

39. A final issue concerning the implementation time line involves the testing of new procedures and information systems. Implementation timeframes need to include sufficient time to fully test new systems and procedures, as new systems rarely operate as effectively when first implemented as their designers anticipated. Occasionally, testing will reveal that the systems and procedures are simply not adequate. In these cases, there is little choice but to delay the scheduled effective date of the reform until adequate systems and procedures can be devised.

40. In contrast to the situation in Poland, the Swedish reform was implemented smoothly. One major difference between the Polish and Swedish situation was that the Swedish government had the foresight to delay the implementation of the reform for almost three years to make sure that the information systems worked properly before the program was initiated. The Russian government should also make sure that all of the necessary information systems are in place and operating effectively before it attempts to implement worker choice of asset managers.

5. Summary and Recommendations

41. The reform poses three basic challenges for administration of the pension system. First, the Russian Pension Fund must maintain much more information on the work history of each individual worker, and maintain that information for a much longer period of time than under the old system. Second, the introduction of this advanced-funded component will require the agencies handling contribution collection and pension payment to become more accountable to the Russian people for their financial actions. Third, dividing the responsibility for contribution collection and data management complicates the reform by requiring effective collaboration on a continuous basis of two independent agencies of government in order to reconcile data and financial flows, a difficult challenge for any government under any circumstances.

42. Overcoming the administrative challenges facing the pension system requires the following actions:

- *Creating an accurate, integrated, national database for tracking the pension credits and accounts of individual workers.* This requires first, developing the software modifications needed to adjust the Pension Fund's current earnings record system; second, overcoming telecommunications and other barriers to making the system a national system; third, increasing the processing and storage capacity of the Pension Fund's information systems; and fourth, developing and implementing operating procedures at both the Pension Fund and the Tax Ministry that will assure accurate and efficient operations.
- *Developing a modern financial management system.* This system is important for four reasons: first, tracking the movement of funds through the pension and tax system; second, generating reports on the financial condition of the pension system and audits of annual financial statements; third, ensuring the accuracy of accounting and internal control systems to manage funds and generate accounting statements; and fourth, covering the fiscal operation of the pension system, including collection, investment function, and payment.
- *Instituting regular issuance to each individual worker of an annual statement.* An annual statement showing pension contributions credited to the worker in that year and the current balance in the worker's funded account is important for improving accountability and increasing the transparency of the pension system.
- *Strengthening of the payment functions of the Pension Fund.* The PFR must undertake successful upgrades of its staff skills and equipment and conclude, with all regional governments, all agreements necessary to meet its new payment functions.
- *Improving the coordination of collections of data and contributions.* Ensuring coordination of functions among the Treasury, the Tax Authority, and the Pension Fund on the collection of data and funds, and instituting procedures for reconciliation of differences in data and fund flows in the two agencies are key factors for improvement.
- *Developing an implementation plan.* Successful implementation of a reform as complex as the Russian pension reform requires good planning, effective coordination, and realistic implementation timeframes. The main issues to be

addressed in such a plan include: a complete statement of internal and external dependencies; a detailed and realistic time line; an estimate of administrative resources to build systems capacity; and the assignment of responsibility for each step to a particular individual. International evidence from Sweden and Poland shows that for successful implementation these issues ideally should be solved prior to the implementation of the reform.

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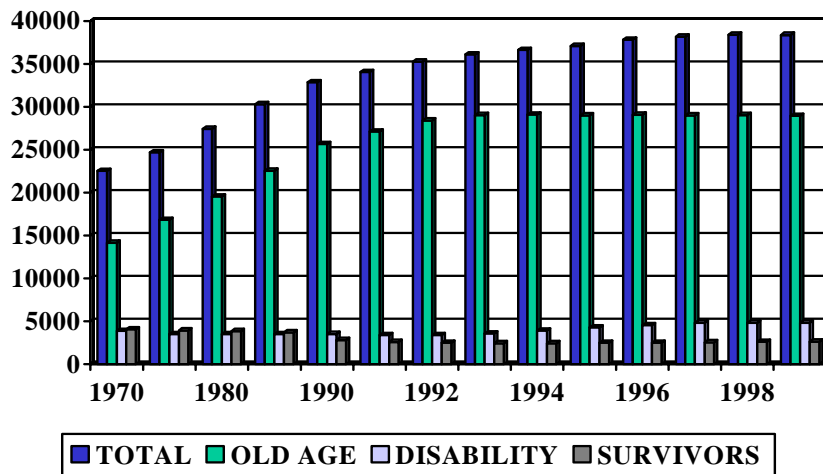
Annex I

A Description of the Pre-Reform Pension System.

The previous pension system consisted of two main parts - public and voluntary (or non state pension funds). The public pension system was comprised of a mandatory defined benefit pay as you go scheme. The system provided pension benefits to contributing individuals in the event of old age, disability, survivorship, based on a defined benefit formulas and eligibility requirements. Separate laws and legal acts established pensions for civil servants, including members of Parliament, tax police, customs servants, judges, prosecutors, cosmonauts.¹² In 2001, about 52 million workers contributed to the system, while about 40 million individuals received benefits. The largest number of beneficiaries are old age pensioners, while survivorship and disability benefits are received by a smaller share of total pensioners. (Figure A1)

Since 2001, the contributions from workers towards future pensions have been collected by the Central Tax Authority on the basis of a single social payroll tax, of which 28 percent is earmarked for pensions, lower than in most CEE countries, but higher than OECD norms (graph). The calculation and payment of pensions is made by the Pension Fund through its regional offices across Russia. Prior to 2001, the Pension fund collected contributions at the

Figure A1: The evolution of pensioners, by type, 1970-1999 (000)



Source: PFR statistics

¹² The public pension system in the Russian Federation was formed on the legal basis of about 50 different federal laws and legal acts. The main and most important laws were the federal law the Russian Federation “On State Pensions in the Russian Federation” (# 340- FZ as of November, 20, 1990), “On pension provision to persons who conducted military service, service in internal affairs offices and their families” (as of November, 12, 1993), “On social protection of persons victims of radiation and Chernobyl catastrophe” (as of May 15, 1992). “On the procedure for calculating and raising state pensions” (as of July, 21 1997 #113-FZ). Separate laws and legal acts established pensions for civil servants, including members of Parliament, tax police, customs servants, judges, prosecutors, cosmonauts.

regional level, and transferred them fully or partially to social protection bodies for payment of pensions. Funds not transferred to SP bodies were accumulated at the federal level accounts of the PFR and redistributed among deficit regions. Total contributions for the pension fund were higher, 29%, of which 28 percent were paid by employers and 1% by workers. Since 1992, private voluntary pension schemes, or non-state pensions, have also been available to individuals. Currently there are 260 licensed pension funds in the industry with 21-22 bln RUR under management and 15.5 bln RUR in reserves (540 million USD). Funds are predominantly established under corporate sponsorship, but there are examples of pension funds open to broad public. Eligible pension products include annuities and programmed withdrawals, while lump-sum payments are prohibited.

B. The key issues with the un-reformed system

The previous pension system faced several problems that limited its ability to protect pensioners, and did not limit its exposure to the financial problems caused by future aging of the population.

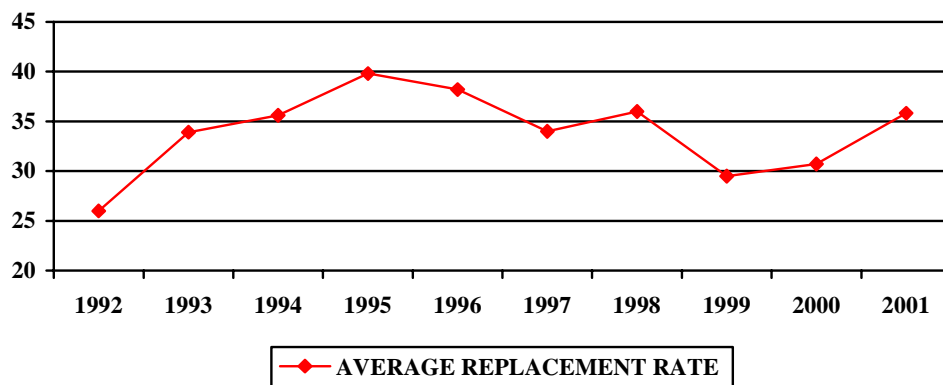
Eligibility Structure. The benefit and eligibility structure of the old system was quite complex. Retirement age of 60/55 for men/women—lower than in most OECD and reforming CEE countries. Eligibility was very complicated. For example, almost 250 categories of the pensioners under the basic pension law were eligible for receiving different privileged or early retirement pensions, including mothers having 5 and more children, some categories of disabled, those working in hazardous working conditions, working in the Northern territories or territories which are regarded as equal to Northern territories. The number of pensioners covered by other than general pension system (military pensioners, judges, customs e.t.c) is not known precisely, but has been estimated in the range of 2-6 million persons. The average pensions received by those covered by other than general state pension system are significantly higher than those received according to basic pension laws. The lack of data makes it impossible to provide correct estimates of the amounts paid through those pension systems, but experts indicate that these pensions might be 3-6 times higher than state pensions.

Benefit calculations were also not very simple. Originally, benefits were paid according to a single formula. According to this formula, the pension was 55% of the previous wage (assessed at best five or last two years) with an additional 1% for each additional year of service, but not more than 75% of wages. In 1997, a second pension formula was introduced, with the purpose of increasing differentiation in pension benefits. Currently, a larger share of pensioners receives benefits according to this new formula.

The new formula was based on the so called individual coefficient of a pensioner. This was calculated by calculating the percent of accumulated pension (based on years of service) and multiplying it by the ratio of average monthly earnings (assessed over an individual's contribution period) and the national average wage/salary for the same period. The new formula was introduced without elimination of the previous pension formula, complicating the benefit structure. Individuals could choose the benefit formula they wanted for assessment of their pensions. Further complications were introduced by a complex compensation system which existed as a supplement to the basic pension.

Generosity The pension system provided low and uncertain replacement rates. Though, as noted above, the replacement rate envisaged in the legislation was roughly 70-75% of best five or last two years wages, ad hoc pension indexation have compressed the actual replacement rate to 35-36% (Replacement rate as of 2001 was 32.5%). (Figure A2) While this replacement rate is lower than the mean of select CEE transition countries (46 percent), it is not very low relative to the mean of high income OECD countries (41 percent), and is consistent with the mean replacement rate of select FSU countries (32 percent), it has been very uncertain. The main reason has been ad hoc indexation and pension benefit arrears in the past.

Figure A2. The effective replacement rate of the Russian Pension System

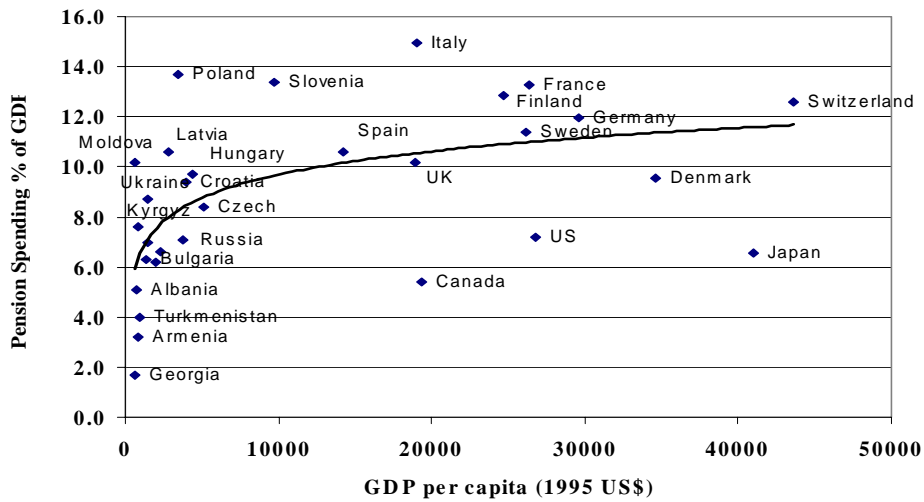


Source: expert estimate based on PFR statistic

The ad-hoc indexation has also meant that pensions are virtually flat with a strong redistribution towards low income earners. Minimum pension (plus compensation) in 2001 was 600 rubles per month: 17.5 % of average wage and by law, could not be lower than the minimum wage (300 rubles per month) The ratio between minimum and maximum pension is approximately 1:1.8. The replacement rate for low income earners is above 100% while for high income earners it is below 10%.of wages. The mix of distributional and savings objectives of the pension program introduced distortions because it reduced an individuals' incentive to contribute to the pension system.

Financial Solvency/ Financial Sustainability The pension system had a history of financial problems. Low rates of economic growth, and a decline in contributors (a result of growing unemployment and tax compliance problems) have led to substantial contribution arrears in

Figure A3. Relative spending on pensions in transition and OECD countries



So

Source: World Bank, Social Protection Strategy Paper, ECSHD, 2000.

recent years. Prior to introduction of the social tax, the arrears in contribution were 151.6 billion rubles as of January, 2001 (approximately equal to a half year pension payments) (2.1% of GDP) as compared to 129.3 billion rub in 1999. (2.7% of GDP). Pension benefit arrears have also been substantial and reached up to 3-6 months (50-80 billion rubles), though these were eliminated in 1999. In 2001, Pension expenditures as a share of GDP were 5.6 percent and were low by Eastern and Central European standards, but roughly in line with expenditures in country's with similar levels of GDP (Figure A3, above). The pension fund is currently in surplus, however, given the favorable economic situation of the country.

Figure A4 The Ratio of Contributors to Pensioners, 1992-99

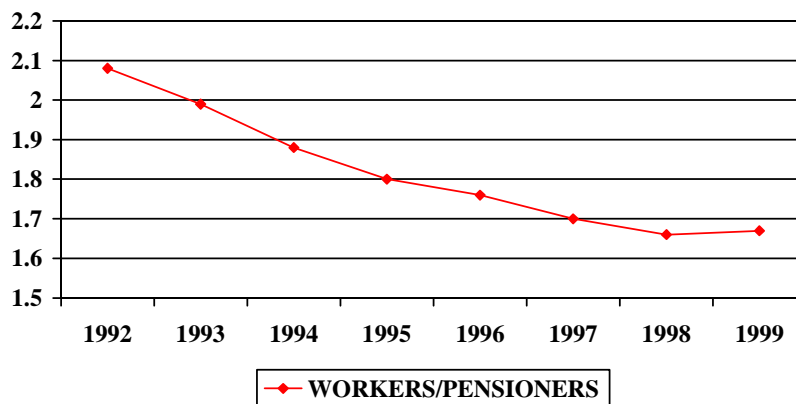
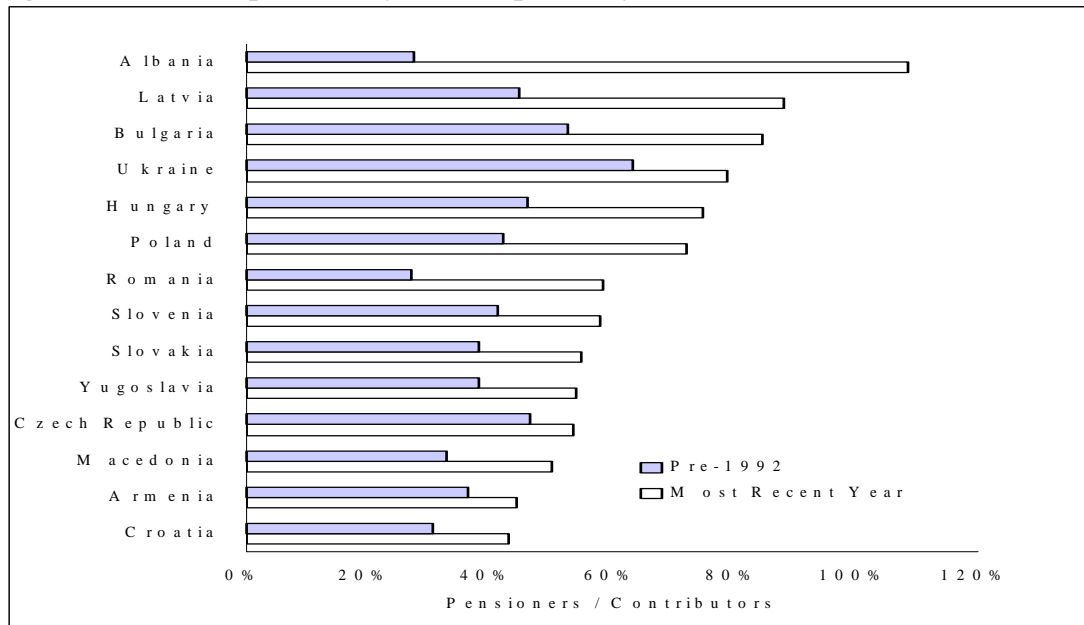


Figure A5. The pension system dependency ratio in Transition Countries

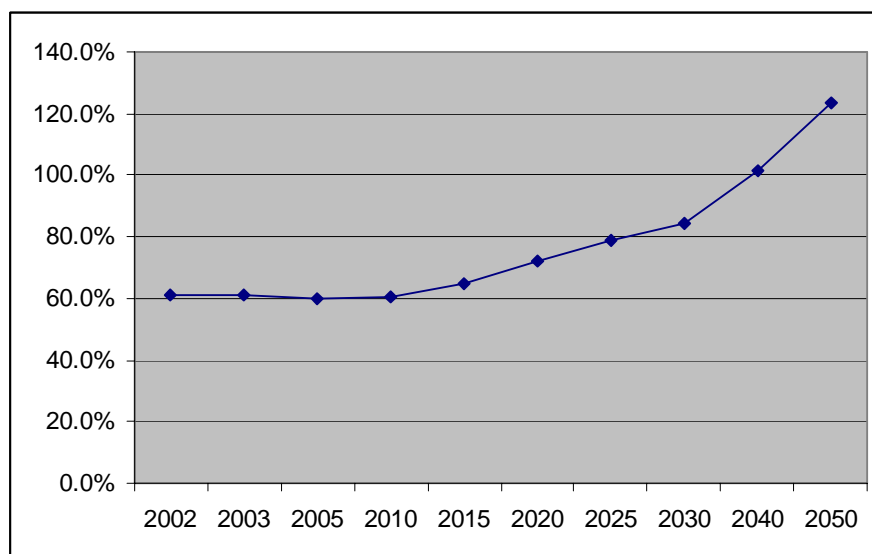


Source: World Bank, 2000.

What factors contributed to these problems? The pensioner to contributor ratio (or dependency ratio) was 48 percent in 1992 (nearly 2.1 contributors/pensioners) and has been increasing over the past decade, reaching 60 percent (or 1.7 pensioner in 1999 (Figure A4). The increase in the dependency ratio is consistent with developments in other transition countries (Figure A5) is amongst the highest in the region. The increase in this ratio is a result of growing rates of unemployment (pre-1998) and tax avoidance. Tax rates in Russia are high relative to OECD countries but lower than those prevailing in most CEE countries. Economic growth and the decrease in the unemployment rate should help improve this ratio and consequently, the finances of the system, but tax avoidance will decline if there are improvements in tax administration and enforcement. Other factors for improving compliance—which may have a much smaller impact—are a reduction of the tax rate (from fiscal savings) and/or if individuals believe that they are receiving benefits commensurate with their contributions.

The pension system will face major financial insolvency in the future as a result of population aging. Over time, the contributor to beneficiary ratio is expected to worsen as the population ages, making it difficult for a shrinking number of workers to finance pension obligations to a growing number of pensioners. As the following graph shows (Figure A6), the dependency rate will likely increase from the current 60 percent to over 100 percent in the long run.

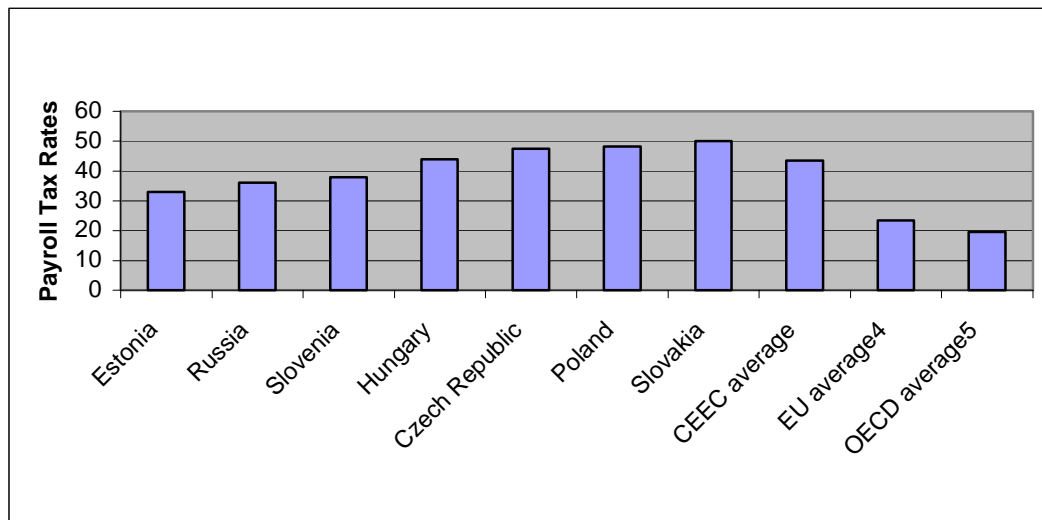
Figure A6. Projection of System Dependency Ratio (Base Case¹³)



Administration The Pension system is administrated through different institutions. A Pension Fund of the Russian Federation (PFR) was created in 1991 as an extra budgetary system of collection of pension insurance contributions paid by employers and employees. Strategic planning of pension system development is a responsibility of Ministry of Labor and Social Development, Ministry of Economic Development and Trade is responsible for economic forecasts of pension system development and development of the investment issues, Ministry of Taxation plays its role as a collector of pension contributions within the unified social tax. Regional social protection services prior to 2001 were responsible for calculating and paying pensions to pensioners, but starting with year 2001 according to the decree of the president it was decided that PFR should receive a responsibility to calculate

¹³ The projection is based on a base case macro-economic scenario and particular demographic assumptions (see Annex 2 for details). The macro-economic developments influence the dependency ratio, in addition to demographic assumptions, because they influence the rate of employment and therefore the number of contributors to the system. The Fiscal projections were undertaken by Dmitri Pomazkin with assistance of Jean Noel Martineau based on a pension system forecasting model developed by an Independent Actuarial Information Analytical Center. The full description of the model and results are attached as Annex 2

Figure A7: Payroll Tax Rates in Russia, CEE Countries, EU, and OECD



Source: World Bank, 2000

and pay pensions. So in 87 regions of the RF (two regions are still against unified pension service concept) the appropriate social protection bodies responsibilities were transferred to PFR

The pension fund has made significant gains as an institution over the past ten years in both collecting and paying out benefits, but it has faced major challenges in its operations. As noted above, the complexity of the eligibility criteria and benefit formulas for standard pensions, and many special privileges and pensions noted above, makes the calculation of pensions and administratively cumbersome, imposing considerable burden on pension fund staff.

The PFR introduced individual accounts, which is a major step forward. However, considerable remains to be done. The unified pension service is not operational in 2 regions, and data transfer between and across regions, or changes in the location of pensioners could still be improved. It is also not clear that the pension fund has the full data management capacity or data system architecture required for maintaining individual accounts.

The PFR activities have also not been standardized and are not very transparent. The legal status of PFR was not changed from the time of its establishment in 1991, and it is mainly a contribution collection institution; pensions were calculated and paid by local social protection bodies. However, the subsequent establishment of the unified pension service on a national level in 2001 or of transferring of collection responsibility to Tax ministry has not been reflected in PFR Charter and appropriate status legal documents. Finally, the accounting system of the PFR does not correspond to international accounting standards. This makes tracking arrears payments very difficult (though this may have been solved by the shift of such tracking to the Tax Ministry)

The introduction of the social tax collected by the central tax authority was intended to reduce the regional inequity in the collection of contributions and payment of pension

benefit, and streamline the revenue system. However, it poses a major challenge from an administrative perspective. This is because the reform has split information and revenue collection for the pension system. Since the Pension Fund no longer collects revenue, discussions with pension fund officials indicate that employers are often not as willing to provide information on employment records to the Pension Fund, making it difficult maintain individual accounts.

Another key issue is the weak statistical base for pensions. Pension statistics are collected by PFR, but these do not provide several key indicators, making it impossible to assess the number of pensioners by age and by gender. Some of these problems may have been inherited from local MLSD offices which are also limited by the same equipment and system shortcomings noted above.

In summary, the above mentioned problems, including the fiscal unsustainability of the system because of future aging of the population, low and uncertain benefit, insufficient linkage between benefit to contributions and, its complexity of administration (several formulas, extensive eligibility), were the key factors that contributed to the reform of the pension system.

Annex 2

Pessimistic Case										
A. Macro-economic Assumptions										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Real Productivity Growth Rates	3.0%	2.8%	2.4%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Inflation Rates	18.0%	17.0%	15.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Real Rates of Return on Funded Accounts before expenses	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Unemployment Rates	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Labor Participation Rates	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%
Wage Growth in excess of Productivity	1.0%	0.9%	0.8%	0.5%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%

B. Other Assumptions and Parameters

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Demographics										
Mortality, Fertility & Migration	Medium Population Projections as prepared by Russian Demographer, V. Andreev									
Relative Wage Levels										
Female / Male Wage Ratio	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Self-ed/Employed Wage Ratio	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Contribution Rates										
Total	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%
Base Pension	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
NDC - Employees < 36	11%	11%	10%	9%	8%	8%	8%	8%	8%	8%
NDC - Self-ed	RUR 145/month increased by average wage growth									
Funded Scheme - Employees < 36	3%	3%	5%	6%	6%	6%	6%	6%	6%	6%
Effective Contribution Rates										
Collection Rates - Employees	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Collection Rate - Self-ed	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Evasion/Exemption	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Effect of regression contribution rate	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Non contributing participants Eligible to an NDC Pension	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Funded Scheme Expenses										
Sale and Set-up Expenses as % cont.	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3%
Accumulation Period Asset Management Fee as % Account Value	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Annuity Purchase Fee	5%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Liquidation Period Asset Management Fee as % Account Value	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

Paygo Scheme Expenses										
Administrative Expenses as % of Cont.	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Adjustment and Indexation										
Basic Pension Level	RUR 560	Price	Price	Price	Price	Price	Price	Price	Price	Price
Basic Pension - in Payment	RUR 560	Price	Price	Price	Price	Price	Price	Price	Price	Price
NDC Account	Price + 50% Real Wage Growth									
NDC Pension in Payment	Price + 50% Real Wage Growth									
Funded Account	Rate of Return on Funds Net of Expenses									
Funded Pension In Payment	Price	Price	Price	Price	Price	Price	Price	Price	Price	Price
Minimum Pension	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retirement Ages										
Old Age	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60
Remaining Early Pension	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55
C. Macro-Economic										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
GPD										
Billions 2002 rubles	10,950	11,279	11,812	12,605	13,025	13,288	13,406	13,617	13,531	12,519
2002 = 100	100	103	108	115	119	121	122	124	124	114
Real Rate of Growth	3.0	2.3	2.1	0.1	0.5	0.2	0.3	0.3	-0.5	-0.9
Work Force										
Millions	65.5	65.1	64.8	62.0	59.7	56.3	52.8	49.8	42.3	33.6
2002 = 100	100	100	99	95	91	86	81	76	65	51
Rate of Growth	-0.5	-0.2	-0.5	-0.5	-1.0	-1.3	-1.2	-1.3	-2.0	-2.3
Avg Wages										
2002 rubles	3,757	3,908	4,197	4,797	5,267	5,732	6,237	6,786	8,034	9,512
2002 = 100	100	104	112	128	140	153	166	181	214	253
Real Rate of Growth	4.0	3.8	3.2	2.0	1.7	1.7	1.7	1.7	1.7	1.7
Wage Bill										
Billions 2002 rubles	2,803	2,902	3,099	3,389	3,582	3,679	3,753	3,852	3,875	3,643
2002 = 100	100	104	111	121	128	131	134	137	138	130
Real Rate of Growth	3.51	3.55	2.76	1.55	0.68	0.35	0.50	0.40	-0.34	-0.66
Wage Bill to GDP Ratio	25.6	25.7	26.2	26.9	27.5	27.7	28.0	28.3	28.6	29.1

D. Demographics

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Population (millions)	144.2	143.5	142.1	138.7	134.9	131.2	126.6	121.1	108.3	93.8
% Male	46.8	46.8	46.7	46.6	46.4	46.2	46.0	45.8	45.3	44.9
% Female	53.2	53.2	53.3	53.4	53.6	53.8	54.0	54.2	54.7	55.1
Dependency Ratio 55/60										
Male	0.21	0.20	0.18	0.19	0.23	0.29	0.34	0.36	0.44	0.61
Female	0.46	0.46	0.47	0.52	0.60	0.69	0.73	0.79	1.02	1.29
All	0.33	0.33	0.32	0.35	0.41	0.48	0.53	0.56	0.71	0.93
Dependency Ratio 60/60										
Male	0.21	0.20	0.18	0.19	0.23	0.29	0.34	0.36	0.44	0.61
Female	0.38	0.37	0.34	0.34	0.39	0.47	0.54	0.57	0.68	0.93
All	0.29	0.29	0.26	0.27	0.31	0.38	0.44	0.47	0.56	0.78
Dependency Ratio 65/65										
Male	0.12	0.12	0.13	0.12	0.13	0.17	0.21	0.24	0.28	0.37
Female	0.24	0.25	0.26	0.24	0.25	0.30	0.36	0.41	0.47	0.60
All	0.18	0.19	0.20	0.18	0.19	0.23	0.29	0.33	0.38	0.49
Life Expectancy at Retirement Age										
Male at 60	15.1	15.2	15.4	16.0	16.5	17.1	17.4	17.6	17.9	18.2
Female at 55	24.1	24.2	24.5	25.1	25.7	26.3	26.5	26.6	26.8	27.0
Unisex	20.1	21.4	22.6	21.4	21.9	21.9	22.2	22.8	23.2	22.3
Life Expectancy at 60										
Male at 60	15.1	15.2	15.4	16.0	16.5	17.1	17.4	17.6	17.9	18.2
Female at 60	20.1	20.2	20.5	21.1	21.7	22.2	22.5	22.6	22.8	23.0
Unisex	18.0	18.1	18.3	18.9	19.5	20.0	20.2	20.3	20.7	20.9
Life Expectancy at 65										
Male at 65	12.5	12.6	12.9	13.4	13.9	14.4	14.7	14.9	15.3	15.7
Female at 65	16.4	16.6	16.8	17.4	18.0	18.5	18.8	18.9	19.2	19.4
Unisex	14.9	15.0	15.3	15.8	16.3	16.9	17.1	17.3	17.5	17.8

E. Labor Force

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Work force (millions)	65.5	65.1	64.8	62.0	59.7	56.3	52.8	49.8	42.3	33.6
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
Total Employment (millions)	62.2	61.9	61.5	58.9	56.7	53.5	50.2	47.3	40.2	31.9
% Employees	80	80	80	80	80	80	80	80	80	80
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9

% Self-ed	20	20	20	20	20	20	20	20	20	20
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
All										
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9

F. Pension Participants and Beneficiaries (Millions)

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Participants										
Employees	49.7	49.5	49.2	47.1	45.3	42.8	40.1	37.8	32.2	25.5
Self-ed	12.4	12.4	12.3	11.8	11.3	10.7	10.0	9.5	8.0	6.4
Beneficiaries	38.6	38.6	38.7	39.8	41.3	43.0	44.3	44.7	45.7	44.2
Basic Pension	38.6	38.6	38.7	39.8	41.3	43.0	44.3	44.7	45.7	44.2
Old Age	29.0	29.0	29.1	30.4	32.2	34.0	35.3	35.8	37.3	36.9
Others	9.6	9.6	9.6	9.3	9.1	9.0	9.0	9.0	8.4	7.2
NDC	36.3	36.4	36.4	37.6	39.3	41.1	42.5	43.0	44.2	43.0
Old Age	29.0	29.0	29.1	30.4	32.2	34.0	35.3	35.8	37.3	36.9
Others	7.3	7.3	7.3	7.2	7.0	7.1	7.2	7.2	6.9	6.0
Funded Scheme	0.0	0.0	0.0	0.0	6.9	15.4	22.4	26.3	34.0	35.9
Paygo System Dependency Ratios										
Male	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.8	1.0
Female	0.8	0.8	0.9	0.9	1.0	1.1	1.2	1.3	1.5	1.8
All	0.6	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.1	1.4

G. The Balance sheet of the Paygo system

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Revenues (2002 rubles)										
Contributions - Basic	277.4	287.1	306.7	335.3	354.5	364.1	371.4	381.1	383.4	360.4
Contributions - NDC	255.2	262.8	260.5	259.3	258.0	251.1	244.7	243.8	241.7	227.1
Employees	239.0	246.0	242.6	239.7	237.3	229.8	223.0	221.5	219.2	206.0
Self-ed	16.2	16.8	17.9	19.6	20.7	21.3	21.7	22.3	22.4	21.1
Budget Transfer	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Total										
In 2002 Rubles	581.6	598.9	616.2	643.7	661.5	664.2	665.1	673.9	674.1	636.5
As % of GDP	5.3	5.3	5.2	5.1	5.1	5.0	5.0	4.9	5.0	5.1
Minus										
Expenditures										
Expenditures - Basic	259.3	257.4	253.2	249.1	258.8	269.6	277.4	280.3	286.1	276.8

Expenditures - NDC	343.8	349.9	360.2	404.0	462.2	506.1	538.2	540.7	500.8	422.1
Old Age										
Others										
Adm. Expenses	12.1	12.1	12.3	13.1	14.4	15.5	16.3	16.4	15.7	14.0
Total										
In 2002 Rubles	615.2	619.4	625.7	666.1	735.4	791.3	831.9	837.4	802.6	712.9
As % of GDP	5.6	5.5	5.3	5.3	5.6	6.0	6.2	6.1	5.9	5.7
Surplus (Shortfall)										
In 2002 Rubles	-33.5	-20.5	-9.5	-22.4	-73.9	-127.1	-166.8	-163.5	-128.5	-76.4
As % of GDP	-0.3	-0.2	-0.1	-0.2	-0.6	-1.0	-1.2	-1.2	-0.9	-0.6

H. Funded Scheme Cash Flows in 2002 Rubles and % GDP

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Contributions										
In 2002 Rubles	39.2	42.0	65.4	97.6	119.6	137.1	151.5	163.0	167.6	157.7
In % GDP	0.4	0.4	0.6	0.8	0.9	1.0	1.1	1.2	1.2	1.3
Outflows										
In 2002 Rubles	0.0	0.0	0.0	0.0	5.9	14.1	25.3	49.4	146.9	252.9
In % GDP	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	1.1	2.0
Net flows										
In 2002 Rubles	39.2	42.0	65.4	97.6	113.7	122.9	126.2	113.6	20.8	-95.2
In % GDP	0.4	0.4	0.6	0.8	0.9	0.9	0.9	0.8	0.2	-0.8
Accumulations										
In 2002 Rubles	39.2	81.8	204.4	681.9	1258.8	1918.3	2630.4	3213.5	3579.8	3140.6
In % GDP	0.4	0.7	1.7	5.4	9.7	14.4	19.6	23.6	26.5	25.1

I. Replacement Ratios in %

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Replacement Ratios Paid										
Basic	14.9	14.2	13.0	10.9	9.9	9.1	8.4	7.7	6.5	5.5
NDC	21.0	20.5	19.6	18.7	18.6	17.9	16.9	15.4	11.7	8.6
All Paygo										
Pensioners with Basic & NDC	35.9	34.7	32.6	29.5	28.5	27.0	25.3	23.1	18.2	14.1
All Pensioners	34.7	33.5	31.5	28.5	27.6	26.2	24.6	22.5	17.9	13.9
Funded	0.0	0.0	0.0	0.0	0.8	1.1	1.3	2.0	4.1	5.5
All Schemes										
Pensioners with Basic,NDC&Funded	35.9	34.7	32.6	29.5	29.4	28.1	26.6	25.1	22.3	19.6
All Pensioners	34.7	33.5	31.5	28.5	28.4	27.3	25.9	24.6	21.9	19.4
Male										
Female										
Affordable Replacement Ratios										
Basic	15.9	15.8	15.7	14.7	13.6	12.3	11.2	10.5	8.7	7.1

NDC	15.6	15.4	14.2	12.0	10.4	8.9	7.7	7.0	5.7	4.6
All Paygo										
Pensioners with Basic & NDC	31.5	31.3	29.9	26.6	24.0	21.2	18.9	17.4	14.4	11.8
All Pensioners	30.6	30.4	29.1	26.0	23.5	20.8	18.6	17.2	14.2	11.6
Funded - Same as above	0.0	0.0	0.0	0.0	0.8	1.1	1.3	2.0	4.1	5.5
All										
Pensioners with Basic,NDC&funded	31.5	31.3	29.9	26.6	24.8	22.2	20.2	19.4	18.5	17.3
All Pensioners	30.6	30.4	29.1	26.0	24.3	21.8	19.9	19.2	18.3	17.1
Male										
Female										

J. What if the Replacement Ratio is Set at 30%

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
How far from 30% is the actual system Replacement Ratio?	-4.68	-3.52	-1.50	1.46	1.57	2.74	4.06	5.44	8.05	10.65
How far from 30% the Replacement Ratio that system can sustain?	-0.62	-0.35	0.88	4.01	5.72	8.17	10.08	10.82	11.73	12.86
By how much must the contribution rate need to be increased to be sustain to sustain a Replacement Ratio of 30%?	-0.53	-0.30	0.75	3.67	5.67	8.96	12.13	13.89	18.18	24.28
If the contribution rate remained unchanged, how large would be additional deficit (surplus) included by bringing the Replacement Ratio to 30%?	-0.11	-0.06	0.16	0.82	1.38	2.34	3.37	3.88	4.90	6.29

Optimistic Case										
A. Macro-economic Assumptions										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Real Productivity Growth Rates	5.0%	4.7%	4.1%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Inflation Rates	14.0%	12.8%	10.4%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Real Rates of Return on Funded Accounts before expenses	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
Unemployment Rates	8.0%	7.6%	6.8%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Labor Participation Rates	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%
Wage Growth in excess of Productivity	3.0%	2.8%	2.5%	1.7%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
B. Other Assumptions and Parameters										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Demographics										
Mortality, Fertility & Migration	Medium Population Projections as prepared by Russian Demographer, V. Andreev									
Relative Wage Levels										
Female / Male Wage Ratio	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Self-ed/Employed Wage Ratio	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Contribution Rates										
Total	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%
Base Pension	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
NDC - Employees < 36	11%	11%	10%	9%	8%	8%	8%	8%	8%	8%
NDC - Self-ed	RUR 145/month increased by average wage growth									
Funded Scheme - Employees < 36	3%	3%	5%	6%	6%	6%	6%	6%	6%	6%
Effective Contribution Rates										
Collection Rates - Employees	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Collection Rate - Self-ed	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Evasion/Exemption	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Effect of regression contribution rate	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Non contributing participants Eligible to an NDC Pension	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Funded Scheme Expenses										
Sale and Set-up Expenses as % cont.	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3%
Accumulation Period Asset Management Fee as % Account Value	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Annuity Purchase Fee	5%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Liquidation Period Asset Management Fee as % Account Value	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

Paygo Scheme Expenses										
Administrative Expenses as % of Cont.	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Adjustment and Indexation										
Basic Pension Level	RUR 560	Price	Price	Price	Price	Price	Price	Price	Price	Price
Basic Pension - in Payment	RUR 560	Price	Price	Price	Price	Price	Price	Price	Price	Price
NDC Account	Price + 50% Real Wage Growth									
NDC Pension in Payment	Price + 50% Real Wage Growth									
Funded Account	Rate of Return on Funds Net of Expenses									
Funded Pension In Payment	Price	Price	Price	Price	Price	Price	Price	Price	Price	Price
Minimum Pension	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retirement Ages										
Old Age	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60
Remaining Early Pension	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55
C. Macro-Economic										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
GPD										
Billions 2002 rubles	10,950	11,498	13,101	16,963	18,821	20,165	21,365	22,792	24,981	25,493
2002 = 100	100	105	120	155	172	184	195	208	228	233
Real Rate of Growth	5.0	6.7	6.3	3.4	1.5	1.2	1.3	1.3	0.5	0.1
Work Force										
Millions	66.9	68.2	71.2	76.8	73.9	69.8	65.4	61.7	52.4	41.6
2002 = 100	100	102	106	115	110	104	98	92	78	62
Rate of Growth	2.0	2.2	2.0	-0.5	-1.0	-1.3	-1.2	-1.3	-2.0	-2.3
Avg Wages										
2002 rubles	3,757	4,063	4,689	6,196	7,499	8,786	10,293	12,059	16,552	22,719
2002 = 100	100	108	125	165	200	234	274	321	441	605
Real Rate of Growth	8.2	7.7	6.7	4.2	3.2	3.2	3.2	3.2	3.2	3.2
Wage Bill										
Billions 2002 rubles	2,866	3,160	3,807	5,423	6,318	6,987	7,674	8,479	9,889	10,778
2002 = 100	100	110	133	189	220	244	268	296	345	376
Real Rate of Growth	10.26	10.09	8.83	3.75	2.18	1.84	2.00	1.90	1.14	0.82
Wage Bill to GDP Ratio	26.2	27.5	29.1	32.0	33.6	34.6	35.9	37.2	39.6	42.3

D. Demographics										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Population (millions)	144.2	143.5	142.1	138.7	134.9	131.2	126.6	121.1	108.3	93.8
% Male	46.8	46.8	46.7	46.6	46.4	46.2	46.0	45.8	45.3	44.9
% Female	53.2	53.2	53.3	53.4	53.6	53.8	54.0	54.2	54.7	55.1
Dependency Ratio 55/60										
Male	0.21	0.20	0.18	0.19	0.23	0.29	0.34	0.36	0.44	0.61
Female	0.46	0.46	0.47	0.52	0.60	0.69	0.73	0.79	1.02	1.29
All	0.33	0.33	0.32	0.35	0.41	0.48	0.53	0.56	0.71	0.93
Dependency Ratio 60/60										
Male	0.21	0.20	0.18	0.19	0.23	0.29	0.34	0.36	0.44	0.61
Female	0.38	0.37	0.34	0.34	0.39	0.47	0.54	0.57	0.68	0.93
All	0.29	0.29	0.26	0.27	0.31	0.38	0.44	0.47	0.56	0.78
Dependency Ratio 65/65										
Male	0.12	0.12	0.13	0.12	0.13	0.17	0.21	0.24	0.28	0.37
Female	0.24	0.25	0.26	0.24	0.25	0.30	0.36	0.41	0.47	0.60
All	0.18	0.19	0.20	0.18	0.19	0.23	0.29	0.33	0.38	0.49
Life Expectancy at Retirement Age										
Male at 60	15.1	15.2	15.4	16.0	16.5	17.1	17.4	17.6	17.9	18.2
Female at 55	24.1	24.2	24.5	25.1	25.7	26.3	26.5	26.6	26.8	27.0
Unisex	20.1	21.4	22.6	21.4	21.9	21.9	22.2	22.8	23.2	22.3
Life Expectancy at 60										
Male at 60	15.1	15.2	15.4	16.0	16.5	17.1	17.4	17.6	17.9	18.2
Female at 60	20.1	20.2	20.5	21.1	21.7	22.2	22.5	22.6	22.8	23.0
Unisex	18.0	18.1	18.3	18.9	19.5	20.0	20.2	20.3	20.7	20.9
Life Expectancy at 65										
Male at 65	12.5	12.6	12.9	13.4	13.9	14.4	14.7	14.9	15.3	15.7
Female at 65	16.4	16.6	16.8	17.4	18.0	18.5	18.8	18.9	19.2	19.4
Unisex	14.9	15.0	15.3	15.8	16.3	16.9	17.1	17.3	17.5	17.8
E. Labor Force										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Work force (millions)	66.9	68.2	71.2	76.8	73.9	69.8	65.4	61.7	52.4	41.6
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
Total Employment (millions)										
% Employees	80	80	80	80	80	80	80	80	80	80
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
% Self-ed	20	20	20	20	20	20	20	20	20	20

% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
All										
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9

F. Pension Participants and Beneficiaries (Millions)

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Participants										
Employees	50.9	51.8	54.1	58.3	56.2	53.0	49.7	46.9	39.8	31.6
Self-ed	12.7	13.0	13.5	14.6	14.0	13.3	12.4	11.7	10.0	7.9
Beneficiaries	38.6	38.6	38.7	39.8	41.3	43.0	44.3	44.7	45.7	44.2
Basic Pension	38.6	38.6	38.7	39.8	41.3	43.0	44.3	44.7	45.7	44.2
Old Age	29.0	29.0	29.1	30.4	32.2	34.0	35.3	35.8	37.3	36.9
Others	9.6	9.6	9.6	9.3	9.1	9.0	9.0	9.0	8.4	7.2
NDC	36.3	36.4	36.4	37.6	39.3	41.1	42.5	43.0	44.2	43.0
Old Age	29.0	29.0	29.1	30.4	32.2	34.0	35.3	35.8	37.3	36.9
Others	7.3	7.3	7.3	7.2	7.0	7.1	7.2	7.2	6.9	6.0
Funded Scheme	0.0	0.0	0.0	0.0	6.9	15.4	22.4	26.3	34.0	35.9
Paygo System Dependency Ratios										
Male	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.8
Female	0.8	0.8	0.8	0.7	0.8	0.9	0.9	1.0	1.2	1.5
All	0.6	0.6	0.6	0.5	0.6	0.6	0.7	0.8	0.9	1.1

G. The Balance sheet of the Paygo system

	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Revenues (2002 rubles)										
Contributions - Basic	283.5	312.6	376.7	536.6	625.1	691.3	759.3	838.9	978.5	1,066.4
Contributions - NDC	260.9	286.2	320.0	415.0	455.1	476.9	500.3	536.7	616.7	671.8
Employees	244.3	267.9	298.0	383.6	418.5	436.4	455.9	487.6	559.5	609.4
Self-ed	16.6	18.3	22.0	31.4	36.6	40.5	44.4	49.1	57.3	62.4
Budget Transfer	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Total										
In 2002 Rubles	593.4	647.8	745.8	1,000.6	1,129.2	1,217.2	1,308.6	1,424.6	1,644.2	1,787.2
As % of GDP	5.4	5.6	5.7	5.9	6.0	6.0	6.1	6.3	6.6	7.0
Minus										
Expenditures										
Expenditures - Basic	259.3	256.9	251.6	246.1	255.7	266.4	274.1	276.9	282.7	273.5
Expenditures - NDC	344.2	356.7	379.3	456.6	552.0	634.0	711.0	756.1	814.0	853.9
Old Age										
Others										
Adm. Expenses	12.1	12.3	12.6	14.1	16.2	18.0	19.7	20.7	21.9	22.5
Total										
In 2002 Rubles	615.6	625.8	643.6	716.7	823.8	918.4	1,004.7	1,053.7	1,118.6	1,149.9
As % of GDP	5.6	5.4	4.9	4.2	4.4	4.6	4.7	4.6	4.5	4.5

Surplus (Shortfall)										
In 2002 Rubles	-22.1	22.0	102.2	283.9	305.3	298.7	303.8	370.9	525.6	637.3
As % of GDP	-0.2	0.2	0.8	1.7	1.6	1.5	1.4	1.6	2.1	2.5
H. Funded Scheme Cash Flows in 2002 Rubles and % GDP										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Contributions										
In 2002 Rubles	40.0	45.7	80.4	156.2	211.0	260.3	309.8	358.7	427.8	466.7
In % GDP	0.4	0.4	0.6	0.9	1.1	1.3	1.4	1.6	1.7	1.8
Outflows										
In 2002 Rubles	0.0	0.0	0.0	0.0	11.9	31.1	61.5	135.4	487.7	983.2
In % GDP	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.6	2.0	3.9
Net flows										
In 2002 Rubles	40.0	45.7	80.4	156.2	199.0	229.1	248.3	223.3	-59.9	-516.6
In % GDP	0.4	0.4	0.6	0.9	1.1	1.1	1.2	1.0	-0.2	-2.0
Accumulations										
In 2002 Rubles	40.0	87.5	239.7	993.8	2150.2	3707.6	5673.1	7679.5	10310.4	10539.9
In % GDP	0.4	0.8	1.8	5.9	11.4	18.4	26.6	33.7	41.3	41.3
I. Replacement Ratios in %										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Replacement Ratios Paid										
Basic	14.9	13.6	11.6	8.3	6.9	5.9	5.0	4.3	3.1	2.3
NDC	21.0	20.1	18.5	16.3	15.6	14.6	13.6	12.1	9.3	7.3
All Paygo										
Pensioners with Basic & NDC	35.9	33.7	30.1	24.7	22.5	20.5	18.6	16.4	12.4	9.6
All Pensioners	34.7	32.6	29.0	23.8	21.7	19.8	18.0	16.0	12.1	9.4
Funded	0.0	0.0	0.0	0.0	1.2	1.5	2.0	3.1	6.6	8.9
All Schemes										
Pensioners with Basic, NDC & Funded	35.9	33.7	30.1	24.7	23.7	22.0	20.5	19.5	19.0	18.5
All Pensioners	34.7	32.6	29.0	23.8	22.9	21.4	20.0	19.1	18.7	18.3
Male										
Female										
Affordable Replacement Ratios										
Basic	16.3	16.6	17.3	18.2	16.8	15.2	13.9	13.0	10.8	8.9
NDC	15.9	16.1	15.6	14.8	12.9	11.0	9.5	8.6	7.0	5.7
All Paygo										
Pensioners with Basic & NDC	32.2	32.7	32.9	33.0	29.7	26.2	23.4	21.6	17.8	14.6
All Pensioners	31.3	31.8	32.0	32.2	29.1	25.7	23.0	21.2	17.6	14.4
Funded - Same as above	0.0	0.0	0.0	0.0	1.2	1.5	2.0	3.1	6.6	8.9

All										
Pensioners with Basic,NDC&funded	32.2	32.7	32.9	33.0	30.9	27.8	25.4	24.7	24.4	23.5
All Pensioners	31.3	31.8	32.0	32.2	30.2	27.3	25.0	24.4	24.2	23.4
Male										
Female										
J. What if the Replacement Ratio is Set at 30%										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
How far from 30% is the actual system Replacement Ratio?	-4.70	-2.57	1.00	6.23	7.11	8.64	10.03	10.92	11.34	11.70
How far from 30% the Replacement Ratio that system can sustain?	-1.30	-1.79	-2.02	-2.19	-0.22	2.74	5.01	5.63	5.85	6.63
By how much must the contribution rate need to be increased to be sustain to sustain a Replacement Ratio of 30%?	-1.08	-1.46	-1.57	-1.62	-0.18	2.43	4.87	5.83	7.31	10.10
If the contribution rate remained unchanged, how large would be additional deficit (surplus) included by bringing the Replacement Ratio to 30%?	-0.23	-0.31	-0.31	-0.29	-0.03	0.48	1.02	1.22	1.49	2.07

Base Case										
A. Macro-economic Assumptions										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Real Productivity Growth Rates	4.0%	4.0%	3.5%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Inflation Rates	15.0%	14.0%	12.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Real Rates of Return on Funded Accounts before expenses	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
Unemployment Rates	9.0%	8.8%	8.4%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Labor Participation Rates	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%
Wage Growth in excess of Productivity	2.0%	1.9%	1.7%	1.1%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
B. Other Assumptions and Parameters										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Demographics										
Mortality, Fertility & Migration	Medium Population Projections as prepared by Russian Demographer, V. Andreev									
Relative Wage Levels										
Female / Male Wage Ratio	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Self-ed/Employed Wage Ratio	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Contribution Rates										
Total	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%
Base Pension	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
NDC - Employees < 36	11%	11%	10%	9%	8%	8%	8%	8%	8%	8%
NDC - Self-ed	RUR 145/month increased by average wage growth									
Funded Scheme - Employees < 36	3%	3%	5%	6%	6%	6%	6%	6%	6%	6%
Effective Contribution Rates										
Collection Rates - Employees	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Collection Rate - Self-ed	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Evasion/Exemption	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Effect of regression contribution rate	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Non contributing participants Eligible to an NDC Pension	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Funded Scheme Expenses										
Sale and Set-up Expenses as % cont.	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3%
Accumulation Period Asset Management Fee as % Account Value	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Annuity Purchase Fee	5%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Liquidation Period Asset Management Fee as % Account Value	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Paygo Scheme Expenses										

Administrative Expenses as % of Cont.	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Adjustment and Indexation										
Basic Pension Level	RUR 560	Price	Price	Price	Price	Price	Price	Price	Price	Price
Basic Pension - in Payment	RUR 560	Price	Price	Price	Price	Price	Price	Price	Price	Price
NDC Account	Price + 50% Real Wage Growth									
NDC Pension in Payment	Price + 50% Real Wage Growth									
Funded Account	Rate of Return on Funds Net of Expenses									
Funded Pension In Payment	Price	Price	Price	Price	Price	Price	Price	Price	Price	Price
Minimum Pension	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retirement Ages										
Old Age	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60	55/60
Remaining Early Pension	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55	50/55
C. Macro-Economic										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
GPD										
Billions 2002 rubles	#####	11,388	12,504	14,869	15,957	16,684	17,250	17,958	18,744	18,215
2002 = 100	100	104	114	136	146	152	158	164	171	166
Real Rate of Growth	4.0	4.8	4.4	2.0	1.0	0.7	0.8	0.8	0.0	-0.4
Work Force										
Millions	66.2	66.7	67.9	69.4	66.8	63.1	59.1	55.8	47.4	37.6
2002 = 100	100	101	103	105	101	95	89	84	72	57
Rate of Growth	0.7	1.0	0.8	-0.5	-1.0	-1.3	-1.2	-1.3	-2.0	-2.3
Avg Wages										
2002 rubles	3,757	3,985	4,459	5,520	6,357	7,196	8,145	9,220	11,814	15,137
2002 = 100	100	106	119	147	169	192	217	245	314	403
Real Rate of Growth	6.1	6.0	5.2	3.1	2.5	2.5	2.5	2.5	2.5	2.5
Wage Bill										
Billions 2002 rubles	2,834	3,029	3,453	4,368	4,841	5,173	5,489	5,860	6,381	6,492
2002 = 100	100	107	122	154	171	183	194	207	225	229
Real Rate of Growth	6.85	7.04	6.01	2.63	1.48	1.15	1.30	1.20	0.45	0.13
Wage Bill to GDP Ratio	25.9	26.6	27.6	29.4	30.3	31.0	31.8	32.6	34.0	35.6
D. Demographics										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Population (millions)	144.2	143.5	142.1	138.7	134.9	131.2	126.6	121.1	108.3	93.8
% Male	46.8	46.8	46.7	46.6	46.4	46.2	46.0	45.8	45.3	44.9
% Female	53.2	53.2	53.3	53.4	53.6	53.8	54.0	54.2	54.7	55.1
Dependency Ratio 55/60										
Male	0.21	0.20	0.18	0.19	0.23	0.29	0.34	0.36	0.44	0.61
Female	0.46	0.46	0.47	0.52	0.60	0.69	0.73	0.79	1.02	1.29
All	0.33	0.33	0.32	0.35	0.41	0.48	0.53	0.56	0.71	0.93

Dependency Ratio 60/60										
Male	0.21	0.20	0.18	0.19	0.23	0.29	0.34	0.36	0.44	0.61
Female	0.38	0.37	0.34	0.34	0.39	0.47	0.54	0.57	0.68	0.93
All	0.29	0.29	0.26	0.27	0.31	0.38	0.44	0.47	0.56	0.78
Dependency Ratio 65/65										
Male	0.12	0.12	0.13	0.12	0.13	0.17	0.21	0.24	0.28	0.37
Female	0.24	0.25	0.26	0.24	0.25	0.30	0.36	0.41	0.47	0.60
All	0.18	0.19	0.20	0.18	0.19	0.23	0.29	0.33	0.38	0.49
Life Expectancy at Retirement Age										
Male at 60	15.1	15.2	15.4	16.0	16.5	17.1	17.4	17.6	17.9	18.2
Female at 55	24.1	24.2	24.5	25.1	25.7	26.3	26.5	26.6	26.8	27.0
Unisex	20.1	21.4	22.6	21.4	21.9	21.9	22.2	22.8	23.2	22.3
Life Expectancy at 60										
Male at 60	15.1	15.2	15.4	16.0	16.5	17.1	17.4	17.6	17.9	18.2
Female at 60	20.1	20.2	20.5	21.1	21.7	22.2	22.5	22.6	22.8	23.0
Unisex	18.0	18.1	18.3	18.9	19.5	20.0	20.2	20.3	20.7	20.9
Life Expectancy at 65										
Male at 65	12.5	12.6	12.9	13.4	13.9	14.4	14.7	14.9	15.3	15.7
Female at 65	16.4	16.6	16.8	17.4	18.0	18.5	18.8	18.9	19.2	19.4
Unisex	14.9	15.0	15.3	15.8	16.3	16.9	17.1	17.3	17.5	17.8
E. Labor Force										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Work force (millions)	66.2	66.7	67.9	69.4	66.8	63.1	59.1	55.8	47.4	37.6
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
Total Employment (millions)	62.9	63.3	64.5	65.9	63.5	59.9	56.2	53.0	45.0	35.7
% Employees	80	80	80	80	80	80	80	80	80	80
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
% Self-ed	20	20	20	20	20	20	20	20	20	20
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9
All										
% Male	52.8	52.8	52.6	52.5	52.3	52.2	52.2	52.2	52.1	52.1
% Female	47.2	47.2	47.4	47.5	47.7	47.8	47.8	47.8	47.9	47.9

F. Pension Participants and Beneficiaries (Millions)										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Participants										
Employees	50.3	50.7	51.6	52.8	50.8	47.9	44.9	42.4	36.0	28.6
Self-ed	12.6	12.7	12.9	13.2	12.7	12.0	11.2	10.6	9.0	7.1
Beneficiaries	38.6	38.6	38.7	39.8	41.3	43.0	44.3	44.7	45.7	44.2
Basic Pension	38.6	38.6	38.7	39.8	41.3	43.0	44.3	44.7	45.7	44.2
Old Age	29.0	29.0	29.1	30.4	32.2	34.0	35.3	35.8	37.3	36.9
Others	9.6	9.6	9.6	9.3	9.1	9.0	9.0	9.0	8.4	7.2
NDC	36.3	36.4	36.4	37.6	39.3	41.1	42.5	43.0	44.2	43.0
Old Age	29.0	29.0	29.1	30.4	32.2	34.0	35.3	35.8	37.3	36.9
Others	7.3	7.3	7.3	7.2	7.0	7.1	7.2	7.2	6.9	6.0
Funded Scheme	0.0	0.0	0.0	0.0	6.9	15.4	22.4	26.3	34.0	35.9
Paygo System Dependency Ratios										
Male	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.9
Female	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.1	1.3	1.6
All	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.0	1.2
G. The Balance sheet of the Paygo system										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Revenues (2002 rubles)										
Contributions - Basic	280.4	299.7	341.7	432.2	479.0	511.8	543.1	579.8	631.3	642.3
Contributions - NDC	258.1	274.3	290.3	334.2	348.7	353.1	357.9	370.9	397.9	404.6
Employees	241.7	256.8	270.3	308.9	320.7	323.1	326.1	337.0	361.0	367.1
Self-ed	16.4	17.5	20.0	25.3	28.0	29.9	31.8	33.9	36.9	37.6
Budget Transfer	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Total										
In 2002 Rubles	587.5	623.0	681.0	815.4	876.7	913.9	950.0	999.8	1,078.3	1,096.0
As % of GDP	5.4	5.5	5.4	5.5	5.5	5.5	5.5	5.6	5.8	6.0
Minus										
Expenditures										
Expenditures - Basic	259.3	257.3	253.1	248.6	258.3	269.1	276.9	279.7	285.5	276.3
Expenditures - NDC	344.0	354.0	371.8	433.2	508.8	570.8	623.5	644.8	644.5	608.9
Old Age										
Others										
Adm. Expenses	12.1	12.2	12.5	13.6	15.3	16.8	18.0	18.5	18.6	17.7
Total										
In 2002 Rubles	615.4	623.5	637.4	695.4	782.4	856.7	918.4	943.0	948.7	902.9
As % of GDP	5.6	5.5	5.1	4.7	4.9	5.1	5.3	5.3	5.1	5.0
Surplus (Shortfall)										
In 2002 Rubles	-27.8	-0.5	43.6	120.0	94.3	57.1	31.6	56.7	129.6	193.1
As % of GDP	-0.3	0.0	0.3	0.8	0.6	0.3	0.2	0.3	0.7	1.1

H. Funded Scheme Cash Flows in 2002 Rubles and % GDP										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Contributions										
In 2002 Rubles	39.6	43.8	72.9	125.8	161.7	192.7	221.6	247.9	276.0	281.1
In % GDP	0.4	0.4	0.6	0.8	1.0	1.2	1.3	1.4	1.5	1.5
Outflows										
In 2002 Rubles	0.0	0.0	0.0	0.0	8.9	22.2	42.0	87.9	291.6	548.4
In % GDP	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.6	3.0
Net flows										
In 2002 Rubles	39.6	43.8	72.9	125.8	152.8	170.5	179.5	160.0	-15.5	-267.3
In % GDP	0.4	0.4	0.6	0.8	1.0	1.0	1.0	0.9	-0.1	-1.5
Accumulations										
In 2002 Rubles	39.6	84.7	222.6	837.5	1689.1	2758.3	4023.4	5207.3	6431.1	6117.0
In % GDP	0.4	0.7	1.8	5.6	10.6	16.5	23.3	29.0	34.3	33.6
I. Replacement Ratios in %										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
Replacement Ratios Paid										
Basic	14.9	13.9	12.2	9.4	8.2	7.2	6.4	5.7	4.4	3.4
NDC	21.0	20.3	19.1	17.4	17.0	16.1	15.0	13.5	10.3	7.8
All Paygo										
Pensioners with Basic & NDC	35.9	34.3	31.3	26.8	25.2	23.3	21.4	19.2	14.7	11.2
All Pensioners	34.7	33.1	30.2	25.9	24.3	22.6	20.8	18.7	14.4	11.0
Funded	0.0	0.0	0.0	0.0	1.0	1.3	1.7	2.7	5.5	7.5
All Schemes										
Pensioners with Basic,NDC&Funded	35.9	34.3	31.3	26.8	26.2	24.6	23.1	21.9	20.2	18.7
All Pensioners	34.7	33.1	30.2	25.9	25.4	23.9	22.5	21.3	19.9	18.5
Male										
Female										
Affordable Replacement Ratios										
Basic	16.1	16.2	16.5	16.4	15.2	13.8	12.5	11.7	9.8	8.0
NDC	15.8	15.8	14.9	13.4	11.6	9.9	8.6	7.8	6.3	5.2
All Paygo										
Pensioners with Basic & NDC	31.9	32.0	31.4	29.8	26.8	23.7	21.2	19.5	16.1	13.2
All Pensioners	31.0	31.1	30.5	29.1	26.3	23.3	20.8	19.2	15.9	13.0
Funded - Same as above	0.0	0.0	0.0	0.0	1.0	1.3	1.7	2.7	5.5	7.5
All										
Pensioners with Basic,NDC&funded	31.9	32.0	31.4	29.8	27.9	25.0	22.9	22.2	21.6	20.7
All Pensioners	31.0	31.1	30.5	29.1	27.3	24.6	22.5	21.9	21.4	20.5
Male										

Female										
J. What if the Replacement Ratio is Set at 30%										
	2002	2003	2005	2010	2015	2020	2025	2030	2040	2050
How far from 30% is the actual system Replacement Ratio?	-4.69	-3.09	-0.20	4.11	4.64	6.08	7.50	8.67	10.13	11.48
How far from 30% the Replacement Ratio that system can sustain?	-0.96	-1.07	-0.55	0.90	2.71	5.41	7.49	8.14	8.60	9.47
By how much must the contribution rate need to be increased to be sustain to sustain a Replacement Ratio of 30%?	-0.81	-0.89	-0.44	0.74	2.40	5.30	8.05	9.33	11.90	15.97
If the contribution rate remained unchanged, how large would be additional deficit (surplus) included by bringing the Replacement Ratio to 30%?	-0.17	-0.19	-0.09	0.14	0.51	1.19	1.92	2.22	2.74	3.60

Annex III¹⁴

A Description of the Simulation Model (Analytical pension model (APM))

1. Program architecture
2. Methodology
 - 2.1 Variables description
 - 2.2 Number of contributors
 - 2.3 Number of pensioners
 - 2.4 Initial capital
 - 2.5 Wages calculations
 - 2.6 Contribution calculations
 - 2.6.1 Employees
 - 2.6.2 Self employed
 - 2.7 Benefit calculations
 - 2.7.1 Old age retirement
 - 2.7.2 Privilege pensioners
 - 2.7.3 Survivors
 - 2.7.4 Disables
 - 2.7.5 Social
 - 2.8 Replacement ratio calculations
 - 2.9 Balance

1. Program architecture

There are many programs exist to meet similar problems. Usually they are Excel oriented because it is easier to explain methodology, educate potential users and demonstrate obtained results. Excel allows to make this program open and transparent. But usually these programs are highly overloaded with calculations traditionally based on VBA for Excel. In this connection it is very difficult to follow, check and control calculations. Program code resembles “black box”. Calculations and analysis turn into time consuming job and often bring head ache.

Working out APM existing experience was taken into account. It is Excel program which based on VBA for Excel. But some new features as follows were efficiently added:

- Flexible data structure.
Each array (initial data or output) has unique position at the worksheets and easily can be replaced and analyzed. Special system was elaborated to access and operate both with initial data and results produced by the model.
- Flexible opportunities for sharing population into different social groups both for contributors and beneficiaries. Any group has similar property and can be quickly tuned for actual problem. For example, population is shared

¹⁴ . The Fiscal projections were undertaken by Dmitri Pomazkin with assistance of Jean Noel Martineau based on a pension system forecasting model developed by an Independant Actuarial Information Analytical Center. The full description of the model and results are attached as Annex 2

into 2 groups of contributors (employees and self-employed) and 5 groups of pensioners (old age pensioners, privilege pensioners, survivors, disability, social). For all groups age-sex distribution is taken into account for cash-flow projections. Contributions are paid in different types of pensions and pensioners are getting different pensions. If structure of the pension system will be changed and some new groups will appear or pensions be rearrange between pensioners. In this case using APM model is possible to easily change and add properties of the groups tuning initial data.

- Three types of pension – PAYGO, NDC and funded can be calculated for any groups of pensioners.
- Each group has its own indexation mechanism based on indexation formula or external forecast.
- Calculation methods are very transparent and can be easily supplemented and improved.
- Output interface forms specially organized to make results analysis obvious.
- Archive allows to save obtained results and produce comparison.

2. Methodology

2.1. Variables description

PS – pension system

NC_employees – number of contributors among employees who pay to the PS

NC_selfemployed – number of contributors among selfemployed who pays to the PS

NP_oldage – number of old age pensioners

NP_privilege – number of privilege pensioners

NP_survivors – number of survivors old age pensioners getting pension

NP_disable – number of disabled pensioners

NP_social – number of social pensioners

Average_base_pension(t) – average base pension

Average_ndc_pension(t) – average NDC pension

Average_funded_pension(t) – average funded pension

Average_salary(t) – average wage

Contrib_bp(t) – contributions to base pension

Contrib_ndc(t) – contributions to NDC pension

Contrib_funded(t) – contributions to funded pension

Transfert(t) – budget transfer

Expend_bp(t) – expenditures for base pension

Expend_ndc(t) – expenditures for NDC pension

Expend_funded(t) – expenditures for funded pension

Wage – average wage

IC – initial capital

Model being used in calculations allows to separate contributors and pensioners by different groups and calculate revenues and expenditures for 3 types of pensions (base NDC and funded).

External data for the model are demographic and macroeconomic forecasts. In the future model will be supplemented with internal demographic and macroeconomic forecasts.

Working with the program it is possible to use different macroeconomic forecasts. (there is an option to choose the forecast).

2.2 Number of contributors

Employees

Number of employees can be calculated as follows:

$$NCE(s,a,t) = POP(s,a,t) * LPR(s,a,t) * (1 - UN(s,a,t)) * ShareOfEmployees(s,a,t) * (1 - EvasionE(t))$$

s-sex;

a- age;

t –year.

LPR(s,a,t)- labor participation rate;

UN(s,a,t) –unemployment level;

EvasionE(t) one-dimensional function to adjust number of employees to current data.

Selfemployed

Number of selfemployed can be calculated as follows:

$$NCSE(s,a,t) = POP(s,a,t) * LPR(s,a,t) * (1 - UN(s,a,t)) * (1 - ShareOfEmployees(s,a,t)) * (1 - EvasionSE(t))$$

EvasionSE(t) one-dimensional function to adjust number of selfemployees to current data.

Compliance ratio

$$CmR(t) = \frac{\sum(NCE(s,a,t) + NCSE(s,a,t))}{\sum(POP(s,a,t) * LPR(s,a,t) * (1 - UN(s,a,t)))}$$

2.3 Number of pensioners

Number of pensioners is calculated using “Stock” method. For each categories of pensioners share matrixes were prepared. There are five categories of pensioners in the model. Model allows to increase number groups of beneficiaries.

Old-age pensioners

$$NP_Oldage(s,a,t) = Pop(s,a,t) * Share_Oldage(s,a,t)$$

Privilege pensioners

$$NP_Privilege(s,a,t) = Pop(s,a,t) * Share_Privilege(s,a,t)$$

Disabled

$$NP_Disabled(s,a,t) = Pop(s,a,t) * Share_Disabled(s,a,t)$$

Survivors

$$NP_Survivors(s,a,t)=Pop(s,a,t)*Share_Survivors(s,a,t)$$

Social pensioners

$$NP_Social(s,a,t)=Pop(s,a,t)*Share_Social(s,a,t)$$

The share matrix is tuned for the base year. For the next year this values can be calculated externally or to be interpolated between base year and last year keeping the sum of ratios constant.

The total numbers of pensioners are shown in the table 1.

Table 1. PFR report 30/06/01

	Number of pensioners
All pensioners	38 506 291
Old age pensioners	36 883 051
Disable	4 561 969
Survivor	2 573 354
Social	1 498 584
Long service	671 374
Military	124 656

System dependency ratio (SDR)

$$SDR = \frac{\sum (NP_Oldage(s,a,t) + NP_Privilege(s,a,t) + NP_Disabled(s,a,t) + NP_Survivors(s,a,t) + NP_Social(s,a,t))}{\sum (NCE(s,a,t) + NCSE(s,a,t))}$$

C. 2.4 Initial capital

According to the reform initial capital should be defined both for employees and self employed. To calculate initial capital the next formula was used:

Males.

Length of service ≥ 25 years

$$IC = (\text{Min}(0.55 + (\text{Stage} - 25), 75) * \text{Min}(\text{AvWage} / \text{AvWageGKS}, 1.2) * 1671 - \text{BP}) * T$$

AvWage – average wage for person
 AvWageGKS – average wage by Goskomstat
 T- annuity factor = $19 * 12$.
 BP – base pension = 450 rub.

Approximately initial NDC pension for average length of service 35 year is equal
NDC Pension = $0.65 * 1671 - 450 = 636$ rub.

Length of service < 25 years

$$IC = (0.55 * \text{Stage} / 25 * \text{Min}(\text{AvWage} / \text{AvWageGKS}, 1.2) * 1671 - \text{BP}) * T$$

Females.

Length of service ≥ 20 years

$IC = (\text{Min}(0.55 + (\text{Stage} - 20), 75) * \text{Min}(\text{AvWage} / \text{AvWageGKS}, 1.2) * 1671 - \text{BP}) * T$

T- annuity factor = $19 * 12$.

BP – base pension = 450 rub.

Length of service < 20 years

$IC = (0.55 * \text{Stage} / 20 * \text{Min}(\text{AvWage} / \text{AvWageGKS}, 1.2) * 1671 - \text{BP}) * T$

2.5 Wages calculations

In the model wage is calculated using the formula:

$Wage(s, a, t) = Wage(s, a, 0) * WageIndex(t) * EP(s, a, t);$

$WageIndex(t) = WageIndex(t -$

$1) * (1 + Inflation(t)) * (1 + LPgrowth(t)) * (1 + Wagegrowth(t)).$

$EP(s, a, t)$ – earning profile;

$LPgrowth(t)$ – labor productivity growth.

$Wagegrowth(t)$ – wage growth in excess of productivity

Wage growth in excess of productivity was taken into account to flexibly change percentage of the Wage Bill in the GDP.

One more option was added into the model to choose between constant unemployment rate (no dependency on age) and variable unemployment. It was done to meet variable external unemployment forecast.

Percentage of privilege pensioners was changed in accordance with eliminating lists 1 and 2 and keeping other groups including mainly Far North.

To calculate contributions based on different salary ratio for males and females wage factor $WF(t)$ was used. Initial value for ratio male wage to female wage was set equal 0,7. Recalculation of the new wage can be done by formula

$$W(0, a, t) = (W(0, a, t) * NC(0, a, t) + W(1, a, t) * NC(1, a, t)) / (NC(0, a, t) + NC(1, a, t) * WF(t))$$

Where index 0 is for male and 1 – for female.

2.6 Contributions calculations

Model architecture allows to separate contributors to some groups (four in the current version) and define cash flow. To calculate contributions for different types of pension contribution rates are shared in accordance with the project of reform (or scenario). Model calculates balance for PAYGO, PAYGO+NDC, PAYGO+NDC+Funded.

Contributions for employees are calculated as follows:

$\text{ContribBase}(s, a, t) = \text{NC_employees}(s, a, t) * \text{CRBase}(s, a, t) * \text{ColR}(t) * \text{RegrR}(t) * \text{PrivR}(t) * \text{Wage}(s, a, t)$

$\text{ContribNDC}(s, a, t) = \text{NC_employees}(s, a, t) * \text{CRNDC}(s, a, t) * \text{ColR}(t) * \text{RegrR}(t) * \text{PrivR}(t)$

*Wage(s,a,t)

$ContribFunded(s,a,t) = NC_employees(s,a,t) * CRFunded(s,a,t) * ColR(t) * RegrR(t) * PrivR(t)$

$Wage(s,a,t) * (1 - AdmExpIComp(t)) * (1 + interest(t)/2)$

AdmExpIComp(t) – investment company expenditures as share of contribution

Interest(t) – interest rate depending on time.

Contribution rate depends on age, sex and the year. The sum of these rates is total contribution rate to be constant.

Factors decreasing contribution rate

Colr(t) – collection rate. This factor is one-dimensional and reflects the collection.

RegrR(t) – regression rate. This factor is used to take into account the regression scale.

Priv(t) – privilege rate or exemption. Some categories of employees have tax reduction.

All this data for the current year were taken from the PFR material and frozen Initial values are the next

ColR(2002)=0,95

RegrR(2002)=0,95

PrivR(2002)=0,95.

All these factors lead to total decreasing of the contribution rate till 24% instead of 28%.

For long term model this approach seems reasonable. For short term model these factors should be calculated more precisely.

Selfemployed are paid to NDC only. Contributions for selfemployed are calculated based on fixed contribution:

$ContribNDC(s,a,t) = NC_selfemployed(s,a,t) * ColRSE(t) * Tax(t)$

Tax – fixed contribution.

Tax for 2002 year is 145 rub per month.

$Tax(t) = Tax(t-1) * WageGrowth(t)$

Budget transfer

$BT(i) = BT0 * CPI(i)$. Price indexed.

D.

E. Effective contribution rate

$EfContrib(t) = \frac{\sum(ContribBase(s,a,t) + ContribNDC(s,a,t) + ContribFunded(s,a,t))}{WageBillEmployees(t) + WageBillSelfemployed(t)}$

F.

G. 2.7 Benefit calculations

Base pension

Base pension is indexed to price and depends only on year.

$$BP(t) = BP(t-1) * (1 + \text{inflation}(t))$$

$$BP(2002) = 560 \text{ (average value for year 2002, based on PF materials)}$$

NDP pension

Initial value for NDC pension is calculated as follows:

$$NDC(s, \text{pensionage}, t) = NDCCapital(s, \text{pensionage} - 1, t) / NP(s, \text{pensionage}, t) / T$$

NDCCapital – notional capital calculated by the formula:

$$NDCCapital(s, a, t) = NDCCapital(s, a - 1, t - 1) * (1 + NDCInterest(t)) * (1 + Inflation(t)) * p(a - 1) + ContribNDC(s, a, t)$$

T-annuity factor = $19 * 12 = 228$. During first 10 years this factor is being gradually increased from 144 (12 years) till 228 (19 years)

P(a-1)- probability to survive during year (a-1)

NDCInterest – interest rate for NDC capital. In the model the next approach is used:

$$NDCInterest(t) = (k * LPRGrowth(t) + k1)$$

LPRGrowth – labor productivity growth

K, k1 – constants

In calculations NDC pension was indexed to 50% of wage growth.

$$NDC(2002) = 830 \text{ (average value from PF materials).}$$

Note. In this case we have a gap between pension calculated for initial capital (approximately 636 rub. And 830 rub. From Pension fund)

Funded pension

Initial value for funded pension is calculated as follows:

$$\text{Funded}(s, \text{pensionage}, t) = \text{FundedCapital}(s, \text{pensionage} - 1, t) / NP(s, \text{pensionage}, t) * (1 - \text{InvCompExp}(t)) / \text{Annuity}$$

FundedCapital – real capital calculated by the formula:

$$\text{FundedCapital}(s, a, t) = \text{FundedCapital}(s, a - 1, t - 1) * (1 + \text{Interest}(t) - \text{AexpIC}(t)) * (1 + \text{Inflation}(t))$$

$$* p(a - 1) + \text{ContrbFunded}(s, a, t)$$

InvCompExp(t)- investment company expenditures

Annuity – annuity calculated in accordance with implemented interest and mortality table

P(a-1)- probability to survive during year (a-1)

AexpIC(t)- administrative expenditures of investment company

Interest(t) – real interest rate used in calculations:

There are two possibilities in the model to set interest rate. The first one is external forecast. The second to calculate using assumptions of portfolio containing stocks and bonds.

Funded pension is indexed to CPI.

H. Expenditures

Expenditures are calculated for each group of pensioners and for each types of pension

Old age pensioners

$\text{ExpBP_Oldage}(s,a,t)=\text{NP_oldage}(s,a,t)*\text{BP}(t)*12$ (base pension)

$\text{ExpNDC_Oldage}(s,a,t)=\text{NP_oldage}(s,a,t)*\text{NDC}(s,a,t)*12$ (ndc)

$\text{ExpFunded_Oldage}(s,a,t)=\text{NP_oldage}(s,a,t)*\text{Funded}(s,a,t)*12$ (funded)

Privilege pensioners

$\text{ExpBP_privilege}(s,a,t)=\text{NP_privilege}(s,a,t)*\text{BP}(t)*12$

$\text{ExpNDC_privilege}(s,a,t)=\text{NP_privilege}(s,a,t)*\text{NDCPrivilege}(s,a,t)*12$

To calculate NDCPrivilege length service correlation was used. It leads to decreasing NDC privilege pension approximately at 30%.

$\text{NDCPrivilage}(t)=0.7*\text{NDCAverage}(t)$

Disabled

$\text{ExpBP_disabled}(s,a,t)=\text{NP_disabled}(s,a,t)*\text{BP}(t)*12$ (base pension)

$\text{ExpNDC_disabled}(s,a,t)=\text{NP_disabled}(s,a,t)*\text{NDCdisabled}(s,a,t)*12$ (ndc)

$\text{ExpFunded_Oldage}(s,a,t)=\text{NP_disabled}(s,a,t)*\text{Fundeddisabled}(s,a,t)*12$ (funded)

Survivors

$\text{ExpBP_survivors}(s,a,t)=\text{NP_survivors}(s,a,t)*\text{BP}(t)*12$ (base pension)

$\text{ExpNDC_survivors}(s,a,t)=\text{NP_survivors}(s,a,t)*\text{NDCsurvivors}(s,a,t)*12$ (ndc)

Social

$\text{ExpBP_social}(s,a,t)=\text{NP_social}(s,a,t)*\text{BP}(t)*12$ (base pension)

2.8 Replacement ratio calculations

As an example replacement ratios were constructed for old-age pensioners.

Base pension (RRbp(t))

Average replacement ration for the base pension RRbp(t)

$\text{RRbp}(t)=\text{Average_base_pension}(t)/\text{Average_wage}(t)$

Base pension at the age of retirement (Rrbpra(tt))

$\text{RRbpra}(t)=\text{Base_pension_at_retirement}(t)/\text{Average_wage}(t)$

$\text{Average_base_pension}(t)=\frac{\sum(\text{NP_oldage}(s,a,t)*\text{Pension_oldage}(s,a,t))}{\sum\text{NP_oldage}(s,a,t)}$

$\text{Base_pension_at_retirement}(t)=\text{Pension_old_age}(s,a,t)$

$\text{Average_wage}(t)=\frac{\sum(\text{NC_employees}(s,a,t)*\text{Wage_employees}(s,a,t)+\text{Nselfemployed}(s,a,t)*\text{Wage_Selfemployed}(s,a,t))}{\sum(\text{NC_employees}(s,a,t)+\text{NSelfemployed}(s,a,t))}$

NDC (RRndc(t))

$RRndc(t) = \text{Average_ndc_pension}(t) / \text{Average_salary}(t)$
 NDC pension at the age of retirement (RRndcra(tt))
 $RRndcra(t) = \text{NDC_pension_at_retirement}(t) / \text{Average_salary}(t)$
 $\text{Average_ndc_pension}(t) = \sum (\text{NP_oldage}(s,a,t) * \text{Pension_ndc}(s,a,t)) / \sum \text{NP_oldage}(s,a,t)$
 Average NDC pension calculated for old age pensioners only (Procedure Pension12_calc)
 $\text{Ndc_pension_at_retirement}(t) = \text{Pension_ndc_age}(s,ra,t)$

Funded (RRfunded(t))

$RRfunded(t) = \text{Average_funded_pension}(t) / \text{Average_wage}(t)$
 Funded pension at the age of retirement (RRfundedra(tt))
 $RRfundedra(t) = \text{Funded_pension_at_retirement}(t) / \text{Average_wage}(t)$
 $\text{Average_funded_pension}(t) = \sum (\text{NP_oldage}(s,a,t) * \text{Pension_funded}(s,a,t)) / \sum \text{NP_oldage}(s,a,t)$
 $\text{Funded_pension_at_retirement}(t) = \text{Pension_funded_age}(s,a,t)$

Total replacement ratio RRtotal(t)

RRtotal(t) = RRbp(t) + RRndc(t) + RRfunded(t)

Administrative expenditures

$\text{Adm_expend}(t) = \text{AdmExpR}(t) * (\text{Expend_bp}(t) + \text{Expend_ndc}(t))$
 AdmExpR(t) – percent of administrative expenditures

Affordable replacement ratio Rrafford(t)

$\text{Rrafford}(t) = (\text{RRbp}(t) + \text{RRndc}(t)) * (\text{Contrib_bp}(t) + \text{Contrib_ndc}(t) + \text{BudgetTransfert}(t) - \text{Adm_expend}(t)) / (\text{Expend_bp}(t) + \text{Expend_ndc}(t) + \text{RRfunded}(t))$

2.9 Balance

$\text{Balance}(t) = \text{Contrib_bp}(t) + \text{Contrib_ndc}(t) + \text{Transfert}(t) - \text{Expend_bp}(t) - \text{Expend_ndc}(t) - \text{Adm_expend}(t)$