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Pensions, Price Shocks, and Macroeconomic Stability in
Transition Economies: Illustrations from Belarus

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Abstract

In many countries of the former Soviet Union, pensioners form a large and vulnerable group of the population, with pensions fixed in nominal terms. Attempts to "protect" this group have included a revaluation of benefits for retirees and the introduction of indexation arrangements based on recent wage and price growth. In this paper, lagged indexation arrangements are shown to have large destabilizing effects that can potentially jeopardize the macroeconomic adjustment effort, particularly as inflation begins to decelerate. Some long-term problems relating to the aging of the population and associated policies are also discussed. Illustrative examples from Belarus are presented.

JEL Classification Numbers:

H55, J14, E31, P2

Contents

Summary

In Belarus, as in many countries of the former Soviet Union, pensioners form a large and vulnerable group of the population. Attempts to protect this group from the large unanticipated increases in prices in the early 1990s have included a revaluation of benefits for retirees with pensions fixed in nominal terms, and the introduction of indexation arrangements based on recent wage and price growth.

In this paper, we illustrate the potentially destabilizing effects of lagged indexation procedures, as inflation begins to decelerate, on pension fund balances. Simulations based on hypothetical scenarios suggest that the imbalances generated by these arrangements may jeopardize the macroeconomic adjustment effort.

The paper evaluates a number of possible policy options for a transition period of price stabilization, including, inter alia, the introduction of flat rate pensions, raising the retirement age, and tightening the eligibility criteria for pensions. An alternative is to minimize the lag for pension adjustments, but it may not be feasible to reduce this to less than one quarter in many cases. And to avoid deficits in the Pension Fund, it would be important to ensure that the cost of any pension revaluations not exceed changes in payroll contributions.

For the transition period in Belarus, the introduction of a flat rate basic state pension for those with an appropriate work history is seen as the most attractive option from the point of view of protecting the poor and generating needed savings on account of pension expenditures. Other measures, such as increasing the required working time, would also have to be introduced in the short term to take account of the longer-term problems of an aging population.

In the medium term, once price stability has been achieved, it should be possible to revert to social insurance principles introduced in the former Soviet Union in 1991. Alternatively, if the basic flat rate state pension is maintained, funded pensions may be possible as a second-tier supplement--although this does not appear to be feasible in the immediate future.

Projections suggest that Belarus will also face medium- to longer-term problems related to the aging of the population. This makes the structural reform of the pension system in the next few years of considerable importance. The analysis is meant to be illustrative, and should also be of relevance in other transition economies with aging populations.

I. Introduction

In many countries of eastern Europe and the former Soviet Union, pensioners form a relatively large and vulnerable group of the population, with pensions fixed in nominal terms. Attempts to "protect" this group have included a revaluation of benefits for those who have retired in the past, as well as the introduction of indexation procedures [See, e.g., Kopits (1992), Ahmad (1992), Ahmad and Schneider (1993), and Maret and Schwartz (1993)]. Full indexation of benefits, however, may have a deleterious effect on pension fund balances (with unchanged contribution rates and declining compliance). Indexation with a lag, either explicitly or an ad hoc basis, is considered as the appropriate policy response, mirroring the social insurance systems in many industrial countries. However, these measures could have "destabilizing" effects in the aftermath of a price shock--particularly as the effects of the price shock begin to dampen. 1/ In this paper we assess the effects of alternative price paths on pension fund balances under various indexation arrangements.

To underscore the importance of this issue for those FSU economies that have not yet undergone a successful stabilization, the experience of Poland is highly relevant. Briefly, in Poland legislation enacted in October 1991 specified that pensions be calculated on the basis of the average monthly wage in the economy in the previous quarter (Maret and Schwartz, 1993). Inflation accelerated from about 250 percent in 1989 to 585 percent in 1990, before slowing down to 70.3 percent in 1991 and 49 percent in 1992. Cuts in subsidies from 12.1 percent of GDP in 1989 to 1.8 percent in 1992 (Kolodko, 1992) were broadly offset by increases in social spending, with pension expenditures rising from 7.1 percent of GDP in 1988 to 14.9 percent in 1992. Budgetary transfers to the public pension system over the same period increased from 1.4 percent of GDP to 6.5 percent (Maret and Schwartz). These numbers illustrate the potential for large changes in the financial position of pension funds in economies in transition which, if not offset (as they were in Poland), could lead to continued unsustainable fiscal deficits.

The paper is organized as follows: we first analyze the short term impact of recent inflationary pressures on a pay-as-you-go (PAYG) public

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1/ See S. Fischer and L. Summers (1989) and J. Agell and B. Ysander (1993) for discussions of the desirability of inflation indexation arrangements in high inflation environments, and of intersectoral and intergenerational redistributions of income and wealth associated with unanticipated inflation.

pension system. 1/ In section III we describe in some detail the present pension arrangements in Belarus, focusing on the 1992 Pension Law. A menu of alternative policy options is prescribed. This section also focuses on the fiscal implications of aging of the Belarussian population. Given the unfavorable long term demographics, policy measures for long term financial sustainability are discussed. Section IV discusses the timing of reforms and presents some concluding remarks.

II. Macroeconomic Stabilization and Pension Indexation

In this section we present a stylized model of pension indexation, paying particular attention to the macroeconomic implications of a reduction in the rate of inflation on the financial position of the state pension fund. We show in particular that a deceleration in the rate of inflation can lead to the emergence of a dramatic deficit in the pension fund, which must be financed from the budget (as was the case in Poland in the late 80s-early 90s.)

As seen in Poland in 1990 and Belarus in 1992-93, pensions were indexed to average wages in the economy lagged by a few months, combined with a revaluation of the pension base. In a PAYG pension system, the indexation to average wages protects the income of pensioners relative to that of the working generation. However, the revaluation of the pension base is meant to reestablish the link (severed by the unanticipated high inflation) between lifetime earnings and pensions, thus restoring the social insurance character of the pension system.

1. The Model

The model below makes use of the basic PAYG accounting identity for the Pension Fund, supplemented with lagged wage indexation and the revaluation mechanism. The following notation is used:

$N(t)$ = number of contributors in period t,
$B(t)$ = number of retired beneficiaries at t,
$R(t)$ = pension fund receipts,
$E(t)$ = pension benefits at t,
$W(t)$ = average nominal wage in quarter t (rubles/quarter),
$r(t)$ = ratio of the average pension to the average wage at t,
$\theta(t)$ = payroll contribution rate for pensions at t,

1/ In addition to pensions, Social Protection Funds in FSU countries pay a variety of social benefits, including worker sickness and disability benefits, as well as funeral, birth, maternity benefits, and child allowances. While non-pension benefits are important, in this paper we focus on pensions as they are the largest single expenditure item in the social protection system.

β = basic replacement rate (for minimum length service),

α = percent of retiree income added to basic replacement rate for each year of service in excess of the minimum,

c = average value of c^i, the individual revaluation coefficient,

d = average excess service (in years),

The pension fund balance is determined by the difference between revenues and expenditures. In the absence of significant reserves, this may be written as

$$R(t) - E(t) = \theta(t)w(t)N(t) - p(t)B(t), \tag{1}$$

where p(t), the average pension at t, is specified by the following equation:

$$p(t) = c(\beta + \alpha d)W(t-2). \tag{2}$$

In equation (2), $W(t-2)$ reflects the base to which pensions are indexed. The term $c[\beta + \alpha d]$ represents the components of pension revaluation. First, c is the average of individual revaluation coefficients c^i, where c^i is the ratio of the eligible income of the pensioner at retirement, e^i, to the average wage in the economy at that time, say $W(r)$. [1] For example, a worker retiring at the average wage would have $c^i = 1$. Because eligible wages of retiring persons tend to be higher than the average, the value of c is expected to be higher than 1.

The term β is the basic replacement rate for pensioners who have completed the minimum length of service (in the FSU--typically 20 years for women and 25 years for men). Workers with length of service exceeding the minimum are granted higher pensions. This is captured by the term αd, which is the product of years of service in excess of the minimum, d, times the increase in the replacement rate added for each year of excess of service.

To examine the effects of changes in prices on the pension fund, we express the pension fund balance as a fraction of the wage bill (the tax base). This leads to

$$[R(t)-E(t)]/[W(t)N(t)] = \theta(t) - c(\beta + \alpha d)[B(t)/N(t)][W(t-2)/W(t)]$$

$$= \theta(t) - c(\beta + \alpha d)[B(t)/N(t)][W(t)/W(t-2)]^{-1}. \tag{3}$$

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[1] This specification would include for different countries a definition of final average salary. See section III for details on the calculation of individual eligible incomes for the special case of Belarus, where a measure of progressivity designed to limit maximum pension benefits is incorporated in the formula defining e^i.

Let the rate of wage inflation between quarter t and t+1 be denoted $\pi(t+1)$:

$$\pi(t+1) = [W(t+1) - W(t)]/W(t). \tag{4}$$

Then in the right-hand side of equation (3), the term $W(t-2)/W(t)$ can also be written

$$[W(t)/W(t-2)]^{-1} = [(1+\pi(t-1))(1+\pi(t))]^{-1}. \tag{5}$$

Thus (3) can be written as

$$[R(t)-E(t)]/[W(t)N(t)] = \theta(t) - c(\beta+\alpha d)[B(t)/N(t)][1+\pi(t-1)]^{-1}[1+\pi(t)]^{-1}. \tag{6}$$

Equation (6) shows that, for a given contribution rate θ, the pension fund balance as proportion to the wage bill (or GDP, if GDP and the aggregate wage bill are related in a stable manner), is inversely related to the old age dependency ratio, $B(t)/N(t)$, and directly related with the product of lagged wage inflation rates. As long as inflation accelerates, the pension fund balance will improve, or equivalently average pensions will rise slower than average wages, thus leading to a deterioration in the average replacement rate r. If inflation decreases, on the other hand, the pension fund balance would begin to deteriorate, or average pensions would rise faster than average wages.

With a calibration of the basic demographic and pension law parameters from Belarus, we can trace the evolution of the average replacement ratio as inflation changes. To this end, we use c=1.3, β= 0.55, α=.01, and d=13 years. Figure 1 shows a possible evolution of the average pension/wage ratio r, for a profile of wage inflation which initially accelerates through the first year after a price shock, and gradually slows down by the end of the following year. A "scissors effect" with pension fund surpluses during periods of rising inflation, followed by deficits during price stabilization, can be clearly discerned.

2. Short-run Sustainability of Pension Benefits With No Inflation

In addition to studying the effects of different inflation paths on the pension fund balance, it is also useful to calculate the contribution rate θ required to sustain a balanced budget in a PAYG, noninflationary, steady state under our benchmark assumptions. In the short run, demographic factors may be treated as constant. Reflecting the demographic characteristics of many Eastern European and FSU economies, the ratio of workers to retirees may be treated as approximately equal to 2. Requiring that contributions match expenditures, equation (7) illustrates the relation between the average contribution rate, the wage bill, the dependency ratio, and the benefit rate:
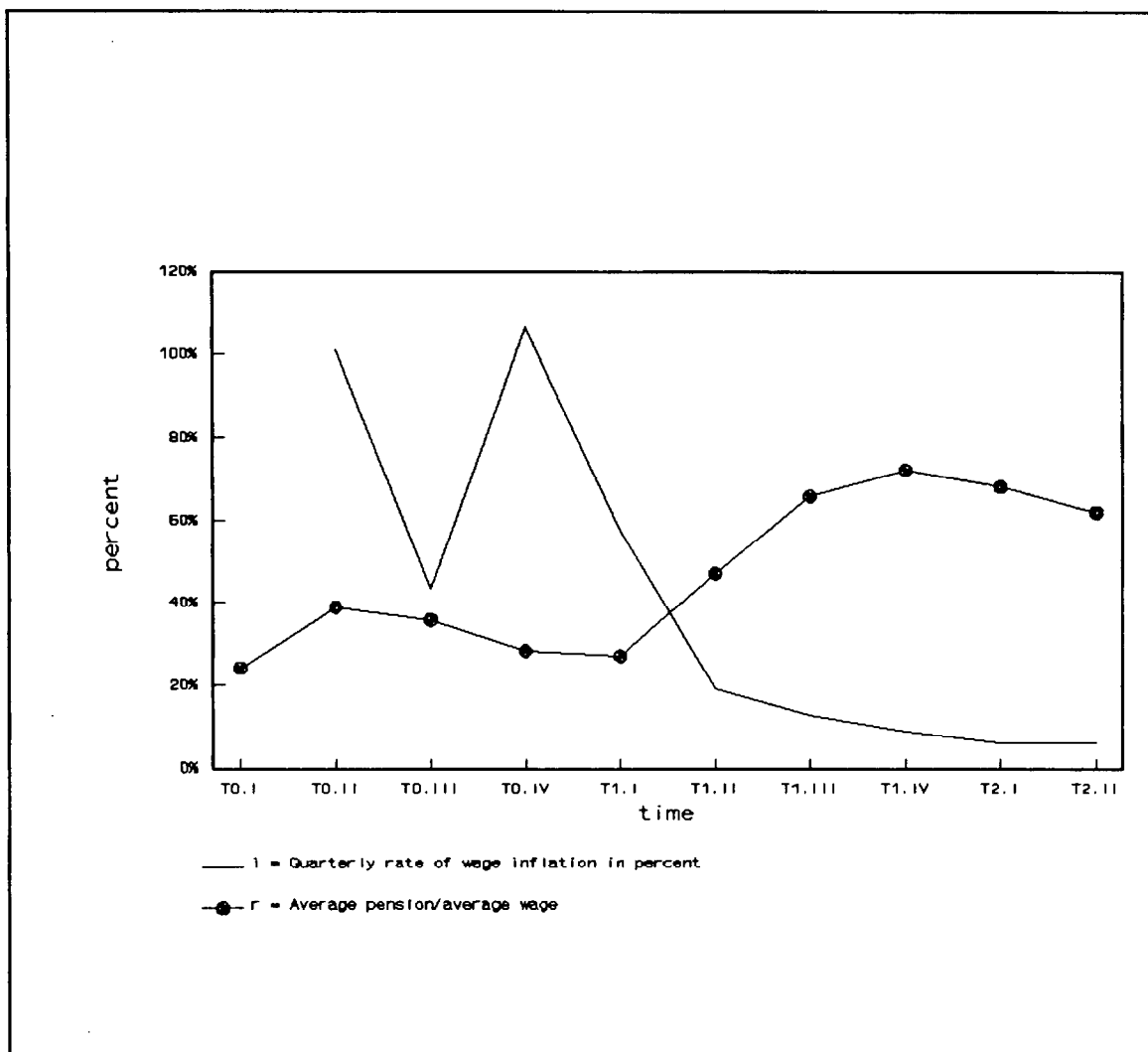
Figure 1.
Effects of Inflation Deceleration on Pension Fund Balances

$$\theta = (B/N)c(\beta+sd)/[(1+\pi)^2],\tag{7}$$

where the required contribution rate θ is proportional to the product of the dependency ratio B/N and the average revaluation coefficient c, and inversely proportional to the <u>square</u> of the rate of growth of nominal wages.

We may consider as a benchmark the case of constant nominal wages ($\pi=0$). In this case,

$$\theta = (B/N)c(\beta+sd),\tag{8}$$

or, since $B/N = 1/2$,

$$\theta = c(\beta+sd)/2.\tag{9}$$

Notice from (9) that the contribution rate required for pension fund budget balance under conditions of wage stability is 0.44 (this figure is obtained by setting $\beta = .55$, $s = .01$, $d = 13$ and $c = 1.3$--the basic parameters from Belarus--in the right-hand side of equation (7)). With the contribution rate at $\theta = .35$, the system would run a deficit if the average revaluation coefficient is 1.3. Since c and d are historical statistics that cannot be changed, and since it is not politically feasible to raise θ, the system is not sustainable in the steady-state, and would need to be made less generous.

3.   Simulations of Pension Fund Balances

To illustrate the "scissors effect" we present some hypothetical simulations of pension fund balances during a period of price stabilization. It is assumed that the inflationary shock occurs in the last quarter of year T^0 (the year prior to reform, or year 0) and continues into the first quarter of year T^1 (the first year of reforms, or year 1). This may be due, for example, to a cut in subsidies, or an exchange rate adjustment. Quarterly rates of wage inflation in these two periods are assumed to reach 50 percent. After decelerating to a quarterly rate of 30 percent in the second quarter of year T^1, wage growth is assumed to moderate further to 10 percent per quarter thereafter (end of year 1 and into year 2; see Table 1). This is a price-wage scenario that might be considered desirable for stabilization purposes after a price shock.

With no change in unemployment, the wage bill increases by 50 percent in the last quarter of year T^0 and first quarter of year T^1. Subsequently, wage inflation slows down to 30 percent in the second quarter and then stabilizes at 10 percent starting in the third quarter. Assuming that the wage bill is 1000 in the first quarter of year T^1 and that the pension bill is 400 at the same time, financed by a constant contribution rate of 40 percent, and that pensions are indexed on wages with exactly one

quarter lag, one gets the pattern of receipts and expenditures shown in Table 1. It is seen that a deficit in the pension fund appears as soon as wage inflation slows down. In this example, financing the deficit would require a 14.6 point increase in the contribution rate as from T^1.III.

Table 1. The Scissors Effect

	T^0.IV	T^1.I	T^1.II	T^1.III	T^1.IV	T^2.I
Wage increase (%)	50	50	30	10	10	10
Wage bill (rub bn)	667	1,000	1,300	1,430	1,573	1,730
Pension increase (%)	50	50	50	30	10	10
Pension bill (rub bn)	267	400	600	780	858	944
Pension revenue (rub bn)	267	400	520	572	629	692
Deficit on pensions (rub bn)	0	0	80	208	229	252
Pension deficit/wage bill (%)	0	0	6.2	14.5	14.6	14.6

Note: The notation T^0.IV stands for the fourth quarter of year T^0. It is assumed that the inflationary shock occurs in the last quarter of year T^0 (the previous year or year 0) and first quarter of year T^1 (year 1), when quarterly rates of wage inflation reach 50 percent.

To reiterate, lagged indexation procedures will not particularly favor pensioners as long as inflation is increasing. This is because they lose in real terms, due to the lag in the wage index used to calculate their pension. Conversely, during such a period of rising inflation, the pension Fund will do relatively well, since its pension expenditures are increasing with the lagged average wage, that is increasing less rapidly than revenues, which are based on the current average wage. But when inflation slows, the revaluation mechanism will play against the Pension Fund (scissors effect), and may lead either to a deficit or to a sharp increase in the contribution rate that is necessary to finance the system.

It is evident that with a reduction in inflation, changes are needed in the structure of pensions in order to ensure minimum adequate protection of pensioners and at the same time not to risk jeopardizing the adjustment by generating large deficits on account of pensions. However, eliminating the time lag between pensions and price changes during the period of rising inflation would both reduce the "cushion" that might otherwise occur in the Pension Fund and possibly contribute to the inflationary spiral. Therefore, the timing of policy responses, such as a reduction in indexation lags, needs to be carefully assessed. A number of policy options are discussed below for the Belarus case.

III. <u>Belarus: A Case Study</u>

Recent macroeconomic developments in Belarus have been dominated by continued high rates of wage and price inflation (which in December 1993 reached a monthly rate of 50 percent), and sharp declines in real activity. After a large price shock, correcting for administered price distortions in late 1991-early 1992, inflation continued unabated at a monthly rate in excess of 20 percent. A second price shock was expected, given higher costs of energy and raw material imports, and a further correction for administered prices.

1. <u>The 1992 Pension Law</u>

After the large price shock of late 1991-early 1992, the distribution of pensions became very concentrated, with most pensioners receiving the minimum pension. This was typically set at one minimum wage (MW), and was thus increased in the same ad-hoc fashion that the MW was raised during 1992. The pressures to protect the real value of pension benefits and to restore differentiation of pensions according to an earnings-related criterion led to pressures for pension revaluation and indexation in late 1992.

The Belarus pension system was reformed to provide indexation of average pensions to the average wage in the economy with a lag of about a quarter. 1/ In addition, individual coefficients, on the basis of historical information on each pensioner's income and historical minimum wages, form the basis for differentiating pension benefits. While this procedure links pensions more closely to wage levels at the time of retirement, fairly substantial numbers remain concentrated at or around the minimum pension. Thus, the "vulnerability" of Belarus pensioners remains, despite the gains to the "better off" pensioners.

Implementation of the 1992 Pension Law is as follows. For persons with the minimum required service, the basic replacement rate is 55 percent of effective income, and for each year of service in excess of the minimum, it is increased by 1 percent. The following additional notation is used.

s^i = person i's length of service (in years),
Smin = minimum length of service (25 years for men, 20 for women),
W(r) = average wage in the economy at the age of retirement.

1/ There have been attempts to reduce this lag to two months. However, in most FSU countries, it would be difficult to reduce the lag to much less than one quarter, given constraints on information flows and administration of benefits.

The pension benefit paid to person i in quarter t is either the minimum pension, or

$$p^i(t) = [\beta + \alpha(s^i - Smin)]c^i W(t-2).$$ (10)

The 1992 Law set the minimum pension to the minimum wage. 1/

The calculation of the actual pension combines wage revaluation with lagged indexation. Individual revaluation coefficients are first computed to estimate each retiree's position in the income distribution at the time of retirement. That is, for person i, this coefficient, denoted by $c^i = e^i(r)/W(r)$, shows the effective wage at retirement, $e^i(r)$, in proportion to the average wage in the economy <u>at the time of retirement</u>, W(r). In 1992, c was between 1.2 and 1.3.

Equation (10) specifies that, at each period t, the pension of individual i is calculated as the product of the individual revaluation coefficient, c^i, times the term $\beta + \alpha(s^i - Smin)$, times the average wage in the economy two periods earlier. To introduce a measure of progressivity into the pension system, the 1992 Pension Law specified a "sliding schedule" according to which the <u>effective</u> income e^i, used for the computation of pensions, is capped. Specifically, the law considers fully for the pension calculation only incomes less than 4 times the MW. Above this threshold, successively smaller fractions of income are taken into account as follows:

$$e^i = \begin{cases} e_1 = 4 \text{ MW} & \text{if } MW \le y^i \le 4 \text{ MW} \\ e_2 = 4 \text{ MW} + 0.85[y^i - 4 \text{ MW}] & \text{if } 4 \text{ MW} \le y^i \le 5 \text{ MW} \\ e_3 = 4.85 \text{ MW} + 0.70[y^i - 5 \text{ MW}] & \text{if } 5 \text{ MW} \le y^i \le 6 \text{ MW} \\ e_4 = 5.55 \text{ MW} + 0.55[y^i - 6 \text{ MW}] & \text{if } 6 \text{ MW} \le y^i \le 7 \text{ MW} \\ e_5 = 6.10 \text{ MW} + 0.40[y^i - 7 \text{ MW}] & \text{if } 7 \text{ MW} \le y^i \le 8 \text{ MW} \\ e_6 = 6.50 \text{ MW} + 0.25[y^i - 8 \text{ MW}] & \text{if } 8 \text{ MW} \le y^i \le 9 \text{ MW} \\ e_7 = 6.75 \text{ MW} + 0.15[y^i - 9 \text{ MW}] & \text{if } 9 \text{ MW} \le y^i \le 10 \text{ MW} \\ e_8 = 6.90 \text{ MW} & \text{if } 10 \text{ MW} < y_i \end{cases}$$ (11)

The effect of introducing this progressivity turns out not to be large, a result of the concentrated distribution of earnings during the Soviet era, when 70 percent of wage earners received between half and 1.3 times the average wage.

1/ Effective June 1, 1993, the minimum pension was set to 1.4 times the minimum wage. This change is not reflected in the estimations that follow.

Note that the function f(y) according to which effective final average incomes are calculated can be written as

$$f(y^i) = y^i - k(y^i, MW),$$ (12)

where the <u>progressivity schedule</u> k as given implicitly in (11) limits the degree of indexation for high income pensioners.

2. Hypothetical Pension Fund balances

The Pension Fund had a balanced budget in January 1992 with an effective contribution of 31 percent of which 15.5 points were devoted to pensions the remainder for allowances and administrative costs. Hypothetical price changes are used to simulate Pension Fund balances. Two periods may be distinguished--to illustrate the effects of increasing and then decreasing inflation (see Table 2). Periods 1 to 3 represent the "inflationary" stage, with quarterly inflation increasing from 41.6 percent to 158.3 percent. The "stabilization" stage is taken to be over periods 4 to 6, with inflation declining to 23 percent in the 6th. quarter. Employment is assumed to decline gradually over time, in a manner that does not depend on the path of inflation. The scissors effect is clearly seen in the example, with required contribution rates declining during the period of increasing inflation, and increasing sharply as prices stabilize. Indeed the required contribution rate almost doubles during the three "stabilization" quarters (4 to 6).

Table 2. Hypothetical Pension Fund Balances

Period (quarters)	1	2	3	4	5	6
Inflation %	41.6	63.0	158.3	59.4	36.6	23.0
Wage bill (R.bn.)	66.6	137.0	232.4	409.5	547.1	661.2
Pension bill (")	12.9	21.2	28.2	51.0	90.0	154.3
Contribution %	19.4	15.5	12.1	12.4	16.6	23.3

It is clear that the Pension Fund will generate surpluses during periods 2 to 4, with a PAYG contribution rate of 15 percent. These surpluses should be used to avoid sharp increases in the contribution rate (or a deficit to be financed from the budget), during the "stabilization" period to follow. It is still important, during the period of rising inflation, to protect the living standards of the "vulnerable" pensioners, below or around 1.5 times the minimum wage (almost 75 percent of all pensioners were in this category in Belarus in 1992, see Appendix 1).

Additional measures will still need to be taken (of the order of around an 8 percent payroll contribution) by the end of period 6--and in perpetuity thereafter (not allowing for the aging of the population--see below) to avoid deficits on account of the pension fund.

3.   Short Run Pension Policy Options

     As described above, the system of pension benefit determination introduced with the new Pension Law is overly complex. Structural changes are needed to simplify the system, and reduce outlays in a manner that also meets the objective of protecting large numbers of vulnerable from further declines in living standards. An option, which would both simplify administration and considerably reduce outlays, is to move to a flat rate system. Some of the pension options (e.g., the flat-rate option) will have an impact in the short-run, whereas others will generate savings in the medium-term if implemented soon (e.g., increasing the working age or raising the retirement age). Another class of measures should only be considered for the medium-term (such as a supplemental system of funded pensions).

     a.   Basic flat-rate pensions with a funded supplement

     A flat-rate benefit provided to all pensioners, irrespective of the previous wage, could drastically reduce the cost of the pension system, and still increase the income of the poorest pensioners. 1/ Such a system can be used as an emergency measure during the transition period, since it provides equal basic protection to everyone in the short run, forming an effective social safety net. An additional advantage is that the flat rate pension is the simplest system to administer, and may contribute significantly to a reduction in the 6 percent points of the contribution that goes towards administrative costs (excluding Pension Fund salaries).

     In the short run, a flat-rate pension could substantially lower the expenditures of the Pension Fund. With the 1992/3 wage profile, and a flat-rate pension of 1.5 times the minimum wage, there would be a 7.0-point reduction in the associated contribution rate.

     Although the flat rate benefit may not be a pressing concern if indexation rules are changed, the possible extent of savings generated (and a reduction in the associated contribution rate) suggests that it be considered seriously given the pressing needs of expenditures on rehabilitation, following the Chernobyl nuclear disaster, and likely unemployment in the short run, and given the unfavorable prospects for the Pension Fund itself in the medium term (as described below).

     1/ In practical terms, the current social pension would continue to be retained for those without a work history, and the flat rate pension would be given to those with the requisite qualifying work history.

The major disadvantage of the flat-rate pension 1/ is it does not fit well to the move towards Social Insurance principles, which were introduced in the former Soviet Union and Belarus in 1991, together with the establishment of independent Pension Funds. However, linking pensions to past earnings in a number of FSU countries may not be appropriate, given the arbitrary wage structure of the 1950s, when some blue-collar workers were paid more than many skilled white-collar occupations. While the flat-rate option may not be palatable to all, it could be defended as being an important part of a stabilization program, providing an effective safety net without being inherently unfair.

A flat-rate pension system may be retained in the longer run, after the transition period, with two additional provisions: that an individual's contribution would not exceed some ceiling (since benefits are fixed), and that a supplementary funded pension system is made available on a voluntary basis 2/, if one wished to get more (and to contribute more) than just the flat rate.

b. Limiting higher benefits

Another reform option is to reduce the cap on higher pensions, but without any increase in the lower benefits. This option generates no gainers, but some losers, and to be politically acceptable, the ceiling could probably not be below two or three times the minimum wage. Given the 1992 distribution of pensions, such a reform would affect only a small proportion of the pensioners: 10 percent of them get a pension above two times the minimum wage, and not more than 3 percent above three times the minimum wage. With a maximum pension fixed at three times the minimum wage, the Pension Fund would benefit at most from a 0.7 reduction in the contribution rate. With a ceiling at two times the minimum wage, the in contributions would be 1.4 points.

c. Taxation of pensions

At present pensions do not form part of the tax base. An option is to initiate the taxation of pensions, since it would be another way to achieve a limitation in the richer pensioners' net income. This would not provide any additional revenue to the Pension Fund, and consequently the contribution rate would not be affected. But, given the current income tax

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1/ With the flat rate benefit there is no explicit notion linking current pensions to past contributions.

2/ This is a voluntary second tier, and would not be subject to the budgetary costs of a transition from a PAYG to a solely funded system. The private administration of such "pension funds" would need to be monitored. Conditions for the effective operation of such funds for Belarus are discussed in Ahmad and Schneider (1992), and include a positive rate of return greater than the growth of the population. See also V.2 below.

schedule and assuming that pensions would be taxed like primary wages, budget revenue would increase by the equivalent of 1.5 percent of the wage bill.

d. Increasing the retirement age

Increasing the retirement age (with a corresponding increase in the working time that is required to get the basic replacement rate) would have positive effects both on the wage bill and on the pension bill. On the pension side, a one-year increase in the retirement age would reduce, for the Pension Fund, the cost of the expected 140,000 new pensioners. Assuming that these new pensioners were earning 1.3 times the average wage and that the replacement rate is 68 percent on average (corresponding to an average of 13 more working years than the required 25 years for men and 20 years for women), the gain on the expenditure side would be equal to 2 percent of the wage bill.

On the revenue side, the Pension Fund would benefit from an increase in the wage bill, and associated increase in contributions (for a 40.8 percent contribution rate). This would allow a total 1.9 point-reduction in the contribution rate.

In the longer run, the effect of increasing the retirement age would be more important since the diminution of the number of pensioners and the increase in the wage bill will already be achieved and one will get a full-year effect. In the long term, the reduction in the associated contribution rate will be about 2.1 points. The increase in the retirement age should be implemented in the medium term, given the possible interactions with unemployment during the short run.

e. Reduction in the basic replacement rate

The present minimum replacement rate of 55 percent is responsible for the high cost of the pension system compared to the wage bill. Adding to that 1 percent for every additional working year pushes the average replacement rate to about 68 percent, which is more than in most Western European countries.

Lowering the basic replacement rate from 55 percent to 50 percent would directly affect the average replacement rate in the short run and might indirectly lead to an increase in the retirement age in the longer run. Here only the first effect is examined. A 5-point reduction in the average replacement rate would reduce the pension bill, and the associated contribution rate by 1.8 points.

A reduction in the basic replacement rate would only affect those receiving more than the minimum pension. Assuming that 16 percent of pensioners are getting the minimum pension, the effect in year 1 would only be 1.6 points on the associated contribution rate.

f.   Increase in the required working time

As in other FSU countries, the Belarus minimum working period of 20 years for women and 25 years for men is very low by international standards. Only 11 percent of the pensioners have actually worked for the minimum qualifying period, and the average number of working years in excess of the minimum is 14 for women and 12 for men. Hence, an increase in the required working period would not affect the labor market, but would be a convenient way to reduce progressively the replacement rate, and to relate expected benefits to lifetime contributions. A man who earns the minimum wage during 25 years, with a 35 percent contribution for pensions, pays for 8.75 years of minimum wage. But if he retires at 60, his life expectancy is still more than 18 years, during which he will get 1.25 times the minimum wage. Hence, he can expect to receive the equivalent of 22.5 years of the minimum wage, although he has only paid for less than 9. The situation is even worse for women, who have a lower required work period, an earlier retirement age, and a higher life expectancy than men.

Increasing by one year the working time necessary to get the basic replacement rate of 55 percent, without moving the minimum retirement age, would de facto reduce the replacement rate. Assuming that the measure concerns only new pensioners, and that all of them have already worked the necessary 21 or 26 years, the Pension Fund would gain less than rub 10 million in year 1. In the longer run, a five-year change in the required working time would affect more the replacement rate and a larger part of the pensioners would be concerned. This would allow a 0.9 point reduction in the contribution rate after five years.

Claims for an early pension could rapidly make the whole pension system unsustainable. Even though the number of such people have been limited to date, the liberalization of the labor market may encourage the tendency for early retirement -- this should be avoided.

g.   Excluding working pensioners

A commonly recommended policy option is to exclude working pensioners from receiving benefits. There were 440,000 working pensioners, receiving both pension and salary in 1992. The effect of excluding them from receiving pension as long as they are active will depend upon whether they choose to go on working or to retire. We assume that these workers are not easily substitutable by the pool of the currently unemployed. Thus the retirement of working pensioners is, in the extreme, likely to lead to a fall in the wage bill. Assuming that all such pensioners renounce work (and that they used to get the average wage), the wage bill would drop, and the contribution rate would have to be increased by 2.8 points.

Assuming that working pensioners remain in work without pensions (and that they used to get the average pension), the cost for the Pension Fund

would be reduced, lowering the required contribution rate by 4.3 points in the short run. However, the Pension Fund will have to pay higher pensions later because of a longer working time. If they choose to work five years more than necessary, they will get a 5-point increase in their replacement rate when they retire, which will require a special 0.3-point increase in the contribution rate in steady state, leaving it still 4.0 points lower than before.

In a period of rising unemployment, it is hard to predict which of the two above hypotheses are more likely. Although excluding pensioners should be implemented as soon as the economy stabilizes, doing so immediately would have an uncertain effect on the Pension Fund balance. Excluding working pensions should not be an immediate priority.

    h.   <u>Increasing the base-period for pensions</u>

Another policy option which will have a medium-term impact but which should be introduced in the short run is to increase the number of years over which the pension base is to be calculated. According to the new Pension Law, the base period will be increased up to 5 years by 1995, but this is still low by international standards. The number of years could be gradually increased further up to 10 or 15 years. If, for example, the number of years is increased up to 15 years, by 2005, this measure would eventually save one-tenth of the contribution rate. This calculation assumes that individuals work for 38 years, and for every six years of work, 10 percent is gained over the average wage. Increasing the reference period from 1 to 15 years would reduce the reference wage on average by 7 years -- which would be equivalent to 11 percent of the average wage, or a two-percentage points reduction in the long run contribution rate.

4.   <u>Longer-term Demographic Change</u>

In addition to the difficulties that are likely to be faced by the Pension Fund as prices stabilize, there are likely to be additional pressures generated by demographic change that would reinforce the need for a major overhaul of the structure and eligibility for benefits.

The structure of the Belarussian population by age cohort and by sex in 1992 is shown in Table 3. There are two noteworthy features: the relative importance of the cohort aged 30-40, the baby-boom generation, and the relatively small dimension of the cohort aged 45-49, which reflects the low birth rate during World War II. The corresponding life expectancy, $l(c)$, is shown in Table 4. The survivor rate of each cohort, $z(c)$, is approximated by the ratio of the life expectancy of the cohort to the life expectancy of the preceding cohort, plus the interval cohorts ($n=5$ years in this case), approximating the life expectancy of the survivors in the cohort at $(t-n)$:

$$z(c) = l(c)/[l(c+1) + n] \qquad\qquad (21)$$

Table 3. Distribution of Population by Cohorts, 1992

Age (years)	Male	Female	Total	Male	Female	Total
				(in percent of total)		
0	67,872	63,343	131,215	0.7	0.6	1.3
1	73,147	69,585	142,732	0.7	0.7	1.4
2	79,729	75,124	154,853	0.8	0.7	1.5
3	85,471	80,567	166,038	0.8	0.8	1.6
4	82,450	79,289	161,739	0.8	0.8	1.6
5-9	424,369	409,203	833,572	4.1	4.0	8.1
10-14	383,154	371,858	755,012	3.7	3.6	7.4
15-19	366,630	360,975	727,605	3.6	3.5	7.1
20-24	332,517	341,062	673,579	3.2	3.3	6.6
25-29	384,804	384,596	769,400	3.8	3.8	7.5
30-34	441,604	438,587	880,191	4.3	4.3	8.6
35-39	383,397	388,495	771,892	3.7	3.8	7.5
40-44	336,723	347,546	684,269	3.3	3.4	6.7
45-49	202,960	218,046	421,006	2.0	2.1	4.1
50-54	294,092	340,574	634,666	2.9	3.3	6.2
55-59	262,012	329,200	591,212	2.6	3.2	5.8
60-64	255,630	344,817	600,447	2.5	3.4	5.9
65-69	157,067	305,538	462,605	1.5	3.0	4.5
70-74	72,884	157,215	230,099	0.7	1.5	2.2
75-79	54,545	145,638	200,183	0.5	1.4	2.0
80-84	38,016	107,315	145,331	0.4	1.0	1.4
85+	22,306	72,900	95,206	0.2	0.7	0.9
Total	4,801,379	5,431,473	10,232,852	46.9	53.1	100.0

Source: Goskomstat.

Notes: A. population above working age   2,063,071
        B. working age population   5,824,620
        A/B   0.354

Table 4.   Life Expectancy and Survivor Rates

Age	Life Expectancy 1991			Estimated Survival Rate	
	Male	Female		Male	Female
0	65.5	75.48			
1	65.5	75.25			
2	64.6	74.33		0.998	0.998
3	63.6	73.38			
4	62.6	72.42			
5-9	61.7	71.46		0.997	0.998
10-14	56.9	66.57		0.998	0.999
15-19	52.0	61.67		0.994	0.998
20-24	47.4	56.82		0.989	0.997
25-29	42.9	51.98		0.987	0.997
30-34	38.4	47.15		0.984	0.996
35-39	34.0	42.36		0.978	0.993
40-44	29.8	37.64		0.969	0.990
45-49	25.8	33.02		0.952	0.985
50-54	22.1	28.53		0.932	0.976
55-59	18.7	24.23		0.913	0.965
60-64	15.5	20.12		0.887	0.953
65-69	12.4	16.12		0.837	0.915
70-74	9.9	12.62		0.776	0.862
75-79	7.7	9.64		0.703	0.791
80-84	6.0	7.18		0.625	0.703
85+	4.5	5.21		0.300	0.350

Source: Goskomstat and staff estimates.

The birth ratio is estimated as the ratio of the new-born in 1992 to women between 15 and 44. Under a steady state assumption, including no external migration, it is straightforward to estimate the future population in 5, 10, 15, 20, and 25 years using the estimated survivor and birth rates (Table 5). These are used to calculate the dependency ratio. With the major structural changes in the economy at present, and the uncertain affects of the Chernobyl disaster, we do not believe that longer projections for Belarus would be appropriate.

a.   Longer-term policy options

Many countries have supplementary private funded pensions, to which employers or workers may make additional contributions. The necessary condition for such schemes to be feasible is for the real rate of interest to exceed the rate of growth of the working population. Since the latter is only 0.25 percent in Belarus, the condition translates into a requirement that interest rates should be positive, i.e., be higher than inflation. Such a rate of return may be provided by government instruments, or through the development of a capital market. If such a scheme could be established, it would complement the flat-rate pension option described above.

In the longer run, the sustainability of a pay-as-you-go system depends on the ratio of the average pension on the average wage and on the ratio of pensioners on the working population. Because of the aging population, the average dependency ratio for men and women under the current pension law will increase dramatically from 0.35 to 0.40 between 1992 and 1997 (see Table 6). Without policy changes, the contribution rate would have to increase by roughly 14 percentage points. It will then remain stable mainly because of the lower birth rates during the war. The situation will worsen again after 2010, as cohorts born after the war come to retirement age, increasing the old age dependency ratio to 0.47 by 2017. Thus, in the medium to long term, pension costs are likely to increase sharply, and measures should be taken to change the structure of eligibility, and to provide adequate resources to meet future contingent liabilities.

Column 2 of Table 6 shows a possible solution. Raising the retirement age for women from the present level of 55 years up to 60 years (as for men), would lower the future dependency ratio to the present level at least until 2007. This would postpone, but not eliminate, the need for further policy changes.

Table 5. Population Forecast: 1997–2017
('000s).

Age cohort	1997			2002			2007			2012			2017		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	339	317	656	342	319	661	344	321	665	333	311	643	322	301	623
5-9	388	367	755	339	316	655	341	318	660	343	320	664	332	310	642
10-14	423	409	832	387	367	753	338	316	653	340	318	658	342	320	662
15-19	382	371	754	422	408	830	386	366	752	337	315	652	339	317	657
20-24	364	360	724	380	370	750	419	407	826	383	365	749	335	314	649
25-29	329	340	669	360	359	720	376	369	745	415	406	821	379	364	743
30-34	380	383	763	325	339	664	356	358	714	371	368	740	410	405	814
35-39	435	437	871	374	382	756	320	337	657	350	356	707	365	367	732
40-44	375	386	761	425	434	859	366	379	745	312	335	648	342	354	696
45-49	326	344	670	363	382	745	412	429	841	354	375	729	303	332	635
50-54	193	215	408	311	339	650	346	376	722	392	423	815	337	370	707
55-59	274	332	607	180	210	390	290	331	620	322	367	690	366	413	778
60-64	239	318	557	250	321	571	164	202	367	264	319	583	294	354	649
65-69	227	328	555	212	303	515	222	305	527	146	193	338	234	304	538
70-74	131	280	411	190	301	490	178	277	454	186	279	465	122	176	298
75-79	57	136	192	102	241	343	147	259	406	138	239	376	144	241	385
80-84	38	115	154	40	107	147	72	191	262	104	205	309	97	189	286
85-89	24	75	99	24	81	105	25	75	100	45	134	179	65	144	209
>90	7	26	32	7	26	34	7	28	36	2	10	12	13	47	60

Table 6. Belarus: Dependency Ratio

	Current Pension Law 1/	Retirement Age at 60 2/
1992	0.35	
1997	0.40	0.32
2002	0.39	0.35
2007	0.39	0.32
2012	0.42	0.34
2017	0.47	0.38

Source: Estimates based on data provided by Goskomstat.
1/ This assumes a retirement age of 60 for men and 55 for women.
2/ For both men and women.

IV. Conclusions and Timing of the Reforms

The need for immediate reforms of the pension system in the short run will depend very much on how prices behave. If there is a temporary acceleration in inflation, due for example to a cut in some subsidies, then the pension fund in most FSU countries will do relatively well in the aftermath. However, the safety net would be somewhat suspect. Attempts to "redistribute" the initial surpluses of the pension fund, e.g. through a revaluation combined with indexation, may pose problems for a subsequent stabilization.

As seen in the hypothetical Belarus simulations, the inflation deceleration together with the revaluation mechanisms will lead to a deficit of the Pension Fund. An increase of the contribution rate must be excluded given that its current level is already too high. The remaining policy options are then summarized in Table 7, based on the discussion above.

There are two possible short-term strategies. The first consists in avoiding the problem by changing the revaluation mechanism. Belarussian attempts to reduce the lag with wage indexation may not be successful in many cases. It is important that the pension revaluation chosen not exceed that of the wage bill, to avoid deficits in the Pension Fund. The only strategy that is likely to provide the needed savings in the short run is the adoption of flat rate basic state pension, to be supplemented by improvements in administration, and the implementation of some of the other measures identified in Table 7. The level of the flat-rate pension would be determined in relation to adequacy of protection and overall fund resources. This would also meet the objective of providing an effective safety net for all pensioners. The flat rate pension should be seen essentially as a measure for the transition.

If a basic flat rate state pension is to be retained in the medium term, an optional funded pension system should be considered as a

<u>supplement</u>. A necessary condition for such a supplement is the evolution of capital markets, and a real rate of return in excess of the growth rate of the population. An alternative, in the medium term, is to return to social insurance, as envisaged by the current legislation

In addition to the problems faced by the pension system during the transition, the ageing of the population in countries like Belarus imposes additional constraints that would require adjustments to the structure and eligibility for benefits. While a flat rate basic benefit would have the maximum short run impact, other measures could be put in place immediately to allow for population ageing. One such option includes increasing the required working time to 30 or 35 years for all, which will not affect existing pensioners, but will avoid major problems in medium term. Other reforms, such as an increase in the retirement age, should be implemented as soon as the transition period is over.

Table 7. Summary of the Effects of Various Policy Options

Options for pensions	Change in the contribution rate year 2	the long run
Flat rate (1.5*minimum wage)	-7.0	-7.0
Maximum pension (3*minimum wage)	-0.7	-0.7
Maximum pension (2*minimum wage)	-1.4	-1.4
1-year increase in retirement age	-1.9	-2.1
5-point reduction in replacement rate	-1.6	-1.6
5-year increase in working time	0.0	-0.9
Excluding working pensioners	+2.8/-4.3	+2.8/-4.0
Taxing pensioners 1/	-1.5	-1.5
Increasing the base for pension calculation	0.0	-2.0
Needed adjustment 2/	-8.4	

1/ Budget revenue
2/ With current indexation procedures and declining inflation. Note that this is the annual adjustment required to balance the accounts of the Pension Fund.

The Distribution of Pensions

In 1992, given the rapid inflation, ad hoc adjustments to pension benefits were made throughout the year. The minimum pension was set at the minimum wage (MW). The distribution of pensions before the 1992 Pension Law was a function mainly of the length of service, given the structure of wages in the Soviet era. Table 1 summarizes the distribution of old-age and social pensions (expressed as multiples of the minimum wage (MW)), before and after the price shock of early 1992.

Table Al. Distribution of Pensions, 1992

Multiple of MW	January 1992 (in percent)	July 1992 (in percent)
0.5-1	5.6	5.4
1	67.0	9.5
>1-1.6	14.7	76.6
1.6-2.0	9.5	5.4
>2	3.2	3.1

Source: Estimates calculated from data from the Ministry of Social Affairs.

The first row in Table 1 includes social pensions and pensions awarded to persons with less than the minimum length of service. In January 1992, 67 percent of pensions were concentrated on the MW. In July there was a shift due to a lump-sum increase of rub 300 per month paid to all pensioners, but the distribution became even more concentrated: 91.5 percent of pensions were below 1.6 MW compared to 87.3 percent in January.

During 1993, the minimum pension was raised to 1.4 MW. Around 75 percent of pensioners received less than 2MW, and 25 percent more than 2MW. However, direct comparisons with 1992 are misleading because of the real differences in the MW between the two years.

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