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Monika Blaszkiewicz, Jerzy Konieczny,
Anna Myslinska, Artur Radziwil and Przemyslaw Wozniak

Some benefits of reducing inflation in transition economies

Bank of Finland
Institute for Economies in Transition, BOFIT

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Economists

Mr Pekka Sutela, head
Russian economy and economic policy
Russia's international economic relations
Baltic economies
Pekka.Sutela@bof.fi

Ms Tuuli Koivu, economist
Baltic economies
Tuuli.Koivu@bof.fi

Mr Tuomas Komulainen, economist
Russian financial system
Polish economy
Currency crises
Tuomas.Komulainen@bof.fi

Mr Iikka Korhonen, research supervisor
Baltic economies
Issues related to the EU enlargement
Iikka.Korhonen@bof.fi

Mr Vesa Korhonen, economist
Russia's international economic relations
Russia's banking system
Issues related to the EU enlargement
Vesa.Korhonen@bof.fi

Ms Seija Lainela, economist
Russian economy and economic policy
Seija.Lainela@bof.fi

Mr Jouko Rautava, economist
Russian economy and economic policy
Jouko.Rautava@bof.fi

Mr Jian-Guang Shen, economist
Chinese economy and economic policy
Financial crises
Jian-Guang.Shen@bof.fi

Ms Laura Solanko, economist
Russian regional issues
Public economics
Laura.Solanko@bof.fi

Ms Merja Tekoniemi, economist
Russian economy and economic policy
Merja.Tekoniemi@bof.fi

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Contact us

Bank of Finland
Institute for Economies inTransition, BOFIT
PO Box 160
FIN-00101 Helsinki

Phone: +358 9 183 2268
Fax: +358 9 183 2294

E-mail: bofit@bof.fi
Internet: www.bof.fi/bofit

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Monika Blaszkiewicz*, Jerzy Konieczny**, Anna Myslinska***
Artur Radziwil*** and Przemyslaw Wozniak ***

Some benefits of reducing inflation in transition economies

Abstract

We analyse welfare effects of the interactions between the tax system and inflation in Poland and in Ukraine, using the framework developed by Feldstein (1997, 1999). This approach stresses the fact that inflation increases distortions created by the tax system, in particular distortions to intertemporal saving decisions. We find that the effects are much smaller in the two transition countries than in developed marketeconomies. The reason is that taxation of investment returns is much more limited. Our results suggest that taxes on investment returns should be avoided in any future redesign of the tax system.

*Ministry of Finance and Center of Social and Economic Studies, Warsaw, Poland; ** Wilfrid Laurier University, Waterloo, Canada and Center of Social and Economic Studies, Warsaw, Poland; ***Center of Social and Economic Studies, Warsaw, Poland. The second author thanks the Bank of Finland's Institute for Economies in Transition, BOFIT, for providing excellent research facilities during his stay as a Visiting Researcher in 2002, when much of the research was done.

Monika Blaszkiewicz, Jerzy Konieczny, Anna Myslinska
Artur Radziwil and Przemyslaw Wozniak

Some benefits of reducing inflation in transition economies

Tiivistelmä

Tutkimuksessa käsitellään verojärjestelmän ja inflaation yhteisvaikutusta hyvinvointiin Puolassa ja Ukrainassa. Analyysin perustana on Feldsteinin (1997, 1999) kehittämä tutkimuskehikko. Inflaatio lisää verojärjestelmän luomia vääristymiä ja erityisesti säästämiseen liittyviä vääristymiä. Inflaation ja verojärjestelmän yhteisvaikutus hyvinvointiin on Puolassa ja Ukrainassa selvästi pienempi kuin kehittyneissä markkinatalousmaissa, koska investointien tuoton verotus on huomattavasti vähäisempää. Johtopäätöksenä on, että verojärjestelmiä kehitettäessä investointien tuoton verotusta ei pitäisi lisätä.

1 Introduction

The goal of the paper is to analyse welfare effects of the interactions between the tax system and inflation in two transition economies. We consider several scenarios and potential changes in the tax system. The framework we use was developed by Feldstein (1997, 1999), who analysed the benefits of reducing inflation under the current US tax code. Similar studies have been undertaken for the United Kingdom (Bakhshi, Haldane and Hatch, 1999), New Zealand (Bonato, 1998), Spain (Dolado, Gonzalez-Paramo and Vinals, 1999), Canada (O'Reilly and Levac, 2000) and Germany (Tödter and Ziebarth, 1999).

Traditional approaches to evaluating the costs of inflation assume the tax system is not at issue. Instead, they typically concentrate on money market distortions (e.g. Lucas, 2000). The idea is that tax-induced distortions can be eliminated through redesign of the tax system. Moreover, estimates of welfare losses from inflation are usually assumed to be quite low and so they do not justify the costs of inflation reduction. So, in the end, it is difficult to provide a numerical basis for anti-inflationary policies.

Feldstein (1997) points out that eliminating tax-induced costs with a redesign of the tax system is impractical. Tax-system reform is a complex process with many stakeholders and central banks have little say in the design of tax rules. Therefore, a more fruitful approach is to analyse the costs of inflation in the context of existing tax rules and the distortions they induce.

Our analysis follows two parallel strands. The first concentrates on the evaluation of the distortionary effect of taxation operating through the tax system. The second, in the tradition of Phelps (1973), evaluates the revenue consequences of reducing inflation and welfare losses resulting from replacing lost revenue with other distortionary taxes. This point is important as the calculation of the effect of reducing inflation on welfare assumes that government revenue is unchanged.

The application of the analysis to transition economies has two advantages. First, at least in terms of the issues considered here, the tax systems in transition countries are presently superior to those of developed market economies. The main difference is the limited scope of taxation of investment income. This is clear from our estimates, which find that the benefits of reducing inflation are, under the current tax system, much smaller than in developed market economies. The second reason is that, as the tax system develops, governments are tempted to find new sources of revenue and may introduce taxation on these types of income. A likely argument for introducing new taxation would be that additional revenue is needed and "that is how things are done in developed countries." Our analysis stresses that such changes would be detrimental and the current tax system is worth preserving.

2 Welfare effects of reducing inflation - replicating Feldstein's calculations

Inflation, operating in conjunction with the tax system, has four basic effects on welfare. It distorts

- the intertemporal consumption choice (i.e. saving for old age),
- the money market,
- the real cost of servicing government debt, and
- the housing market.

We consider each effect in turn.

2.1 Intertemporal allocation of consumption

In developed countries, the main channel through which the tax system-inflation interactions affect welfare is through distorting the intertemporal consumption choice. Since returns on savings are taxed, inflation reduces the real return on investment. This reduces savings and lowers retirement consumption. It is important to note that this distortion is created by the tax system regardless of whether inflation is, or is not, present. Inflation makes matters worse by enhancing the distortion, as it increases the difference between the before-tax and after tax real rates of return.

To make the analysis as simple as possible, consider a two-period overlapping generations model. Individuals work when they are young and divide their income between consumption and saving for old age. Savings are invested at the real rate r. Therefore, consumption in old age is related to savings by the following equation:

(1) $$C=S(1+r)^{T}$$

where T is the length of the period between saving while working and dissaving in old age. Define: $p=(1+r)^{-T}$. Then

(2) $$S = pC$$

The tax system and inflation distort the choice between current and old-age consumption by affecting the relative price of old-age consumption, p. This is illustrated in Figure 1 below, which shows the individual's compensated demand for retirement consumption as a function of the price of retirement consumption (at the time of the savings decision).

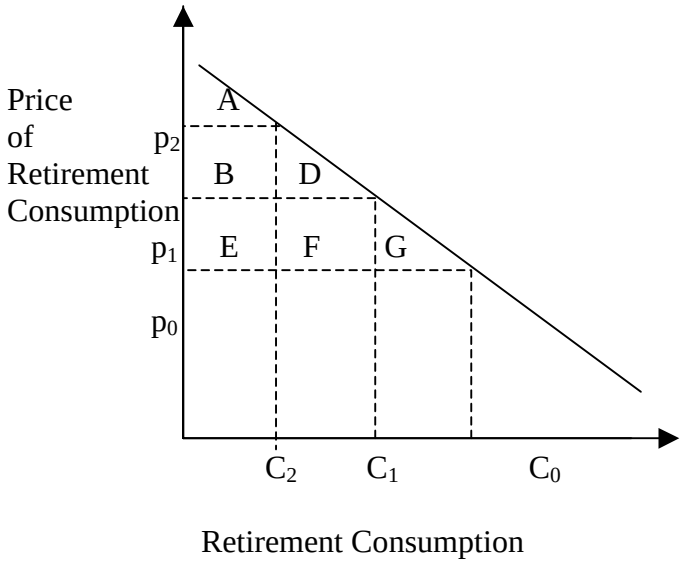

Figure 1. Individual's compensated demand for retirement consumption as a function of the price of retirement consumption at the time of the savings decision

Assume, first, there are no taxes or inflation. This would enable individuals to save at the best available real interest rate, r_0, which corresponds to the relative price of old-age consumption of p_0. At that relative price the demand for old-age consumption is C_0. Consumer surplus is equal to the sum of the areas A+…+G. In the presence of distortionary taxes and inflation, the real interest rate is r_2, the relative price of old-age consumption is p_2 and the demand falls to C_2. Consumer surplus is reduced to the area A, B+E of tax revenue is generated, and the deadweight loss is equal to the triangle D+F+G.

A reduction of inflation reduces the burden of distortionary taxation (discussed below), so the real after-tax interest rate increases to r_1, while the relative price of old-age consumption falls to p_1 and demand increases to C_1, i.e. closer to the optimum value. As a result, deadweight loss falls by D+F, while tax revenue changes by the area F-B (which may be positive or negative). The importance of the Feldstein's approach for estimating the welfare costs of inflation is immediately obvious. In traditional analyses of the costs of inflation, the comparison is with the optimal rate of inflation. Therefore, welfare changes are depicted by the 'Haberger triangles', which are second order, i.e. small. On the other hand, in the presence of distortionary taxes, the initial situation is not optimal and welfare changes are first order. In Figure 1, these changes correspond to the area of a trapezoid B+D, rather than a triangle. Thus, welfare changes are potentially large.

Assume further that the fiscal authority wants to keep tax revenues constant. This requires other taxes be altered to offset the change in tax revenues resulting from lower inflation. Usually, it is assumed that new taxes are lump-sum and nondistortionary. Clearly, this assumption is unjustified. In all countries, the scope of lump-sum taxes is limited and they do not raise significant amounts of revenue. Therefore the effect of a compensating tax change, equal to the area B-F (see Figure 1), has to be taken into account. Let λ denote

the deadweight loss per unit of alternative taxes. Thus, the total gain[1] from reducing inflation is:[2]

(3) $G_1 = D+F + \lambda (F-B)$.

Using Figure 1, the areas represented in equation (3) can be expressed in terms of prices and consumption as:

(4) $G_1 = [p_1 - p_0 + (p_2 - p_1)/2]*(C_1 - C_2) + \lambda [(p_1 - p_0)*(C_1 - C_2) - (p_2 - p_1)C_2]$.

We now turn to expressing equation (4) in terms of observable magnitudes. The change in consumption can be approximated as:

(5) $C_1 - C_2 = (dC/dp)(p_1-p_2) = C_2(p_2/ C_2)\ (dC/dp)(p_1-p_2)/ p_2 = p_2\ C_2\, \varepsilon_{C_p}\ (p_1-p_2)/ p_2^2$

$= \quad S_2\, \varepsilon_{C_p}\ (p_1-p_2)/ p_2^2$

where ε_{C_p} is the compensated elasticity of retirement consumption with respect to its price, evaluated at the initial inflation rate. This elasticity is not directly observable. Using the Slutsky decomposition and the fact that $S=pC$ we get:

(6) $\varepsilon_{C_p} = \eta_{C_p} + \sigma = \eta_{S_p} + \sigma - 1$

where η_{C_p} is the uncompensated elasticity of retirement consumption with respect to its price, σ is the propensity to save out of exogenous income and η_{S_p} is the uncompensated elasticity of savings with respect to the price of retirement consumption. Differentiating $p=(1+r)^{-T}$ and converting the result into elasticities we get:

(7) $\eta_{S_p} = - (1+r)\ \eta_{S_r} /rT$

where η_{S_r} is the uncompensated elasticity of savings with respect to its rate of return.

[1] It should be noted that, since the sign of revenue change is ambiguous, it is possible that a reduction of inflation would reduce welfare. This is more likely if the compensated demand curve is steep and the deadweight loss from other taxes is large.

[2] If, for example, tax revenue falls as inflation decreases (i.e. F<B), other taxes have to be raised by the amount equal to B-F. The compensating increase in other taxes lowers welfare by the amount

The value of S_2 is equal to the value of savings made by young people for retirement. National savings, S_N, are equal to the savings of the young minus dissavings of the old. Consider an overlapping generations model with savings proportional to income. Let n denote the rate of population growth and g denote the rate of real wage growth. Then the ratio of the income of (old) dissavers to the income of (young) savers is $(1+n+g)^{-T}$. Therefore, dissavings of the old equal $S_2\ (1+n+g)^{-T}$ and so $S_N = S_2 - S_2\ (1+n+g)^{-T}$. This implies that the savings of the young, S_2, are related to the national savings by the following equation:

(8) $$S_2 = S_N /(1-(1+n+g)^{-T}).$$

Finally, we assume that the propensity to save out of exogenous income is equal to the propensity to save out of wage income. So:

(9) $$\sigma = S_2/(\alpha * \text{GDP})$$

where α is the share of wages in GDP.

Inserting these results into (4) we obtain the expression for G_1 in terms of observable variables:

(4') $$G_1 = \left[\left(\frac{p_1 - p_0}{p_2}\right) + \left(\frac{p_2 - p_1}{2p_2}\right)\right]\left(\frac{p_1 - p_0}{p_2}\right) \times S_2\left[1 + (1+r_2)\eta_{S_r}\ /r_2 T - \sigma\right]$$

$$+ \lambda \times S_2 \times \left[\frac{p_1 - p_0}{p_2}\frac{p_2 - p_1}{p_2}\left(1 + (1+r_2)\eta_{S_r}\ / rT - \sigma\right) - \frac{p_2 - p_1}{p_2}\right]$$

with S_2 and σ given by equations (8) and (9), respectively.

Equation (4') divides the gain into two conceptually distinct components. The first (consisting of the price ratio terms and λ) is related to the tax system and its interactions with the inflation rate. The second, consisting of the remaining terms, depends on the tax system only indirectly. It is important to note that the terms that involve the prices of retirement consumption under various assumptions are in the form of ratios, so values of various prices are less important than proportional differences between them. This matters for transition economies, where it is still difficult to pinpoint the value of first-best interest rate used by individuals to save for retirement.

We now turn to the estimates of the parameters in equations (4'), (8) and (9), and consider some preliminary estimates of the parameters for Poland and Ukraine.

The most important problem with estimating the required parameters for transition countries is the lack of a steady state. Many macroeconomic variables, as well as institu-

equal to the deadweight loss of the new taxes, λ(F-B). Hence, if F<B, the second term in (3) is negative.

tions, are in a state of continuous change. This fact is of particular importance for our study as the time horizon we consider is a generation. It is clear that the tax rules, inflation rates, profit rates, retirement arrangements or even rates of population growth will change in the next 20-30 years. While some of these variables may be relatively close to the long-run values, some are certainly not. Or example the return on equity has been negative in both Poland and Ukraine in recent years; clearly, this cannot be the case in the steady state.

We start with the numbers for Poland. For the first-best rate of return on savings r_0, we took the real return on equity in industry, construction, trade, repairs, hotels and restaurants in the private sector, during the period 1997-2000. The resulting value is 5.04%.[3] This rate is treated as the proxy for the rate of return on equity (in the sense that we assume that individuals are able to save for retirement consumption at this rate) which is standard in these calculations. Assuming that the average time between saving for retirement and using up these savings to acquire retirement consumption is T=30 years, this corresponds to $p_0 = 0.23$.

To calculate the net of tax real return, we need to take into account corporate and individual income taxes. The average rate of corporate income tax is 25.73% (the average rate 1998-2000).[4] With respect to personal tax rates, we now consider three scenarios. The scenarios are based on the tax treatment of interest, dividends and capital gains income, which depend on the person (institution) receiving the benefit.

Scenario 1: Individual dividend and interest tax rate of 15% and capital gains tax rate of 10%.
Scenario 2: Individual dividend and capital gains tax rate of zero.
Scenario 3: Individual dividend tax rate of zero, individual capital gains tax of 10%.

The combined effect of taxes reduces the rate of return to 3.18% under Scenario 1 and 3.74% under Scenarios 2 and 3. This corresponds to $p_2 = 0.39$ under Scenario 1 and 0.33 under Scenarios 2 and 3.

We now turn to analysing the effects of lowering the rate of inflation. The standard approach in existing studies is to consider a reduction in inflation equal to 2%. This figure comes from Feldstein's initial work. He assumed that the actual rate of inflation in the US was, over the period 1960-1994, 2% above price stability, which he defines as an inflation rate of 2%. The reason for taking as price stability a positive level of CPI inflation is the well-known bias in the calculation of the inflation rate. The bias is particularly large in the US. Whether it is smaller or larger in transition economies is unclear. The factor reducing the bias is the practice of yearly changes in weights of goods in the CPI (unlike in developed countries, where the weights are kept constant for extended periods of time). On the other hand, new goods are introduced in transition economies at a more rapid pace, which makes the problem of inadequate accounting for superior quality of new products more severe than in developed economies. In any case, except for very recently, inflation rates during transition have vastly exceeded 4% per year, implying Feldstein's assumptions do not apply. To make our study comparable with existing literature we, nevertheless, also consider a reduction of the inflation rate by 2%. Obviously, the transition process is ongoing and the achievement of price stability will generally require further reductions.[5]

[3] Source: The Central Bureau of Statistics (GUS).

[4] Source: the Ministry of Finance.

[5] It is important to note that most calculations are independent of the initial level of inflation. The exception is the effect in the money market.

There are three effects of lowering the inflation rate. Firm profits change, due to the effect of lower inflation on the value of depreciation as well as on the cost-of-goods and interest payment deductions. For individuals taxes on capital gains, as well as on interest earnings, fall.

A lower inflation rate increases the value of depreciation allowances and the cost of intermediate goods. In the absence of relevant estimates, we follow Feldstein in assuming that a 1% drop in inflation reduces the corporate tax rate by 0.57%. With a marginal corporate tax rate of 0.34 (average 1996-2001),[6] the total gain from this source is 0.02*0.57*0.34 = 0.4%.[7] On the other hand, the value of tax deduction to firms falls. The average debt-to-capital ratio in Polish industry in 1997-2000 was 59%, so the increase in the tax burden is 0.02*0.59*0.34=0.4%. Hence, the two effects almost exactly offset each other.

We assume that the real value of a company is independent of inflation. Under this assumption, a decrease in inflation reduces capital gains. For a 2% decrease in inflation, the value of the company increases by 2% less than it would have changed otherwise. As the value of nominal liabilities is not affected by the change in inflation, this raises the return on assets by 2% times 1/(1-x), where x is the debt-to-capital ratio. The total effect on the individual rate of return net of tax is this amount multiplied by the share of equity in individual portfolios times the tax rate on capital gains. The average debt-to-equity ratio in Polish industry in 1997-2000 was 59%. The share of equity in individual portfolios is assumed to be 0.2. This results in an increase in individual return on equity by 0.02*2.44*0.2*0.1=0.098% in Scenarios 1 and 3 and zero in Scenario 2.

Lower inflation reduces nominal interest earnings, which reduces the taxes paid on such earnings. As a result, real after-tax earnings increase. To compute the effect of lower interest earnings on individual returns, assume that the Fisher equation holds (which is a good approximation for Poland). With 80% of assets held in interest earning form, individual return on savings increases by 0.02*0.15*0.8=0.24% in Scenario 1 and zero in the other two scenarios.

The total effect on the after tax rate of return is 0.336% in Scenario 1, zero in Scenario 2 and 0.096% in Scenario 3. The resulting rates of return, r_1, are 3.51%, 3.73% and 3.83%, respectively and the prices or retirement consumption, p_1, are 0.36 in Scenario 1, 0.33 in Scenario 2 and 0.32 in Scenario 3.

The average rate of population growth in 1991-2000 was 0.1%, the average rate of wage growth in 1994-2000 was 4.1% and the average value of savings in 1994-2000 was 8.83% of GDP. With the wage share of GDP of 0.58 (average 1995-1999),[8] this implies that S_2 = 12.36 % of GDP and the propensity to save out of exogenous income, σ =21.4%.

The uncompensated elasticity of savings with respect to their rate of return has been very difficult to estimate and no commonly agreed estimates exist – even for the US economy. Similarly, the evaluation of the deadweight loss of other taxes is beyond the scope of the present research. We follow the lead of Feldstein and others and assume η_{S_r} =0.4 and λ =0.4. In subsequent sensitivity analysis, we will consider the effect of using alternative values for these parameters.

For Ukraine, the task was harder as the economy was shrinking until a couple years ago. Thus, return in the stock market and firm profits are both negative. To avoid this problem in our first try at the data, we took as the pre-tax rate of return the average rate of

[6] Source: Ministry of Finance.

[7] All welfare and revenue numbers are in percent of GDP.

[8] Sources: GUS and the Ministry of Finance.

return on equity in profitable firms in 1999 and 2000. This rate is r_0= 1.9%[9] and so p_0=0.838, assuming the average time between saving and retirement is T=22.5 years. This period is shorter than in other countries for two reasons. First, the average life expectancy in Ukraine is relatively low. Second, given the low level of starting wages, it is unlikely large savings are accumulated at the beginning of the working life. Given the average corporate tax rate of 48.3%[10] and individual tax rate of 20%,[11] the after-tax return at current inflation (12%) is r_2= 0.78% and so p_2=0.839.

To calculate r_1 and p_1, we proceed as before. Given the marginal corporate tax rate of 30%[12] and assuming that the profit tax rate increases by 0.57% for 1% of inflation increase, the reduction of inflation by 2% raises the return on equity by 0.02*0.057*0.3=0.34%. The average debt-to-capital ratio in Ukrainian industry was 4.9% (1999-2000, the ratio of credits granted to non-financial sector to working capital), so the reduction in the debt interest deduction is, assuming the Fisher equation holds, 0.02*0.0049*0.3=0.03%. There are no taxes on capital gains. Adding these effects, we get r_1= 1.03%, so p_1=0.793. The average rate of population growth in 1991-2001 was –0.45%. For the rate of growth of real wages we took 4.5%, i.e. the median rate for FSU countries in the first two years of growth. We chose this rate, because changes in Ukrainian real wages were unsustainable over a longer period. Initially, wages fell steadily. In recent years, they have been increasing at a very rapid rate. The average value of savings in 1996-2000 was 5.46% GDP.[13] Using equation (8) this implies S_2 = 9.25% of GDP. The share of wages in income was 0.46 (average 1992-2001).[14] From equation (9) this implies σ =20.03. The effects on welfare are summarised in Table 1.

Table 1. Welfare effects of reduced inflation on intertemporal distortion (% of GDP)

Welfare effect	Feldstein	Poland 1	Poland 2	Poland 3	Ukraine
Distorting the price of retirement consumption	1.038	0.502	-0.018	0.102	0.298
Replacing lost revenue due to lower taxes on investment income	0.113	-0.270	0.013	-0.079	-0.098
Total, % of GDP	0.926	0.232	-0.005	0.023	0.200

The remarkable feature of Table 1 is that the benefits of reducing inflation in the two countries are quite small. In Ukraine, they are less than a quarter of the benefits in the US, and in Poland they are either a quarter of the US value or very close to zero. They are significantly lower than in market economies.

There are two reasons for the difference. The minor reason is that we use low rates of return on retirement consumption. As a consequence, the level of savings and of retirement consumption is low and changes in the rate of return have relatively small effects. This effect is not dominant, as can be seen by comparing the results for Ukraine and Poland.

[9] Source: Statistical Yearbook of Ukraine 2000, State Statistics Committee of Ukraine, Kiev, 2001.

[10] Source: Ministry of Finance, Statistical Yearbook.

[11] Source: ДЕКРЕТ КАБИНЕТА МИНИСТРОВ УКРАИНЫ О подоходном налоге с граждан (Cabinet of Ministers Decree on Individual Income Tax), April 1993.

[12] Ministry of Finance.

[13] Savings include change in net credits granted to households, net deposits, cash, investments and change in inventories made by households, net sales of foreign currency. Source: Financial Week, various issues, website of State Statistics Committee of Ukraine, NBU Bulletins, Statistical Yearbook and State Statistics Committee of Ukraine' annual publications on National Accounts.

[14] Financial Week, various issues, website of State Statistics Committee of Ukraine.

While the prices of retirement consumption are much higher in Ukraine, the benefits of reducing inflation are similar to those in Poland.

The major reason is the difference in the tax structures. In developed market economies, most, if not all, forms of investment income are taxed. Such taxes are rare in transition economies. Dividends and capital gains are usually, and interest income generally, free from income tax. Thus, the choice between current and future consumption is less distorted than in market economies. This underlies our initial claim that some features of the tax system in transition economies are superior to analogous arrangements in market economies. This is clearly seen under Scenario 2 for Poland, which assumes no investment taxes. The intertemporal distortion effect is almost zero.[15]

Does this mean that intertemporal distortion is unimportant in Poland and Ukraine? The answer depends on the time horizon. In the short run, the answer is probably yes. Over a longer period, the situation could change. History shows that governments, especially those faced with revenue shortfalls, often follow the "Willie Sutton" approach to taxation.[16] The temptation to introduce taxes on investment earnings is strong in many countries. For example, taxes on interest income have recently been introduced in Poland. Hence, the inflation-tax structure implications for welfare could become important in the near future.

2.2 The welfare effect of distorting the money market

Inflation affects the demand for money through its effect on the nominal interest rate. A decrease in the rate of inflation reduces the nominal interest rate and raises the demand for money. This has two effects. First, the level of money stock is closer to the optimal value, i.e. the value of money holdings at the nominal interest rate of zero (Friedman, 1969). Second, there are several effects on government revenue that need to be offset by a change in distortionary taxes (Phelps, 1973):

- Seigniorage revenue falls,
- The value of private capital stock declines as money balances increase (with the corresponding drop in revenue and an increase in distortionary taxes), and
- The government replaces a part of its debt with cash.

At the initial inflation rate the nominal after-tax return on equity is equal to the sum of the inflation rate and the real interest rate: $i_2 = \pi_2 + r_2$ and money holdings are M_2 .[17] Reducing the inflation rate by 2% reduces the nominal return to $i_1 = \pi_1 + r_1$ and increases money holdings to M_1. As the cost of producing money is, effectively, zero, the increase in consumer surplus is equal to the sum of the areas A and B in Figure 2.

[15] The only effect is due to the presence of corporate taxes. In Scenario 3, where we assume capital gains are taxable, the result is very close to zero as, by coincidence, the welfare consequences of the revenue effect are almost identical to the welfare consequences of the lower intertemporal distortion.

[16] Willie Sutton, a US bank robber noted for his daring escapes from high-security prisons, long allowed an apocryphal quote attributed to him to become part of American legend. Supposedly, when asked by a reporter why he robbed banks, he responded, "Because that's where the money is." He ultimately admitted the reporter made the story up.

[17] We define the monetary aggregate as non-interest bearing assets, i.e. M0.

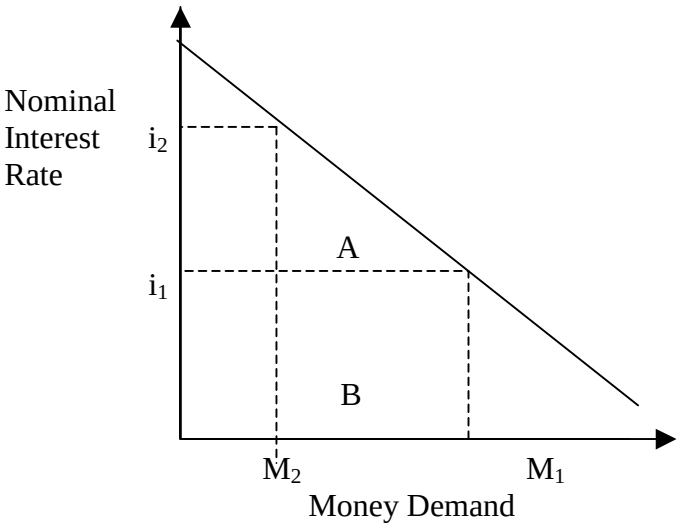

Figure 2. Money demand as a function of the nominal interest rate

This gain is:

(10) $$g_1 = A + B = (i_2 + i_1)(M_1 - M_2)/2 \approx -(i_2 + i_1)(i_1 - i_2)\varepsilon_M M_2 / 2i_2$$

The change in seigniorage, evaluated at the initial values, is:

(11) $$t_1 = \frac{d(M\pi)}{d\pi} = M_2\left(1 + \frac{\pi_2}{i_2}\frac{di}{d\pi}\frac{dM}{di}\frac{i}{M}\right) = M_2\left(1 - \frac{\pi_2}{i_2}\frac{di}{d\pi}\varepsilon_M\right)$$

where the after tax nominal interest rate is the opportunity cost of holding money. The effect of inflation on the nominal interest rate takes into account the effect of inflation on the real rate of return, calculated in the previous section.

We assume that the lower rate of inflation leads to portfolio reallocation. This reduces government revenue by the amount equal to the change in capital, $M_1 - M_2$, times the average tax rate on capital:

(12) $$t_2 = (r_0 - r_1)(M_1 - M_2) \approx (r_0 - r_1)(i_1 - i_2)\varepsilon_M M_2 / i_2$$

Finally, the government replaces some of its debt with the extra cash it has printed. This reduces the cost of servicing government debt by the real after-tax rate of interest on government debt, r_{ng}, times the change in the money stock:

(13) $$t_3 = r_{ng}(M_1 - M_2)$$

The total effect on welfare is:

(14) $$G_2 = g_1 + \lambda(-t_1 - t_2 + t_3)$$

We consider, as the initial level of inflation, 11% in Poland (the average 1997-2000) and 12% in Ukraine (in 2001).[18] The estimated elasticity of demand for M0 in both countries is 0.3.[19] The ratio of M0 in GDP is, in Poland, 8.51% (average 1997-2000)[20] and, in Ukraine, 8.98% (in 2000).[21] The average nominal interest rate on government bonds in Poland in 1997-2000 was 17.8% and the average inflation rate was 11%. For Ukraine the nominal interest rate in 2001 was 14.9%[18] Using these numbers, the estimated effects on welfare, assuming as before that η_{S_r} =0.4 and λ =0.4, are presented in Table 2.

Table 2. Welfare effects from lower inflation in the money market (% of GDP)

Welfare effect	Feldstein	Poland 1	Poland 2	Poland 3	Ukraine
Money market distortion	0.016	0.040	0.048	0.045	0.043
Replacing seigniorage loss	-0.046	-0.055	-0.053	-0.054	-0.054
Replacing revenue loss from change in capital	-0.006	-0.002	-0.002	-0.002	-0.001
Reduction in real cost of debt service	0.002	0.014	0.020	0.019	0.018
Total	-0.034	-0.002	0.014	0.010	0.006

These estimates are similar to those in the US. The gain from reducing the money market distortion in Poland and in Ukraine is about three times higher than in the US. This is due to the higher elasticity of money demand with respect to the interest rate and higher money balances. The latter is caused by a less developed payment system and greater role of cash. Seigniorage loss is similar in all countries and the remaining numbers are small. Overall, the money-market effect of a lower inflation rate is to reduce welfare, but the size of the change is small relative to the effect on intertemporal distortion.

2.3 Debt servicing

Lower inflation increases the real cost of servicing government debt. The reason is that the nominal interest payments, rather than real payments, are taxed. If the real before-tax interest rate is invariant with respect to inflation, lower inflation reduces the nominal interest rate on government debt and reduces the real value of taxes on interest payments to individuals. Assuming that the debt-to-GDP ratio remains constant, the increase in the real value of interest payments is equal to the product of the change in inflation times the marginal tax rate on interest payments, θ_i, times the ratio of debt, *B*, to GDP. Hence the wel-

[18] Source: IMF.

[19] Own estimates. For Ukraine, Banaian et al. (1997) provide a range of estimates between 0.3 and 0.4.

[20] Source: NBU and Ministry of Finance.

[21] Source: IMF.

fare effect of the change in taxes required to offset the change in real government revenue is:

(15) $$G_3 = -\lambda * 0.02 * \theta_i * B / GDP$$

For Poland in Scenarios 2 and 3, the tax rate on interest income is zero and so this value equals zero. In Scenario 1 for Poland, it is -0.06% (quite similar to the US value of –0.1%). In the other Polish scenarios, as well as for Ukraine, it is zero as interest earnings on government debt are not taxed.

2.4 Demand for owner-occupied gousing

In any tax system owner-occupied housing receives preferential treatment, as there is no tax on its implicit rental value. This means that the amount of owner-occupied housing is suboptimal. In addition, many tax systems allow the deduction of mortgage interest from taxable income, further promoting owner-occupied housing.

The scale of this distortion depends on the structure of the economy. For example, Dolado, Gonzales-Paramo and Vinals (1999) find that this effect to be very important in Spain, mainly due to the large proportion of owner-occupied housing.

Given widespread privatisation of apartments in some transition economies in recent years, these distortions are potentially important. However, another factor affecting their role is the level of activity, and freedom of choice, in the housing market. There is very little of either in transition economies. Housing markets are thin, with very low volume of apartments traded, and virtually all privatised apartments ended up in the hands of their occupants. For both reasons, economic factors have little effect on the amount and the distribution of owner-occupied housing, so we decided not to take these effects into account.

2.5 Summary of results

A summary of results is presented in Table 3.

Table 3. Summary of results, (% of GDP)

Welfare effect	Feldstein	Poland 1	Poland 2	Poland 3	Ukraine
Intertemporal distortion	0.926	0.232	-0.005	0.023	0.200
Money-market distortion	-0.034	-0.002	0.014	0.010	0.006
Debt service effect	-0.100	-0.056	0.000	0.000	0.000
Housing market effect	0.220	0.000	0.000	0.000	0.000
Total	1.012	0.174	0.008	0.033	0.206

It is clear from Table 3 that the effects of reducing inflation in Poland and Ukraine are much smaller than in the US.[22] The basic thrust of Feldstein argument is that future benefits of reducing inflation (which are permanent and equal to about 1% of GDP) vastly exceed the current costs of disinflation. This argument clearly does not apply in the cases of Poland and Ukraine. Estimates of the costs of disinflation for these countries are not available. If they were equal to the benefits of disinflation in the US, the present value of the benefits would be no higher than the present value of disinflation costs.[23]

In scenarios 2 and 3 for Poland, it is quite possible that reducing inflation actually reduces welfare. Of course, this does not mean the government should push for higher inflation. Feldstein-type estimates evaluate only certain costs of inflation (i.e. those arising from the tax system), and thus underestimate the total costs of inflation.

It is clear, however, that at present the Feldstein channel is not very important in Poland and Ukraine. Thus, central bank considerations about inflation should concentrate on other issues. On the other hand, if the fiscal authorities follow the "Willie Sutton" approach to taxation and introduce taxes on investment income, these considerations will become important. We now turn to this and other issues.

3 Alternative scenarios

As discussed above, there are two basic reasons why the benefits of reducing inflation are low in Poland and in Ukraine. The first is the low rate of return on savings, the second is the superior tax structure. We discuss them in reverse order.

To determine the importance of the tax structure, we replace the tax rates in Poland and Ukraine with US values. For Poland, this involves a significant increase in all tax rates. For Ukraine, it means a significant increase in all tax rates except the marginal tax rate on corporations. For convenience, the current rates are given below.

Table 4. Tax rates

	Feldstein	Poland 1	Poland 2	Poland 3	Ukraine
Avg. Corporate tax rate	41.0	25.7	25.7	25.7	48.4
Marginal corporate tax rate	35.0	34.3	34.3	34.3	30.0
Avg. Individual tax on investment income	25.0	15.0	0.0	0.0	20.0
Dividend tax rate	25.0	15.0	0.0	0.0	0.0
Interest income tax rate	25.0	15.0	0.0	0.0	0.0
Capital gains tax rate	10.0	10.0	0.0	10.0	0.0

When the tax rates in Poland and Ukraine are replaced with US values, the resulting benefits from reducing inflation, disregarding housing market effects, are shown in Table 5.

[22] It is important to note that, as all results are positive, the deadweight loss from taxing investment income exceeds the deadweight loss from other taxes.

[23] For the US, the stream of benefits grows at a rate 2.5% (average rate of growth of GDP) and is discounted at the rate of 5.1% (average after-tax S&P return, see Feldstein, 1997). Thus, the present value of the benefit is almost 40 times higher than the value in the last row of Table 3. The cost of reducing inflation by 2% is generally perceived to be between 4% and 10% of GDP.

Table 5. Summary of results (% of GDP), US tax rates

Welfare effects	Feldstein	Poland	Ukraine
Intertemporal distortion	0.926	0.857	0.096
Money market distortion	-0.034	-0.010	-0.017
Debt service effect	-0.100	-0.094	-0.088
Total	0.792	0.754	-0.010

As the results in Table 5 show, if tax rates in Poland were the same as in the US, the welfare effects would be nearly identical. The differences in the corporate tax rates and personal tax rates are about equally important, i.e. with corporate tax rates equal to US values and personal tax rates at present values, the total effect would be 0.38; with personal tax rates equal to those in the US and corporate tax rates equal to current values, the total result would be 0.35.

The situation is different in Ukraine. Even with US tax rates, the total effect would be minimal. This is because the rates of return we use for Ukraine are very low (r_0 is only 1.9% as opposed to 9.2% in the US). As a result, the benefit from lower distortion of intertemporal choice (0.54% of GDP) is almost exactly offset by the effect of new distortionary taxes needed to maintain tax revenue unchanged (-0.45% of GDP).

Finally, we turn to an alternative assumption about the rates at which individuals save for retirement. For developed countries, Feldstein and other authors assume that the rate is the average rate of return on equity. In fact, households typically hold a combination of equity and bonds in their portfolios. The underlying assumption for the use of the equity return, rather than a weighted average, is that the portfolio composition is on the internal point of the "savings-possibilities" curve. The holding of bonds, which have historically had a lower return than equity, is due to their superior risk characteristics. In the optimum portfolio, these risk characteristics compensate for the lower rate of return. Therefore, bonds and equity are assumed to be equivalent and no distinction is made between either type of asset.

For transition economies this assumption is currently not justified. Equity markets are thin, which makes it nearly impossible for households to hold all their assets in the form of equity even if they wanted to. In other words, the current portfolio composition is a corner solution to the household optimisation problem. From the standpoint of household savings decisions, the two assets are not equivalent.

We therefore take a different approach and assume, more realistically, that all savings are in the form of interest-earning assets. For Poland, we use the interest rates on both government bonds (1-year, average 1997-2001) and bank deposits (3-year deposits, average 1997-2001). For Ukraine, we only use interest rates on government bonds (average 1995-2000, excluding 1998).[24] The results are presented in Table 6.

[24] We exclude 1998 to avoid the effects of the Russian crisis, which drove up real interest rates in Ukraine. The effect of this exclusion is small.

Table 6. Alternative savings assumptions

	Feldstein	Poland, scenario 1	Gov. bonds	Bank deposits	Ukraine	Gov. bonds
Interest rates						
r0 in %	9.2	5.0	6.6	5.5	1.9	13.6
r1 in %	4.6	3.5	3.9	3.0	1.0	7.0
r2 in %	4.1	3.2	3.5	2.6	0.8	6.6
Welfare effects of						
Intertemporal distortion	0.926	0.232	0.616	0.689	0.200	0.504
Money market distortion	-0.034	-0.002	-0.007	-0.005	0.006	-0.014
Debt service effect	-0.100	-0.056	-0.056	-0.056	0.000	-0.071
Total	0.792	0.174	0.553	0.628	0.206	0.419

As in the previous case, the results are dramatic. Under the alternative savings assumptions, the welfare effects are two to three times higher than before and between a half and three-quarters of the US numbers. Clearly, savings assumptions matter.

4 Preliminary conclusions and future work

The results presented here should be considered preliminary for several reasons. The calculations apply to a long time horizon and preferably should have been based on parameters obtained from economies in stationary equilibrium. Neither condition is met in the cases of Poland and Ukraine. Thus the choice of the years for which the parameters are obtain affects the results. For example, the current inflation rates in both countries are much lower than the values we used. The alternative scenarios clearly show that the results crucially depend on assumptions used. As the time frame for the calculations is a generation, it is clear that both the parameter values, as well as savings assumptions, are different from what can be expected to prevail in the future. Therefore, the next step is to try to predict the future behaviour of crucial parameters and revisit various assumptions.

For these reasons, it seems inappropriate to take the present calculations at face value. Rather, they should be understood as an illustration of some important features of transition economies.

The most important policy conclusion here is a warning pertaining to the welfare consequences of taxing investment income. They have so far been avoided in most transition countries, but the recent introduction of interest taxation in Poland suggests that, as has happened elsewhere, the “Willie Sutton” approach to taxation may, eventually, prevail. It is clear that transition countries have high revenue needs, which induces the fiscal authority to search for new sources of revenue. What the current paper points out, however, is that transition economies have the benefit of designing institutions without the burden of the past. This often leads to superior institutions. For example, Cukierman, Miller and Neyapti (2002) find a high degree of central bank independence in transition economies. This paper, similarly, points out to the beneficial structure of taxation. Therefore in further work will concentrate on evaluating the welfare consequences of introducing investment taxes.

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Editor-in-Chief **Iikka Korhonen**

Bank of Finland
Institute for Economies in Transition BOFIT
PO Box 160
FIN-00101 Helsinki

Phone: +358 9 183 2268
Fax: +358 9 183 2294
bofit@bof.fi

www.bof.fi/bofit