DEBT DYNAMICS AND THE SUSTAINABILITY OF UKRAINIAN FISCAL POLICY

In the early 1990's Ukraine incurred large budgetary deficits, sometimes greater than 10 per cent of GDP, and financed them through monetary emission from the Central Bank. The predictable result was hyper-inflation and the destruction of the former national currency, the karbovanets, which people referred to as "fantiki" or play money. To restore macro-stability, the government introduced a new currency, the Hryvnia, in September of 1996 and a policy commitment to avoid Central Bank financing of any fiscal deficit. New methods, therefore, had to be found for financing a persistent fiscal deficit in the State budget and the government turned to both internal and external sources of finance. A domestic Treasury bill market was created in the last half of 1995 and Ukrainian banks became the main purchasers of this new financial instrument. Foreign lenders, ranging from international financial institutions to foreign investment banks such as Merrill-Lynch, also extended new financial credits to the government of Ukraine.

Given the relatively high real rates of interest which Ukraine has had to pay on both its newly issued foreign and domestic debt, this note inquires whether these borrowing tactics offer a permanent solution to the problem of how to finance a fiscal deficit and whether Ukraine faces a fiscal situation which will allow it to incur future fiscal deficits for much longer. In other words, in what sense is Ukraine's current fiscal policy "sustainable" and, if it is not sustainable, how soon will Ukraine be required to adopt new fiscal policies that are sustainable?

To answer these questions, this note constructs a simple model of the dynamics of deficits and public debt and elaborates on the implications of this model in terms of the concept of fiscal sustainability. After presenting a brief profile of Ukraine's recent deficit and debt history, the note offers an assessment of the sustainability of Ukraine's fiscal policies and the extent to which current debt servicing requirements appear to be "crowding-out" socially productive expenditures. The note concludes with a short summary of major points.

I. A MODEL OF FISCAL POLICY SUSTAINABILITY

A fiscal policy is defined to be sustainable if its continuation does not lead to ever larger growth in the ratio of public debt to national income. Unlimited growth in this ratio implies that, at some point, all of a country's revenues would be dedicated to servicing the public debt, which is clearly unsustainable. A sustainable fiscal policy, on the other hand, implies choosing a set of fiscal parameters that will achieve a stable, targeted level of public debt relative to national income. If a fiscal policy is unsustainable, one, or some

combination, of three events must happen in the future. Either fiscal policy must be adjusted, or some other policy must be adjusted, for example, monetary policy, or some exogenous event must occur, such as higher growth rates, to make the fiscal policy sustainable.

To give concrete expression of the concept of sustainability, the following notation is introduced:

D = the stock of public debt;
d = the public sector deficit, or the change in the stock of public debt;
Y = real national income;
r = the real rate of interest payable on the stock of public debt;
g = the rate of growth of real national income;
p = the primary(non-interest) public sector deficit, or the overall deficit less interest paid on public debt; by definition, d = p + rD.

Attainment of a stable ratio of D to Y requires that the stock of public debt grow at the same rate as real national income: d/D = g, or d/Y = g.D/Y. Substituting the definition of d into this expression yields the primary deficit/income ratio that is consistent with any stable debt/income ratio:

$$p/Y = (g - r)\, D/Y.$$

The sign of the required primary budget balance depends on the relationship between g and r. If g exceeds r, a primary deficit is needed to achieve an unchanging debt/income ratio. If g is equal to r, the primary budget must be balanced to obtain a stable debt/income ratio. On the other hand, if g is less than r, a country would be required to run a primary budget surplus in order to prevent a rising ratio of debt to income.

From the preceding equation for debt/income constancy, it is possible to measure the ratio of debt to income at any moment "t" for any given initial value of this ratio, $(D/Y)_o$. To simplify this measurement, assume initially that the primary deficit is zero. In this special case, the evolution over time of the debt/income ratio can be obtained as:

$$(D/Y)_t = (D/Y)_o e^{(r-g)t}$$

As long as a country pays a real rate of interest on its public debt that is in excess of its growth rate its debt/income ratio will growth without bounds at expotential rates if it continues to operate with a balanced primary deficit. In a country such as Ukraine, where growth rates are close to zero, if it chose to have a primary deficit of zero, its debt/income ratio would rise annually at the real rate of interest.[1] With a zero rate of growth, the only way Ukraine could avoid an ever increasing debt/income ratio would be

[1] To see this result clearly, recall the definition of the deficit, d= p + rD. If p is zero and Y is constant (no growth), it follows that d/D, the annual rate of growth of the debt/income ratio, is equal to r.

to have a zero State deficit, or to accept a primary budget surplus equal in size to its debt servicing requirements. With a smaller primary budget surplus and no growth, the debt/income ratio would increase steadily according to the following dynamic equation:

$$(D/Y)_t = (D/Y)_o e^{(1-a)r} \quad \text{where } a=-p/rD$$

Obviously, if –p = rD, and the deficit is zero, the debt/income ratio can be stabilized at any steady value.

This note next looks at the behavior of the debt/income ratio and the burden of debt servicing in Ukraine in recent years, as well as the predicted values of these variables for 1999, in the context of the dynamic relationships that have been developed here.

II. PUBLIC DEBT AND DEBT SERVICE LEVELS IN UKRAINE

As can be seen in Table I, Ukraine's public debt/income ratio has grown considerably over the period 1996-98 and is expected to grow again at a substantial rate in 1999. Table I shows the level of internal and external debt, the latter denominated in local currency, total public sector debt, total debt as a fraction of GDP, and the percentage rate of annual growth in the debt to GDP ratio. In 1996, the debt to GDP ratio was 23 per cent. By the end of 1999, this ratio is expected to grow to 50 per cent. Several factors account for this explosive growth in the debt to income ratio. First, as mentioned above, Ukraine's economy is not growing so that any positive fiscal deficit automatically raises the debt to income ratio. As a percentage of GDP, Ukraine's fiscal deficit was 4.4 per cent in 1996, 6.7 per cent in 1997 and two per cent in 1998.[2] For 1999, Ukraine is expected to incur a primary budget surplus of 2.29 billion UAH but it will be smaller than the amount of debt servicing, 3.545 billion UAH, by the size of the planned fiscal deficit, or UAH 1.260 billion.

Secondly, Ukraine has made no conscious effort to direct its borrowed resources towards investment purposes and create, directly and indirectly, growth in productive capacity that could be used to help service the public debt. In other words, the additional public sector liabilities have not been matched by a corresponding growth in revenue generating assets. Part of the government's Eurobond issue, for example, was dedicated to paying off a portion of the growing volume of public sector wage arrears.

Thirdly, Ukraine pays extremely high real rates of interest on its stock of public debt. Annualized nominal interest rates on domestic Treasury bills fell from 102.5 per

[2] When budgetary arrears are recognized, Ukraine has been incurring effective budget deficits larger than these numbers indicate. For the most part these arrears can be safely ignored for purposes of this analysis because, while formal deficits require financing from capital markets, arrears have been essentially financed through the labor market by simply not paying workers and pensioners the amounts to which they are entitled.

cent in 1996 to 43 per cent in the first quarter of 1997 but then rose again in response to the loss of non-resident investor confidence and the consequences of the banking and debt crises in Asia and Russia. In 1998 Ukraine converted UAH 2.3 billion of domestic Treasury bills held by non-residents and domestic banks into longer term instruments that would not begin to be redeemed until the year 2000. The interest rate on this conversion loan was 40 per cent. Accounting for inflation, real ex post interest rates on internal debt have fluctuated around a central value of about 25 per cent. Despite its poor international credit rating, Ukraine has succeeded in borrowing abroad at dollar interest rates of 15-17 per cent and for a while it was cheaper to obtain foreign rather than domestic credits. That borrowing advantage has been erased with the recent devaluation of the Hryvnia which has added substantially to the domestic currency costs of servicing external debt. In Table I , the decline in the external value of the Hryvnia of about sixty per cent between 1998 and 1999 is reflected in the large increase in the domestic currency value of the external debt by the same percentage. This devaluation also raised the effective interest rate on foreign borrowing to about 25 per cent.

Because Ukraine has made an effort in its 1999 budget to trim the size of the fiscal deficit to about one per cent of GDP, the rate of growth in the debt/income ratio is expected to be lower than it was between 1997 and 1998, although at 27 per cent the current growth rate is clearly non-sustainable and even greater efforts will have to be made in the future to reduce the deficit closer to zero and stabilize the ratio of debt to income. By and large, the annual growth in the debt/income ratio has borne a close relationship to the level of real interest rates payable on that debt. The annual increment was somewhat higher in 1998 because of the sizeable primary budget deficit(4.7 per cent of GDP) that was incurred in the previous year.

TABLE I
GROWTH OF UKRAINE'S PUBLIC DEBT(millions, UAH)

	1996	1997	1998	1999 (forecast)
Domestic debt	2,342	8,762	12,634	14,000
Foreign debt (UAH)	16,177	17,963	28,405	50,200
Total debt	18,519	26,725	41,039	64,200
GDP	81,520	93,365	103,900	129,000
Total debt/GDP(%)	23	28.6	39.5	50
Per cent change of total debt/GDP	-	26	38	27

Source: HIID Quarterly Monitoring Report and calculations by the Barents Group

Over the four year period from 1996 to 1999, Ukraine's debt to income ratio is likely to more than double and reach a level of 50 per cent by the end of 1999. That level will increase in the year 2000 unless the budget for that year aims for, and achieves, a zero deficit.

A more interesting question, perhaps, is what the expected debt/income ratio might look like in the year 2005 under alternative assumptions regarding real economic growth and the level of real interest rates. Two different scenarios are considered in Table II below. The first scenario makes the gloomy assumptions that, over the next five years, no economic growth will be experienced and real interest rate levels will be 15 per cent each year. A higher real interest rate, in line with recent experience, was considered for this policy simulation but was rejected for the following reason. The substantial devaluation of the Hryvnia was a discrete, and hopefully one-time, event and it would be a mistake to assume that it would occur on an annual basis and therefore include the assumption that Ukraine faces perpetually higher real interest rates like those that occurred in 1998.

A more sanguine view of the future is contained in the second set of projections where it is assumed that real annual interest rates are also 15 per cent but annual real economic growth occurs at the rate of 5 per cent. For each scenario, five alternative assumptions are made about the value of the budgetary parameter "a", the size of the primary surplus relative to the amount of debt servicing. The corresponding deficit to GDP percentage for each value of "a", d/Y, is also reported in Table II.

Table II
POTENTIAL EVOLUTION OF UKRAINE'S DEBT/GDP

Scenario	Coefficient "a"	Debt/GDP	2000	2005
1)Pessimistic View(r=.15; g=0)				
	a=0 ;	d/Y = 7.5	.5	1.06
	a=1/3;	d/Y= 5	.5	.83
	a=1/2;	d/Y= 3.75	.5	.74
	a=3/4;	d/Y= 1.88	.5	.61
	a=1 ;	d/Y= 0	.5	.5
2)Optimistic View(r=.15;g=.05)				
	a=0		.5	.83
	a=1/3		.5	.70
	a=1/2		.5	.64
	a=3/4		.5	.55
	a=1		.5	.39

As shown in Table II, Ukraine can tolerate only very small, or zero, deficits in the future if its debt/income levels is to be contained within reasonable bounds. A value for "a" of ¾, for instance, which would permit a modest growth in the debt/income ratio under the pessimistic view, implies that the annual deficit should not exceed 1.5 per cent of GDP. More optimistic assumptions about the rate of economic growth and the level of

real interest rates provide room for a slightly higher deficit, but not much room, and it is clear under any scenario that Ukraine will have to operate for a considerable period of time with a sizable primary surplus if it is to avoid unsustainably high levels of public debt. Under the optimistic view, the last simulation indicates how, with a zero deficit, might be able to "grow down" its debt level if its engines of economic growth could be restarted.

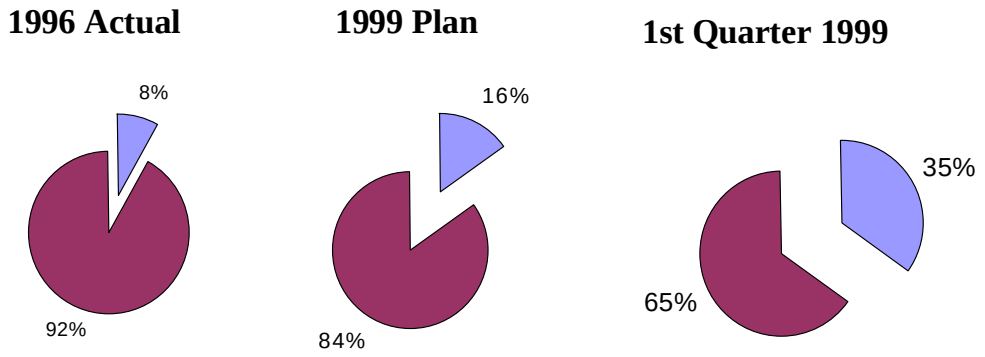
III. SOME CONSEQUENCES OF HIGH AND RISING DEBT LEVELS

Steadily growing debt/income ratios will pose a number of fiscal problems for Ukraine in the future. One of these is the ability of Ukraine to roll-over or refinance its existing stock of domestic and foreign debt. Non-residents have fled the domestic Treasury bill market and domestic banks, formerly the major purchasers of T-bills, have curtailed their acquisition of T-bills as a result of lower yields that have been offered in the primary market. T-bills offered in the secondary market offer a substantially higher yield, currently in the range of 60 to 70 per cent compared to around 30 per cent in the primary market. As a result, the principal participant in the primary market has become the central bank and its purchases of T-bills result in higher lending capacities for domestic banks that could spur a future round of high inflation. In the absence of a fresh infusion of foreign funds, the redemption of foreign debt could exert further downward pressure on the Hryvnia as the central bank no longer possesses a large stock of foreign currency reserves to act as a buffer in support the currency. Those reserves were largely depleted in 1998 as the central bank tried unsuccessfully to resist the devaluation of the Hryvnia beyond the official currency corridor.

Another unpleasant feature of rapidly increasing debt/income ratios may be referred to as budgetary "crowding out". While fiscal deficits, in their competition for loanable funds, may crowd-out private investment spending, high debt levels, because they carry high debt servicing costs, may crowd-out socially productive kinds of public expenditure. There is some evidence that this may be happening in Ukraine today. State debt servicing as a proportion of State total spending has risen from nine per cent in 1996 and 1997 to a level of about fifteen per cent as planned in the 1999 budget. Budget execution figures for the first quarter of 1999 paint an even bleaker picture than these numbers would suggest. In the first quarter of 1999, debt servicing as a fraction of total central government reached the astonishingly high level of 35 per cent, indicating a sharply diminished capacity to pay for other kinds of government expenditure. This is shown in Chart 1 on the next page.

Chart 1: Crowding Out Effect of Increasing Debt Servicing Payments

High Debt Places High Burdens on Budget for Debt Servicing



• In 1996, Ukraine spent about 8 percent of the annual state budget on debt servicing.

• In the first quarter of 1999, Ukraine spent about one-third of total expenditures on debt servicing.

The important policy question is what kinds of government spending were slashed in order to create the expenditure space for higher debt servicing requirements. Table III below provides an answer to that question. While the first quarter execution of total spending was 15 per cent of the 1999 planned amount, for health it was only 6.6 per cent, for education 9.2 per cent, for scientific research and environmental protection 6.9 per cent and for housing, construction and transportation 11.9 per cent. It seems clear that higher debt service levels are especially crimping central government spending on physical infrastructure and on investments in human capital, all of which bodes poorly for the future growth potential of the Ukrainian economy.

TABLE III
FIRST QUARTER 1999 BUDGET EXECUTION

Expenditure Category	1Q Execution (% of 1999 Plan)
Total Spending	15.2
Health	6.6
Education	9.2
Scientific Research and Environmental Protection	6.9
Housing, Construction, and Transportation	11.9

IV. CONCLUSIONS

Several years of cumulative fiscal deficits appear to have pushed Ukraine to the limits of an affordable level of public debt. In a no-growth, high real interest rate environment, Ukraine has reached those limits in a relatively short period of time. Soaring debt levels signal that recent fiscal policy cannot be sustained in the long run. The 1999 budget pursues a lower deficit target of one per cent of GDP but, as long as the economy fails to exhibit positive rates of economic growth, even this more modest deficit will not prevent the ratio of public debt to GDP from increasing. With a zero rate of economic growth, the only deficit target that is consistent with a stable ratio of public debt to GDP is a zero deficit.

As long as no growth occurs, even a relatively modest primary budget surplus could result in a doubling of the debt to GDP ratio within five years. To stabilize the debt/income ratio, the primary surplus in future budgets will have to be set equal to the amount of expected debt servicing. However, one painful consequence of running a higher primary budget surplus is that other expenditures will have to be cut and, so far, the government of Ukraine has shown a marked propensity for cutting investment related spending that will only exacerbate the problem of re-igniting economic growth in Ukraine. More generally, the harsh borrowing terms on which Ukraine has been able to obtain more current resources means that it will have substantially fewer resources with which to fiscally manoeuvre in the future.