Ukraine: Selected Issues

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INTERNATIONAL MONETARY FUND

UKRAINE

Selected Issues

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I. TWO ASPECTS OF THE UKRAINIAN BUSINESS CYCLE

Core Questions, Issues, and Findings

Why is it important to strengthen the analysis of cyclical developments in Ukraine?
Since 2000, Ukraine has experienced pronounced and largely unexpected fluctuations in growth and inflation. A better understanding of these events is key to improving and communicating macroeconomic policy responses, including monetary policy reactions as Ukraine moves to more flexible exchange rates and, ultimately, inflation targeting.

Why are steel prices developments important for Ukraine? The production and export of steel is an important pillar of the Ukrainian economy and steel price developments seem closely linked to fluctuations in economic activity. VAR-based estimates suggest that a 10 percent decline in steel prices reduces annualized GDP growth by 1½ percentage points in the quarter the shock occurs, although the effect dissipates relatively quickly.

What is the outlook for steel prices? What can be done to mitigate steel price risks?
During the global economic upswing steel prices have risen to well above their long term trend. But with the global business cycle now turning, a model-based forecast suggests that steel prices could come down in the years ahead by a cumulative 35 percent. A flexible exchange rate and counter-cyclical fiscal policy would help to limit the effects of steel price fluctuations on the economy.

Why are core inflation indicators useful for Ukraine? Core inflation indicators decompose large monthly movements in inflation into underlying and temporary factors. This helps clarify inflation trends, allows better forecasts, and underpins sound policy formulation: while disturbances having a lasting effect on inflation call for a policy adjustment, this is not necessarily the case for temporary fluctuations. Core inflation indicators can also be used to motivate and communicate policy decisions.

How has core inflation evolved in Ukraine in recent years? Core inflation indicators calculated for Ukraine, including by the Ukrainian authorities, suggest that, while adverse price shocks have played a role, the acceleration of prices observed in the last two years mainly reflects underlying inflationary pressures.

A. INTRODUCTION

1.   **As Ukraine has emerged from its turbulent initial transition phase, the volatility of inflation and growth has remained high.** GDP growth accelerated to 12.1 percent in 2004, fell to 2.7 percent in 2005, before rebounding to 7.6 percent in 2007. Over the same period, inflation has twice reached the mid teens (and now stands at 26 percent), and has dipped as low as 6½ percent (Figure I.1). Understanding these fluctuations, and better forecasting them, is a key challenge in Ukraine's efforts to gradually move to an inflation-targeting monetary regime.

Figure I.1. Ukraine: Growth and Inflation

Real GDP growth, lhs

CPI inflation, rhs, y-o-y

In percent

2.   **The first section of this paper focuses on the price of steel—Ukraine's major export—and its relation to the economic performance.** Steel prices and growth have evolved in parallel of late (Figure I.2). The paper establishes a forecasting model for steel prices, which points to downside risks to steel prices. It then discusses the effects of steel price fluctuations on economic activity and how policies might mitigate them.

Figure I.2. GDP growth and Steel Prices

Real GDP growth, lhs

Steel prices, rhs, y-o-y

In percent
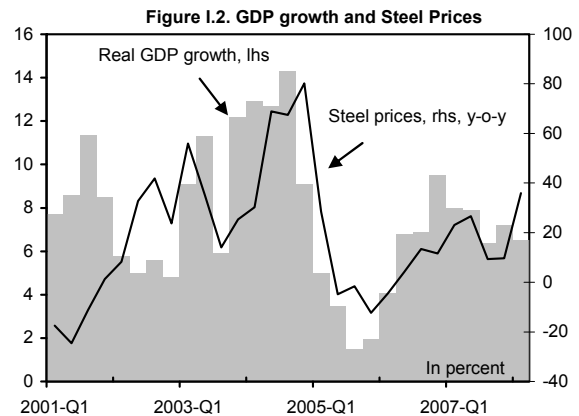
3.   **The second section develops core inflation indicators for Ukraine, to better distinguish underlying from temporary influences on inflation.** Ukraine's inflation has increased markedly since the summer 2006, reflecting both underlying pressures and transitory shocks. This section discusses how core inflation indicators may be of use to policymakers and a variety of core inflation approaches. It calculates core inflation indicators for Ukraine using various methodologies, and assesses their properties against the properties of the authorities' newly constructed measure.

B. LONG-TERM TRENDS IN WORLD STEEL PRICES AND IMPLICATIONS FOR UKRAINE [1]

4.   **The production and export of steel is an important pillar of the Ukrainian economy**. With steel accounting for more than a third of total goods exports (equivalent to some 12 percent of GDP), real growth has been closely linked to steel prices. During the global economic upswing of the past few years, along with a wider surge in metals valuations, steel prices have risen dramatically, thereby underpinning Ukraine's mostly favorable export performance and impressive GDP growth. Although steel prices have been holding up, the current global business cycle downturn raises questions about how long this will last. A decline in steel prices would have significant adverse effects on growth and export receipts, and a key issue is how Ukraine's economy can be made more robust to such global price volatility.

5.   **This section assesses the risks to steel prices and the policy implications for Ukraine**. To this end, section B discusses long-term trends in steel prices and develops a simple forecasting model. Section C analyzes the macroeconomic implications of a sustained decline in steel prices. Section D discusses policy options.

The Evolution of Steel Prices

6.   **To shed light on the possible direction of future developments, this section analyses past steel price behavior and develops a simple forecasting model.** Few useable steel price forecasts are readily available. While futures prices provide an implicit market forecast for several commodities, the futures market for steel is still in its infancy. Steel futures have started trading on the London Metals Exchange this year, but market volumes are still low, and do not yet provide a solid basis for steel price forecasting. Therefore, to get a sense for the outlook for steel prices, past steel price developments are analyzed and a simple model is estimated.

7.   **A first step in the analysis is to select a steel price series that can serve as a reasonable proxy for the market in which Ukraine operates.** There are many different steel prices—the steel market is segmented along product, quality, and geographical dimensions—which do not always move together. A specific price index for Ukraine is not available. To identify a relevant price series, various steel price indices available in Bloomberg were compared with the actual deflator for metals exports in the Ukrainian balance of payments. In the event, the average of CIS hot- and cold-rolled prices matches relatively closely the actual development of Ukrainian steel export prices over the past six years (Figure I.3). However, CIS prices are available only from 1994 and for longer-run comparisons the U.S. series of scrap metals prices also seems to be a reasonable match (although at a monthly frequency it is far more volatile).

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[1] Prepared by David Hofman.

Figure I.3. Ukraine: Steel Export Deflator and Selected International Steel Prices
1995-2006
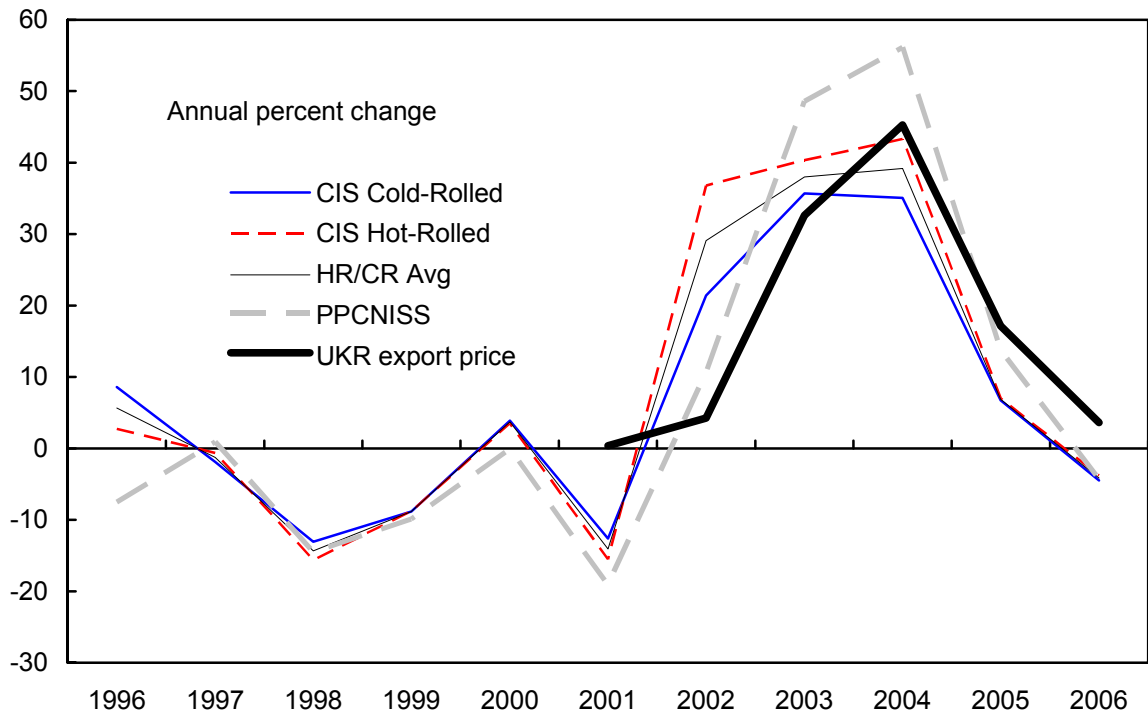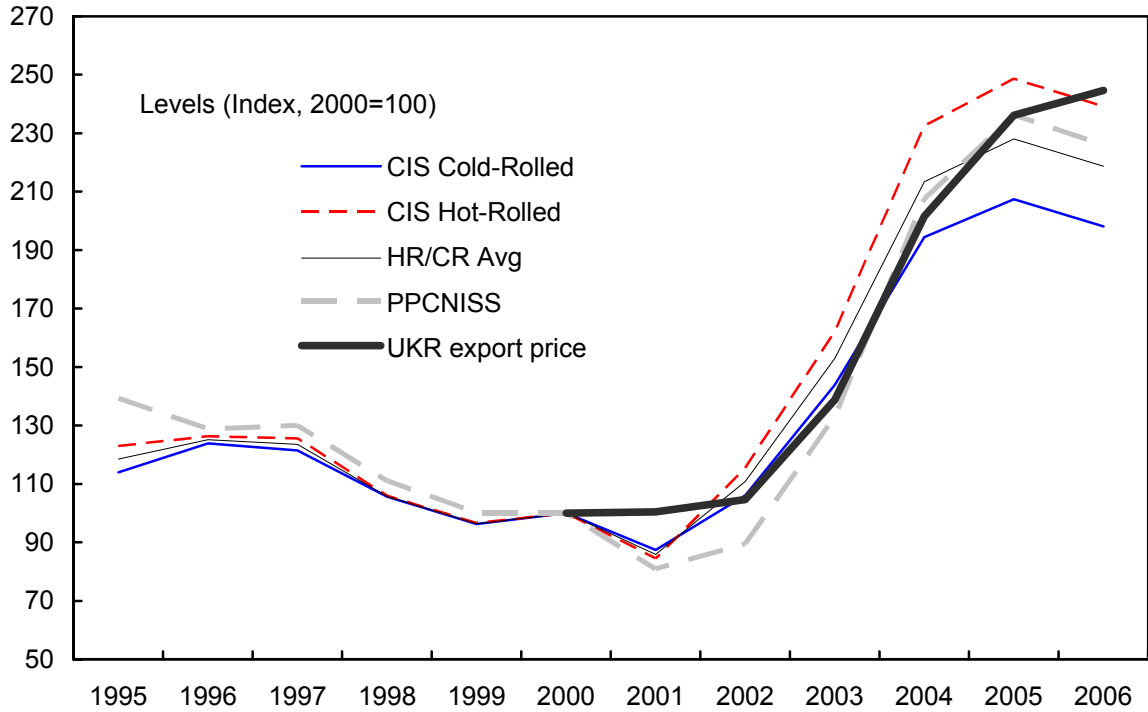
Source: NBU, Bloomberg, and staff calculations.

8.   **Current steel prices are high relative to the long-term downward trend.** The
scrap metal price series, which is available from
the late 1950s, allows an analysis of long-term
trends in steel prices. In Figure I.4, the scrap
price is shown from 1960 to present, deflated by
the U.S. consumer price index. Two points are
worth noting. First, despite the recent surges,
from 1960 to present this real steel price has
trended down, likely reflecting improved
production methods and falling costs of steel
production. Second, current prices are some
35 percent higher than the trend, although such
protracted deviations have also occurred in the
past.

Figure I.4. Real Steel Prices 1/, 1960-2006

Source: Bloomberg and staff calculations
1/ US PPI By Processing Stage: Iron & Steel Scrap NSA
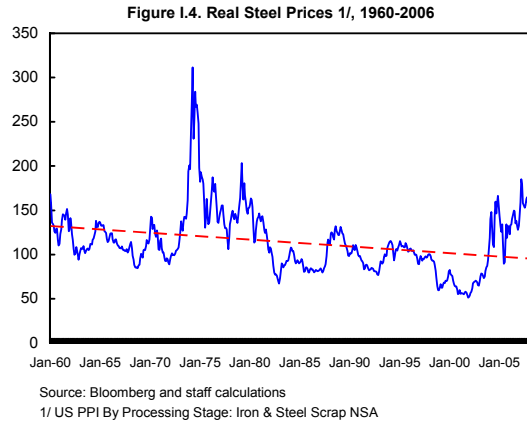
A simple model of steel prices

9.   **A basic model of steel prices is estimated, relating them to inputs in steel
production**. For the steel price, the simple average of nominal CIS hot-rolled and cold-rolled
steel prices is used. Input variables are nominal price series for iron ore, coal, nickel, and tin,
as well as energy prices (using the price of crude oil as proxy). The source for the steel price
series is Bloomberg; the other series were taken from the commodities data base that is
maintained by the Fund's Research Department. The data, shown in Figure I.5, have a
monthly frequency and cover the period 1994M9–2007M2.[2] All data series contain a unit
root in their levels, but not in their first differences (Appendix 1).

10.   **Consistent with data properties, an error-correction model is employed**, which
distinguishes between short-term dynamics and long-run relationships that might exist
between steel prices and key production inputs. The broad framework is given by:

$$\Delta Z_t = \Pi \cdot Z_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \cdot \Delta Z_{t-i} + \mu + \varepsilon_t \tag{1}$$

where Z is a vector containing the n variables of the system, matrix Π captures information
on the long-run relationships among the variables in Z, matrix Γ contains information on the
lagged variables (dynamics), and μ is a vector with constants.

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[2] The sample size is constrained by the availability of CIS data.

Figure I.5. Steel Prices and Selected Commodities: 1994M9, 2007M12
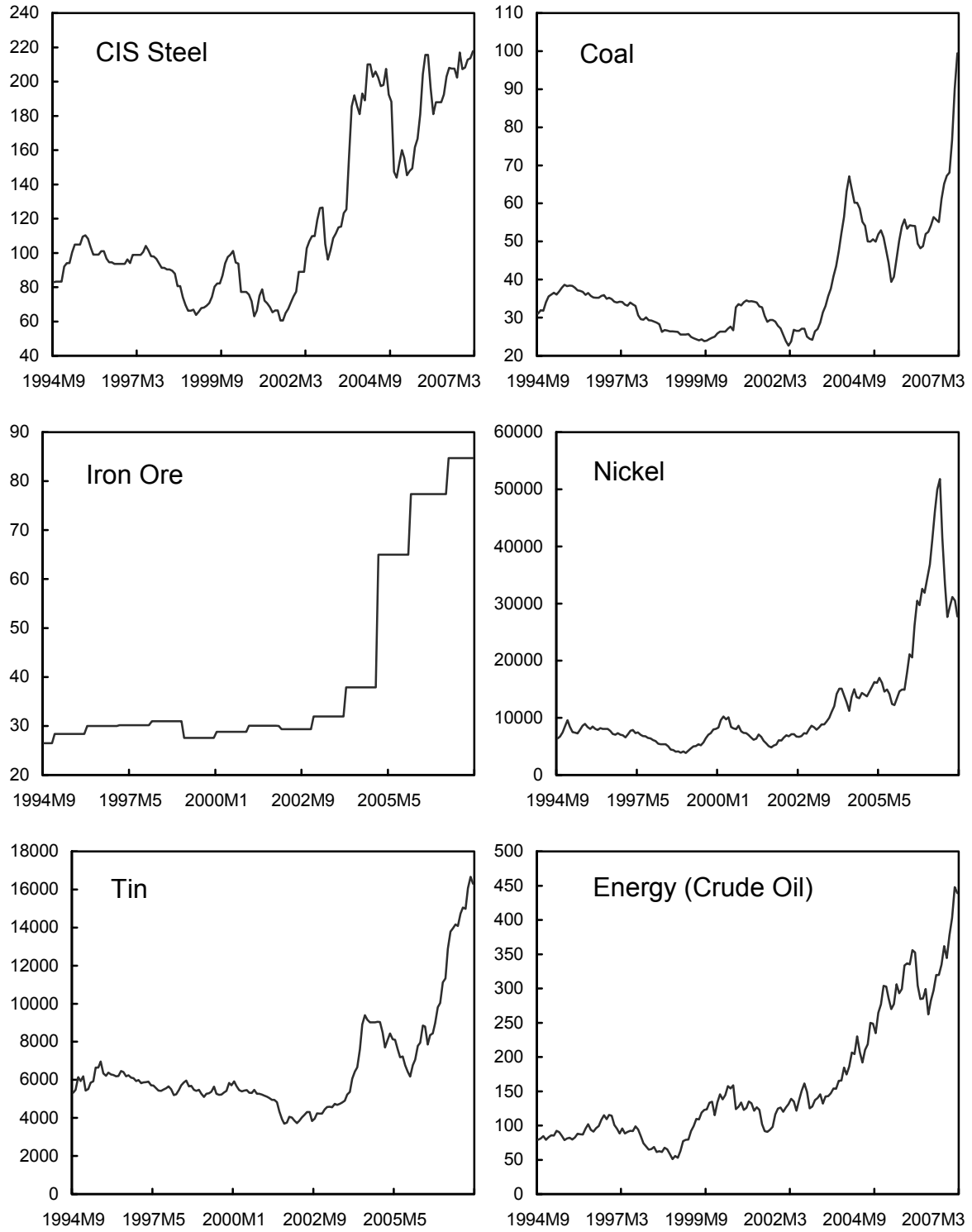
Source: Bloomberg, IMF WEO Database.

11.   **The model was narrowed down applying a general-to-specific approach.** According to the Johansen cointegration test, steel prices are cointegrated with the prices of coal, iron ore and tin, but not with the prices of nickel or energy (Appendix 2, which shows only the final system). As might already be inferred from the absence of evidence for cointegration for these variables, the prices of oil and nickel do not significantly contribute to the explanatory power of the model and are therefore eliminated. It also appears that tin prices can be dropped from the model without significant loss of explanatory power, and they too are therefore eliminated.

12.   **The remaining empirical model includes only the prices of steel, coal, and iron ore, each with 2-lags.**[3] The estimated 3-equation system has the following form:

$$\Delta s = 0.09 - 0.04 * (s - 1.44 i_{t-1} - 0.67 c_{t-1} - 34.44) + \sum_{i=1}^{2} \beta_{1i} \Delta s_{t-i} + \sum_{i=1}^{2} \beta_{2i} \Delta i_{t-i} + \sum_{i+1}^{2} \beta_3 \Delta c_{t-1} \quad (2)$$

$$\Delta i = 0.46 - 0.03 * (i - 0.69 s_{t-1} + 0.46 c_{t-1} + 23.90) + \sum_{i=1}^{2} \beta_{1i} \Delta s_{t-i} + \sum_{i=1}^{2} \beta_{2i} \Delta i_{t-i} + \sum_{i+1}^{2} \beta_3 \Delta c_{t-1} \quad (3)$$

$$\Delta c = 0.07 - 0.002 * (c - 1.50 s_{t-1} + 2.16 i_{t-1} + 51.64) + \sum_{i=1}^{2} \beta_{1i} \Delta s_{t-i} + \sum_{i=1}^{2} \beta_{2i} \Delta i_{t-i} + \sum_{i+1}^{2} \beta_3 \Delta c_{t-1} \quad (4)$$

where s denotes the steel price, i the price of iron ore, and c the price of coal (see Appendix 3 for the lag coefficients and the usual statistics).

13.   **The model's long-term relationship indicates that steel prices are positively related to iron ore and coal prices**, as expected given their role in the steel manufacturing process. In equations 2–4, the term between parentheses is the error correction term (ECT) that represents the long-run (or equilibrium) relationship between the three variables. Note that this relationship is the same across the system (that is, there is only one cointegrating equation), but that it is normalized on the left-hand-side variable in each of the individual equations. The coefficient of the error correction term (0.04) can be interpreted as the speed of adjustment to this long-run relationship, and implies that it takes about two years for steel prices to reach their equilibrium value.

What the model says about the outlook for steel prices

14.   **The model is used to project steel prices for 2008–2013.** The inputs are the IMF's WEO projections for iron ore and coal prices. For iron ore, these projections are mostly based on contracted and futures prices, while the outlook for coal is derived from an ARIMA

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[3] The lag order was selected on the basis of the Schwarz information criterion.

model, complemented with information on long-term trends, developments in related markets, and inventory levels. Since the main concern here is with the broad direction of steel prices (rather than the short-term dynamics), the analysis focuses on the ECT.

15. **The model projections indicate a substantial medium-term downward risk to steel prices.** Figure I.6 shows the ECT, denoted as equilibrium price, together with the actual price. It is worth noting that, given (historically high) current coal and iron ore prices, the current steel price level is only marginally above its long-run level, as given by the ETC (in contrast with the historical trend in Figure I.4). In other words, current steel prices, though high by historical standards, are in line with inputs. Against this background, it is reasonable to expect that the steel price developments in the near future will be closely tied to those of the inputs. Using the WEO forecasts for the latter, the model shows a further rise of

Figure I.6. Ukraine: Actual and Estimated Equilibrium Steel Price, 1995-2013

Source: Bloomberg, WEO, and staff calculations.

steel prices in 2008, followed by a steady cumulative decline of about 35 percent by 2013. This forecasted price decline broadly coincides with the measure of disequilibrium that was established above on the basis of an extrapolation of the long-term trend.
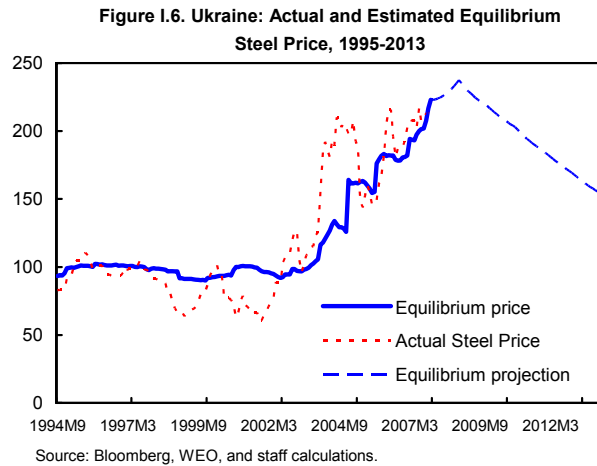
Macroeconomic Effects of Steel Price Changes

16. **Empirical research suggests that terms-of-trade shocks—such as large steel price changes—contribute to macroeconomic volatility**, both directly and because of a strong association between terms-of-trade swings and volatility in fiscal and monetary outcomes (Hausmann, 1999). Large terms-of-trade shocks may also undermine fixed exchange rate regimes. In this section, the potential impact of falling steel prices on key Ukrainian macroeconomic variables is explored.

Channels of impact

17. **Steel price changes—or terms of trade shocks more generally—affect the economy via various channels, and affect several key economic variables**. In particular, steel price changes are likely to have an impact on:

- *Balance of Payments*. In the traditional theory of terms-of-trade shocks, a deterioration of a country's terms-of-trade reduces its real income and national savings, which, under the assumption of unchanged investments, implies a deterioration of the current account (Harberger, 1950; and Laursen and Metzler, 1950). However, as has been demonstrated in later intertemporal models, the

extent to which this mechanism applies depends on whether the terms-of-trade shock is (perceived as) transitory or persistent (Obstfeld, 1982; and Svensson and Razin, 1983). If a terms-of-trade deterioration is perceived as long-lasting or permanent, households and firms may reduce consumption and investment, which will tend to improve the current account, leaving the sign of the effect of the terms-of-trade shock uncertain.

- *Output*. As illustrated in the introduction of this chapter, steel price changes also affect real GDP. They do so directly, as steel production, in the case of a price fall, is reduced in response to lower prices and steel demand. But they also affect output indirectly via the negative effects of lower export earnings on incomes and domestic demand. The size, but not the direction, of these effects will depend on whether the shock is deemed permanent or temporary.

- *Inflation*. Lower steel prices, by lowering demand relative to potential, will tend to reduce inflation. In addition, inflation may be affected via changes in the real exchange rate, but this depends in part on the exchange rate regime. In the case of a fixed rate regime, a decline in steel prices would leave the nominal exchange rate unchanged and would therefore lower the real exchange rate only gradually and to a limited degree via the reduction in domestic inflation brought about by the change in demand. In the case of a flexible exchange rate, in contrast, a steel price fall would cause an immediate nominal depreciation, thereby raising import prices and inflation. The size of this effect will depend on the extent of the exchange rate adjustment.

Estimation of impact on key variables

18.   **To assess the likely impact of a steel price decline within the current policy regime, two quarterly vector autoregression (VAR) models were estimated, for the period 1999–2007.**[4] The first VAR contains four endogenous variables: CIS steel price changes; real GDP growth; changes in the real exchange rate; and CPI inflation—each with two lags. In the second VAR, the same variables are included, again with two lags, but the trade balance (in percent of GDP) is used in place of the real exchange rate.[5] The separate VARs are used to isolate the analysis of the impact on the trade balance from that on GDP and inflation. This approach is preferred because Ukraine's trade balance, even after seasonal adjustment, has shown a very bumpy pattern over the sample period, affecting the responses of the other variables in the model. However, the choice for the two-model approach is mostly presentational; in terms of both magnitude and direction the responses of GDP and inflation are broadly comparable across the two models, and the results are remarkably

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[4] The current policy regime involves a fixed exchange rate, and a low and relatively stable target for the fiscal deficit. See Chapter II for further information on the fiscal framework.

[5] All variables are seasonably adjusted, except for steel prices, which show no seasonal pattern.

robust. The models are stationary and have relatively good statistical properties (Appendix 4 and 5).

19. **The estimated effects on the Ukrainian economy are substantial.** According to the impulse response simulations from the VARs, a 10 percent decline in steel prices (which equals a shock of roughly half a standard deviation) reduces annualized real GDP growth by 1½ percentage points in the quarter of impact (Figure I.7). Thereafter, the effect dissipates quite quickly, to disappear by the fourth quarter, leaving GDP a cumulative ½ to ¾ percentage point lower over the full year. The effect on inflation becomes apparent only in the second quarter after the shock and is largest after three quarters, at which point a 10 percent steel price decline would bring inflation about 2 percentage points lower. The effect peters out after about six quarters. Finally, the effect on the trade balance is largest in the second quarter after the shock, when the trade balance is about 1 percentage point of GDP lower. Thereafter, the negative effect on the trade balance diminishes gradually, with some effect remaining for 2½ years.

20. **And with high steel price volatility, effects could be very pronounced.** It needs to be born in mind that the typical steel price shock tends to be significantly larger than the 10 percent that is used in the simulations. Downward price corrections of 30–40 percent took place, for instance, during 1996–99 and 2000–01. And in 2005, CIS steel prices fell by over 30 percent in just five months, even though on that occasion they recovered quickly.

21. **These macroeconomic effects of a large fall in steel prices would pose considerable challenges to policy makers in Ukraine.**

- The fiscal position would likely deteriorate as a result of the negative effect on output—an effect that can be countered by contracting public spending, but only at the expense of further weakening economic growth.

- The sharp deterioration of the trade balance, and associated reserves losses, could potentially lead to pressures on the hryvnia that might make the exchange rate peg unsustainable. An abrupt exit from the peg may in turn trigger adverse effects in the balance sheets of households, corporates, and the banking system.

- Sharp steel price changes may also directly affect the banking system. This is because terms-of-trade booms are often accompanied by strong increases in domestic deposits that may fuel a domestic lending boom. If the terms-of-trade boom subsequently reverses, a sharp contraction in deposits can have a destabilizing effect on banks (Hausmann, 1999). While Ukraine's credit boom of recent years appears to have been fueled in large part by foreign inflows, the possibility of destabilizing effects on banks of a slowdown in domestic deposit growth should not be discounted.

Figure I.7. Ukraine: Responses to a One Standard Deviation Shock in Steel Prices
(Estimated over 10 Quarters from Shock)

Output (percent)

Inflation (percent)

Trade Balance (percent of GDP)
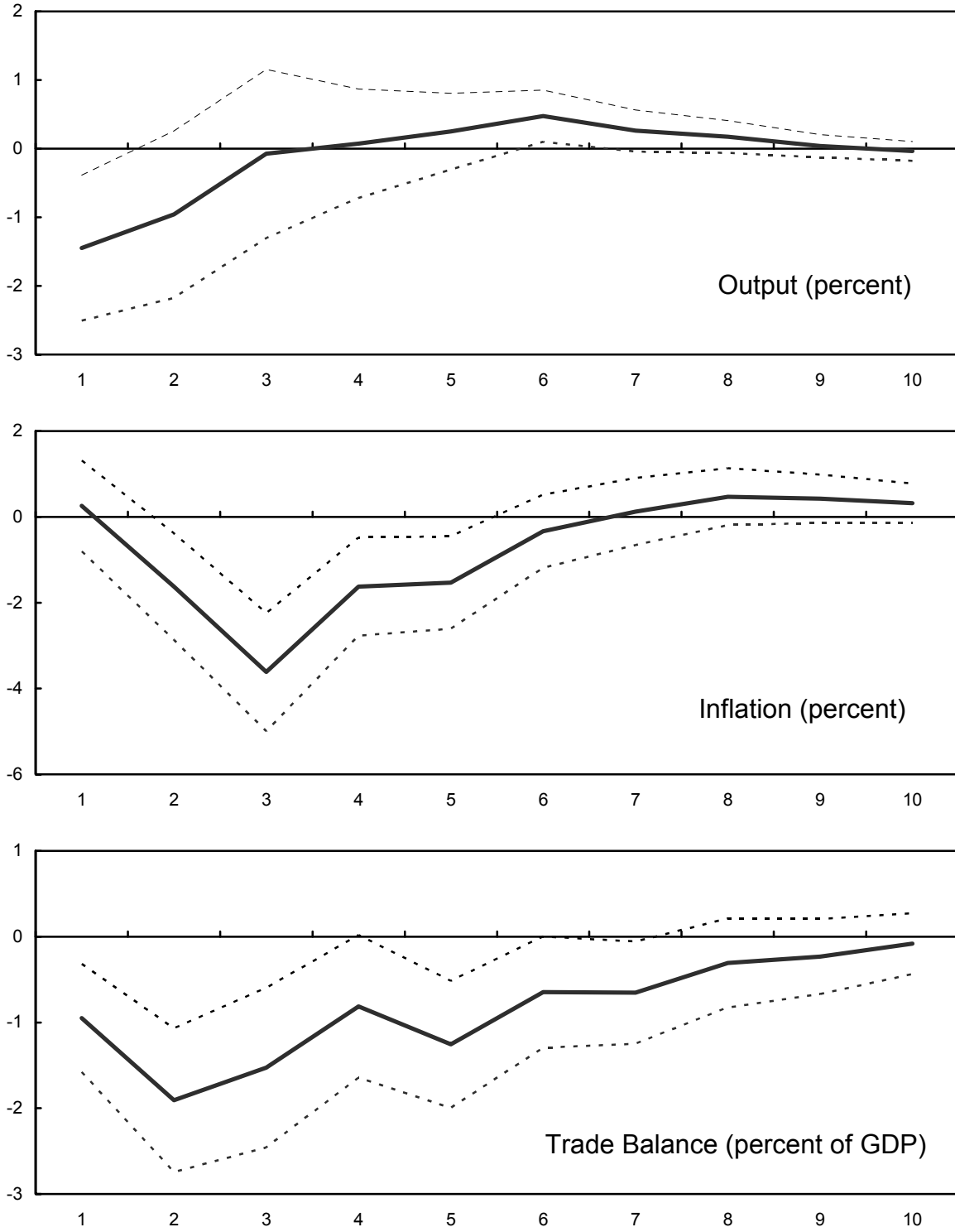
Source: IMF Staff Caluclations

Coping with Steel Price Changes

22.   **Steel price volatility is set to remain a key factor for Ukraine for the foreseeable future.** One obvious solution to the dependence on steel is diversification. However, this will inevitably be a long and gradual process, and should primarily be driven by market forces because policy intervention may only frustrate the workings of comparative advantage, thereby lowering Ukrainian welfare. Structural reforms, however, and a further liberalization of markets (notably in agriculture) would allow market forces to work better and thereby promote greater diversification, eventually. More effective hedging against price risks by the steel industry, as hedging instruments become available, may also potentially help smooth adjustments (text box). In the short- to medium term, however, strong exposure to steel price volatility is likely to remain and the macroeconomic consequences have to be managed. The following areas are of particular interest:

Fiscal policy response

23.   **Counter-cyclical fiscal policies can help cushion the impact of steel price shocks.** In the face of transitory shocks to steel prices, countercyclical fiscal policies, that imply some fiscal expansion when steel prices are low, and a contractionary stance when they are high, help mitigate the effects on the economy. Under a nominal balance target—as has effectively been applied in Ukraine in recent years—the government needs to cut spending whenever lower steel prices and the associated lower output growth reduce revenues; symmetrically it tends to step up spending in times of high steel prices and growth. Such policies are sound from a strict fiscal sustainability perspective, but tend to amplify the business cycle and the impact of steel price volatility.

24.   **A fiscal stabilization fund is a less suitable option.** A fiscal stabilization fund is an established way to make room for countercyclical policies in the context of volatile export receipts.[6] In such a scheme, a part of government revenues are saved during periods of high export prices and revenues, to be drawn upon in times of low revenues. Several commodities exporters have opted for such stabilization funds, including, Chile (Copper Stabilization Fund) and Russia (Oil Reserve Fund). But stabilization funds are usually implemented in cases where the government is the direct beneficiary of commodity export receipts. In Ukraine, however, where iron ore extraction and steel production are the domain of the private sector, the route of a stabilization fund would be less straightforward, and probably less suitable.

25.   **Permanent steel price shifts may require structural fiscal adjustment.** A permanent shift in real steel prices would lower the net present value of government revenue

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[6] For further analysis on the role and conditions for the effectiveness of Fiscal stabilization funds, see IMF (2001).

receipts. If this put fiscal sustainability into question, fiscal adjustment could not be avoided. In such a case, a medium-term expenditure framework may help smooth the adjustment over a number of years and minimize its procyclical effect. Of course, this raises the question of how one might identify permanent steel price shifts (or shocks that decay very slowly). A reasonable indication might be a lack of reversion in input prices toward their real long terms trends over a 5-7 year horizon (i.e. as indicated by futures markets and or long-term contracts).

Exchange rate policy

26. **The exchange rate regime is another important factor determining how steel price changes affect the domestic economy.** In general, flexible exchange rate regimes are thought to be better placed to deal with terms-of-trade shocks than fixed rate regimes (see e.g., Broda, 2001; and Edwards and Levy Yeyati, 2003).

27. **Currency pegs may hinder adjustment to terms-of-trade shocks.** Under a fixed exchange rate—as Ukraine de facto applied in recent years—the negative effects on output of a deterioration in the terms of trade will have to be counteracted fully by adjustment of domestic prices and wages—which tends to be a slow process when domestic prices are sticky. In addition, to prevent the currency from depreciating after a negative terms-of-trade shock, the central bank will typically have to use foreign currency reserves to buy domestic currency, thereby reducing the money supply with a further contractionary effect on the economy.

28. **Under a flexible exchange rate, in contrast, movements in the exchange rate can help absorb the shock.** That is, the required change in the real exchange rate can, at least in part, be borne by the nominal exchange rate, rather than nominal domestic prices and wages. Indeed, with a flexible exchange rate, deterioration in the terms of trade, via its negative effect on output and domestic money demand, leads to lower nominal interest rates and a depreciation of the real exchange rate. This improves the competitiveness of exports, and reduces that of imports, thus providing stimulus to production that helps to offset (part of) the negative effects of the fall in export prices.

29. **Gradually allowing for more exchange rate flexibility—and eventually moving to a float and inflation targeting—would help make Ukraine more resilient to steel price fluctuations**. In addition to the helpful role that adjustments in the nominal exchange rate can play, a floating exchange rate would also allow for an independent monetary policy that can be loosened when the economy is hit by a negative terms-of-trade shock and output and inflation fall, thus increasing the room for policies to respond to steel price shocks. An inflation target would be needed to provide a nominal anchor.

Financial sector policies

30.   **Ensuring soundness of the banking sector is also key.** In light of the risks that strong cycles in domestic deposit growth pose to the banking system, coping with terms-of-trade volatility also requires a sound and well-regulated financial sector that is well placed to deal with fickle inflows of foreign exchange earnings. Adequate supervision, strong prudent lending standards, and high capital-adequacy and liquidity ratios can foster the resilience of banks and reduce the risk that periodic export-related contractions in deposits lead to a sharp rationing of credit, with a further negative effect on domestic demand. Internationalization of the banking sector—as is taking place in Ukraine—also helps to diversify risks and secure the availability of credit in times of low steel prices.

Hedging Against Steel Price Fluctuations—Steel Futures

On the micro-level, a potential way of insuring against steel price volatility is to buy or sell steel futures. In principle, this technique may be used by both the public sector and by private sector entities. Recently, possibilities for hedging in international markets have been increased with the introduction of steel futures at the London Metals Exchange. And reportedly other exchanges, including the New York Mercantile Exchange, have plans to introduce similar steel-related products. Of course, steel producers can also hedge without the use of derivatives, via long-term sales contracts.

Whether futures will prove useful for Ukrainian steel producers remains to be seen. In terms of government policy, however, it may be useful to consider removing any constraints facing private sector entities who might wish to use them.

C. CORE INFLATION INDICATORS IN UKRAINE [7]

31.   **The key purpose of core inflation indicators is to help policymakers distinguish underlying inflationary pressures, which require a policy response, from transitory effects, which may not.** Applied to Ukraine, such indicators point to a significant increase in underlying inflation since the beginning of 2007. They confirm that the recent acceleration of prices (26.2 percent in March-08) mainly reflects mounting underlying inflationary pressures. If not tackled rapidly, the increase in inflation might significantly affect inflation expectations, which seem to be currently drifting up, and feed a vicious inflation-wage spiral potentially harmful for the competitiveness of the Ukrainian economy.

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[7] Prepared by Laurent Moulin.

32.   **This section first reviews recent inflation developments and discusses why core inflation indicators are important and how they are used by central banks**. Then, it constructs core inflation indicators for Ukraine. Given data constraints, the uncertainties inherent to the estimation of unobservable variables, and the shortcomings of individual approaches, the assessment relies on a broad range of methods, discussing the pros and cons of each approach. The last section analyzes the properties of the different indicators.

Inflation Developments in Ukraine

33.   **Inflation has trended up since 2003.** Like most other CIS economies, Ukraine experienced a sharp increase in the price level in the early years of the transition. This resulted from waves of price liberalization while conditions for a parallel development in the supply of goods and services were not in place. The structural reforms in the second part of the nineties and the tighter monetary policy stance that supported the introduction of the Hyrvnia helped anchor price expectations. Inflation declined gradually and fell briefly to zero in 2002. However since then it has increased almost continuously and reached 26.2 percent in March 2008 (Figure I.8).

Figure I.8. Inflation trends in Ukraine
CPI inflation (year over year) and
36-months moving average
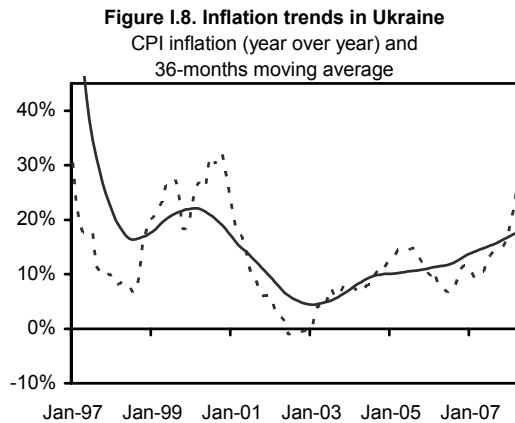
34.   **The higher inflation rates since 2003 partly reflect a succession of unfavorable shocks to energy and, more recently, food prices** (Figure I.9). The price of natural gas imported by Ukraine more than doubled over the period 2005-2007. In addition, since the beginning of 2007, food prices, which represent around 55 percent of the CPI basket in Ukraine, have risen along with global food prices, the effect of which was magnified in Ukraine by a contraction of agriculture production due to unfavorable climatic conditions.

Figure I.9. Inflation components
Year over year rates
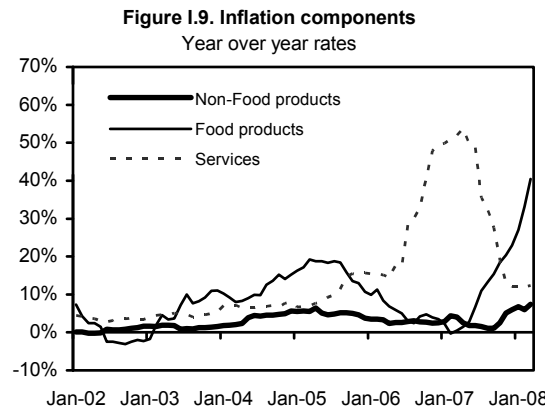
35.   **The increase of inflation since 2003 may also be due to mounting underlying price pressures.** There are converging signs that the economy is overheating. The acceleration of real wage growth well beyond productivity trends, the increase in capacity utilization rates, and the fast increase in producer prices support this view. The marked shift in the composition of growth toward domestic components and the sharp deterioration of the

current account deficit since 2004 (from a surplus of 10 percent to a deficit of 4 percent of GDP) point in the same direction.

36.   **Distinguishing between underlying and erratic, temporary influences on inflation are particularly difficult in Ukraine.** The analysis of Ukrainian CPI data is made complicated by the large volatility of the CPI, including in seasonally adjusted terms. This reflects, inter alia, the significant share of products in the basket subject to climatic developments (energy and food items), and frequent and large changes in administered prices.[8] When developments in inflation are strongly influenced by a small number of large changes in a few CPI components, the risk exists that the aggregate measure deviates significantly from its underlying trend (Pujol and Griffiths, 1998).[9] The non-normality of the cross-sectional distribution of the monthly price changes in Ukraine (it is leptokurtic and skewed to the right), suggests that this risk might be significant in Ukraine.[10]

Functions of Core Inflation Indicators

37.   **Central banks use core inflation indicators for three purposes:**

- **Policy formulation.** Core inflation indicators help policymakers determine whether movements in consumer prices reflect short-term disturbances or a deeper trend. This is an important input for the formulation of policies, which should focus on the control of underlying price movements and the anchoring of price expectations. Attempts to control relative price movements and to address temporary changes in inflation would likely result in larger inflation and output volatility.[11]

- **Explaining policies.** The monetary authorities use core inflation indicators to motivate their policy decisions and explain them to the public. Clear communication on core inflation developments also helps preserve the credibility of the monetary authorities when headline inflation deviates from its core level in the event of a temporary shock.

- **Limiting second-round effects of temporary disturbances.** In the event of unfavorable supply shocks (e.g. to energy or food prices), a greater emphasis by the authorities on developments in core inflation helps focus economic agents' attention

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[8] Food and energy-related products account for about 60 percent of the CPI basket in Ukraine.

[9] High variability of price movements across categories can also imply a bias toward higher inflation because of menu effects. While large increases in costs are likely to be passed along to consumers, slight declines in other sectors may not lead to price declines because of the cost of re-printing menus (Ball and Mankiw, 1994, 1995).

[10] This study uses a breakdown of Ukraine's CPI into 53 items, in the COICOP classification. Such data was recently made available on the website of the State Statistics Committee of Ukraine. For the early years of the period some CPI components were estimated using the monthly price changes in the previous classification.

[11] The reason is that monetary policy affects inflation with long and variable lags and, hence, is not suited for addressing short-term and temporary fluctuations in inflation.

on the underlying trend in inflation. This minimizes the risk of the temporary increase in inflation influencing inflation expectations.

38.   **Core inflation indicators play an important role in inflation-targeting countries.** In almost all inflation targeting countries, the target measure of inflation is based on the CPI. However, most inflation-targeting countries have specified "escape clauses" for their targets, to prevent inappropriate monetary policy reactions to supply shocks. To this aim, virtually all of them have developed and monitor various measures of core inflation (see Roger and Stone, 2005).

39.   **Core inflation does not have a unique widely accepted definition, and several concepts have been developed** (Silver, 2006). All approaches intend to remove the impact of transitory (often supply-driven) shocks on inflation, but the definition of shocks differs across approaches. Some methods rely on purely statistical techniques for the identification of shocks while others appeal to theory-based economic models. Another key difference concerns the degree of complexity: some indicators are fairly simple and understandable by the public; others are considerably more complex.

40.   **The literature stresses a number of desirable properties for core inflation indicators.** According to Roger (1997), core inflation indicators should be (i) significantly less volatile than headline inflation; (ii) available on a timely basis; (iii) unbiased, in the sense that the difference between the historical average of headline and core measure should be small; and (iv) easily reproducible. Wynne (1999) argues that, in addition, core inflation indicators should be (v) understandable by the public; (vi) have some theoretical basis; (vii) not be subject to revisions; (viii) be forward-looking, in the sense of helping to project inflation developments; and (ix) have a track record of some sort, i.e. they should historically not deviate excessively from a trend measure of inflation.

41.   **There is obvious trade-off among these properties.** Namely, there is an incompatibility between those properties related to simplicity (easy to understand and reproduce, not revised) and those calling for an approach consistent with economic theory, which will imply the use of more sophisticated techniques and frequent revisions to the core inflation series. Similarly, sophisticated statistical techniques can be expected to improve core inflation indicators performance on statistical criteria (unbiasedness, volatility, forward-looking orientation), at a significant cost in terms of complexity and reproducibility.

42.   **The consensus, and actual practice, is to use more than one measure for analytical purposes, but to rely on simple indicators for communication purposes.** Most authors (see Roger (2000) and Mankikar and Paisley (2004)) argue that the authorities should rely internally on a wide range of core inflation measures, independently of their degree of complexity, for analytical purposes and the definition of policies. The authorities should however carefully select the core inflation indicators used in their communication with the public. These indicators should be simple and straightforward to explain. This corresponds to

the actual practice of central banks typically relying on simple indicators (e.g. exclusion measures) in their publications, but monitoring a wider range of core inflation indicators for analytical purposes (Table I.1).

Table I.1. Core Inflation Indicators Used by Central Banks
Selected inflation-targeting countries

Country	Official or main core inflation indicator used in official documents	Other core inflation measures used internally by the central bank 1/
Australia	CPI excluding fruits, vegetables and energy Trimmed mean	• Other exclusion measures • Trimmed mean • Weighted median • Model-based measures
Canada	CPI excluding volatile items (food, energy) and the effect of indirect taxes	• Other exclusion measures • Weighted median • Trimmed mean • Model-based measures
Euro area	CPI excluding unprocessed food and energy	• Other exclusion measures • Trimmed mean • Macro model-based measures • Factor models
Poland	CPI excluding food and fuel prices Trimmed mean	• Other exclusion measures • Trimmed mean
Singapore	CPI excluding costs of private road transports can cost of accommodation	• Other exclusion measures • Weighted median • Trimmed mean • Structural VAR approach • Macro model-based measures
United States	CPI excluding fresh food and energy	• Other exclusion indexes • Trimmed mean • Model-based measures

Sources: Publications of national central banks (inflation reports, monthly bulletins, research papers), Staff.
1/ This list is not exhaustive and several central banks most likely rely on other measures than those mentioned in the table.

Core Inflation Techniques

43.   **Core inflation indicators are calculated for Ukraine with four popular techniques**: exclusion indexes, trimmed mean indexes, generalized dynamic factor model, and the Quah and Vahey (1995) structural VAR approach. The general principles and pros and cons of each technique are discussed in this section. The following sections apply the techniques to Ukraine and assess the properties of the core inflation indicators.

i) Exclusion indexes.

44.   **This is the most common way to calculate core inflation.** The principle of this
method is to exclude from the (n) components of the CPI basket a few prices (n-p) which
have historically been particularly volatile. The (p) remaining non-zero weight items are re-
scaled so that their cumulated weight adds up to one. A key choice concerns the elements to
be excluded for the calculation of core inflation. Formally, the measure of underlying
inflation is a weighted sum of the monthly price changes in the *p* non-excluded components:

$$\pi_t^c = \sum_{i=1}^{p} w_i \pi_{i,t} \text{ , with } p < n \text{ , and } \sum_{i=1}^{p} w_i = 1 \quad (5)$$

45.   **The main advantages of exclusion indicators are that they are simple, available
on a timely basis, easily replicable, and understandable by the public.** These features
make such measures well suited for communication on core inflation developments. Their
main shortcoming is that some of the components that are found to be volatile over the whole
period may become relatively stable over time while, symmetrically, some components
established as not being volatile may become so. There may also be, when the core inflation
indicator is used for operational purposes, some public sensitivity to the systematic exclusion
of important consumption items, such as food and energy.

ii) Trimmed mean and weighted median.

46.   **Trimmed indexes and weighted median are constructed by neutralizing the
influence of selected CPI items based on whether their price changes are outliers in a
given month** (Bryan, Cecchetti and Wiggins, 1997). The resulting index is based on the
central part of a distribution of "non-extreme" monthly price changes. Contrary to exclusion
measures, the goods that are "trimmed" can change every month. Two key choices have to be
made in the construction of these indicators: (i) the proportion of the sample to be trimmed;
and (ii) whether to trim symmetrically, i.e. whether to remove an identical proportion of the
CPI basket in both ends of the distribution of monthly price changes. Formally, core inflation
is calculated as in equation (6), with *a* and *b* the percentage trimmed in each tail of the
distribution of monthly price changes:

$$\pi_t^c = \frac{1}{1 - \dfrac{a+b}{100}} * \sum_{i=1}^{Ia,b} w_{i,t} \pi_{i,t} \quad (6)$$

47.   **Trimmed mean indicators share some of the appealing characteristics of
exclusion measures.** Underlying inflation estimates are available on a timely basis and their
replication is easy. But they are not without problems. An implication of (6) is that large
price shocks (e.g. large increases in seasonal food prices) will be trimmed while subsequent
small and gradual adjustments would not be. The result may be a bias in the core inflation

estimates. For this reason, trimmed means and weighted median indicators should be carefully designed, and used at more than one level of trim and in conjunction with other indicators of underlying inflation.

iii) Generalized Dynamic Factor Models (GDFM).

48.   **This technique extracts the signal from a large number of time-series.** It takes into account the information in both the cross-sectional and time dimensions of the sample. It was developed by Forni and others (2000), as an extension of the initial work by Stock and Watson (1989). The model decomposes each CPI component into two sets of unobservable components: a common (principal) component and an idiosyncratic component. Underlying inflation is proxied by the common component of the CPI series, which is estimated as a linear combination of a small number (p) of common factors (u) driving the evolution of the various components of the CPI :[12]

$$\pi_{i,t} = \pi_{i,t}^c + \varepsilon_{i,t} = \sum_{k=1}^{p} a_{i,k}(L) \cdot u_{k,t} + \varepsilon_{i,t} \text{ , where } a_{i,k} \text{ is a polynomial in the lag operator (7)}$$

49.   **The GDFM approach has strong advantages.** Several studies have demonstrated the good properties of core inflation indicators using this technique (Stavrev, 2006). The main drawback of the GDFM approach is that it is fairly complex, which makes the results difficult to replicate and explain to the public. Core inflation indicators based on factor models are frequently subject to criticism that they are derived essentially from a "black box." Moreover, the results are sensitive to the choice of the series included in the database and to the number of common factors selected in the model.

iv) Core inflation according to Quah and Vahey (1995).

50.   **Quah and Vahey (1995) proposed a technique for measuring underlying inflation based on time series analysis of the inflation and output dynamics.** The key assumption is that inflation and output are driven by two types of shocks (u^1 and u^2): respectively, those which have no permanent impact on output ('nominal' shocks) and those associated with a persistent effect on output ('real' shocks). A structural VAR is estimated to derive a measure of core inflation using the restriction that core inflation is the component of inflation that has no long-run effect on output (consistent with a vertical long-run Phillips curve).

51.   **In practice, the estimation of core inflation is made in two steps.** First, a bivariate output-inflation VAR model is estimated. Output growth is proxied by the monthly change in industrial production and inflation by the monthly change of the headline CPI. Both series are seasonally-adjusted. The matrix of the VAR residuals is used to estimate the two shocks u^1 and u^2 mentioned above. The second step consists in computing the core inflation series,

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[12] Each inflation component is allowed to react differently to the common shocks.

by applying the VAR coefficients to the vector of nominal shocks. Formally, the VAR and equation to derive the core inflation indicator can be written as:

$$X_t = \begin{pmatrix} \Delta y_t \\ \pi_t \end{pmatrix} = D(L) * \begin{pmatrix} u_t^1 \\ u_t^2 \end{pmatrix} \quad \text{and} \quad \pi_t^c = \sum_{i=0}^{I} d_{21}(i) u_{t-i}^1 \qquad (8)$$

52.   **The Quah and Vahey approach has economic foundations.** Contrary to the first three approaches, which are purely statistical techniques, it uses an economic restriction in the computation of core inflation. Its main drawback is that the economic model used to derive core inflation might be overly simple, in the sense that the assumption of only two types of structural innovations is very restrictive.[13] Moreover, the results are sensitive to the choice of the variable that proxies output (industrial production vs. monthly GDP), and to the lag length in the VAR.

Estimating Core inflation Indicators for Ukraine

53.   **The Ukrainian authorities recently started to publish an exclusion measure of core inflation for Ukraine.** The indicator is based on the exclusion of fresh fruits and vegetables; other unprocessed food products (selected cereals, meats and dairy products); housing and communal services (including energy); selected administratively priced bakery products; fuel products and derivatives; and selected administratively priced transport and communication services. The items excluded represent about 45 percent of the CPI basket, a relatively large proportion (Figure I.10).

Figure I.10. Ukrainian' authorities core Inflation indicator

54.   **This measure is compared to the core inflation indicators calculated using the four techniques described above, with the following specifications**:

- **Exclusion measures:** Two indicators are constructed: the first one excludes energy, a particularly volatile CPI component in Ukraine; the second one excludes the 20 percent most volatile items of the basket over the period 2001-2007, which is equivalent to excluding energy items, most of fresh food products, and several administered prices.

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[13] Several authors have extended the Quah and Vahey (1995) model to multivariate common trends model. See notably Bagliano and Morana (2003) and Sédillot and Le Bihan (2002).

- **Trimmed indices and weighted median.** Two indexes, with extreme choices concerning the proportion of items trimmed, are constructed: (i) a 10-15 percent trimmed index, which removes a small share of the basket; and (ii) an indicator corresponding to the 65th percentile of the distribution of monthly price changes. In both cases, asymmetric trims are used: given the distribution of monthly price changes in Ukraine, any symmetric trim would result in a measure of core inflation that would almost systematically be lower than headline inflation.

- **Generalized dynamic factor model.** The GDFM is applied to the series of the monthly changes of the CPI components from January 2000 through December 2007. The low-weight, non-stationary items were dropped from the dataset.[14] Based on the principal component analysis of the spectral density matrices of the data, and given the relatively low number of series used, only the first common factor was kept.[15]

- **Quah and Vahey.** The VAR is estimated over the period 2001-2007. Output growth is proxied by the monthly change in industrial production and inflation by the monthly change of the headline CPI. Both series are seasonally-adjusted and stationary. The core inflation series is derived by applying the VAR coefficients to the vector of nominal shocks.

55.   **While adverse price shocks have played a role in the recent increase in inflation, so have mounting underlying inflationary pressures—that is, core inflation has also risen.** Despite the diversity of approaches, the fluctuations in the core inflation series show clear similarities (the cross correlations range from 0.5 to 0.9). All indicators confirm that underlying price pressures have increased significantly since the beginning of 2007 (Figure I.11). According to most measures, core inflation reached a trough in the second half of 2006 in year-on-year terms. Since then, it has increased significantly and is now significantly above its average of the last six years according to all measures.

Properties of the Core Inflation Indicators

56.   **This sub-section discusses the statistical properties of the core inflation indicators, based on the Roger and Wynne criteria.** The core inflation indicators have acceptable statistical properties (Table 1.2):

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[14] The low-weight items are excluded because of their possible disproportionate impact on the common factors.
[15] The choice of the number of common factors involves some arbitrariness. It was, in line with existing literature on the use of such models, decided to stop at the factor that allows to explain about 50 percent of total data variability.

Figure I.11. Measures of Underlying Inflation in Ukraine 1/

Year-on-year
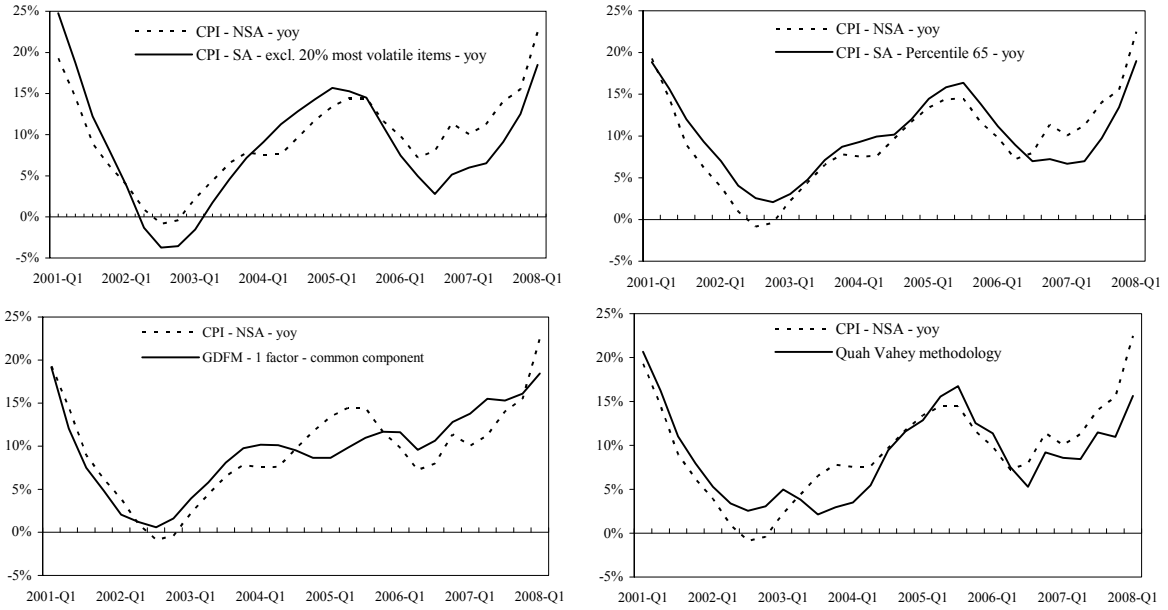
Quarter-on-quarter
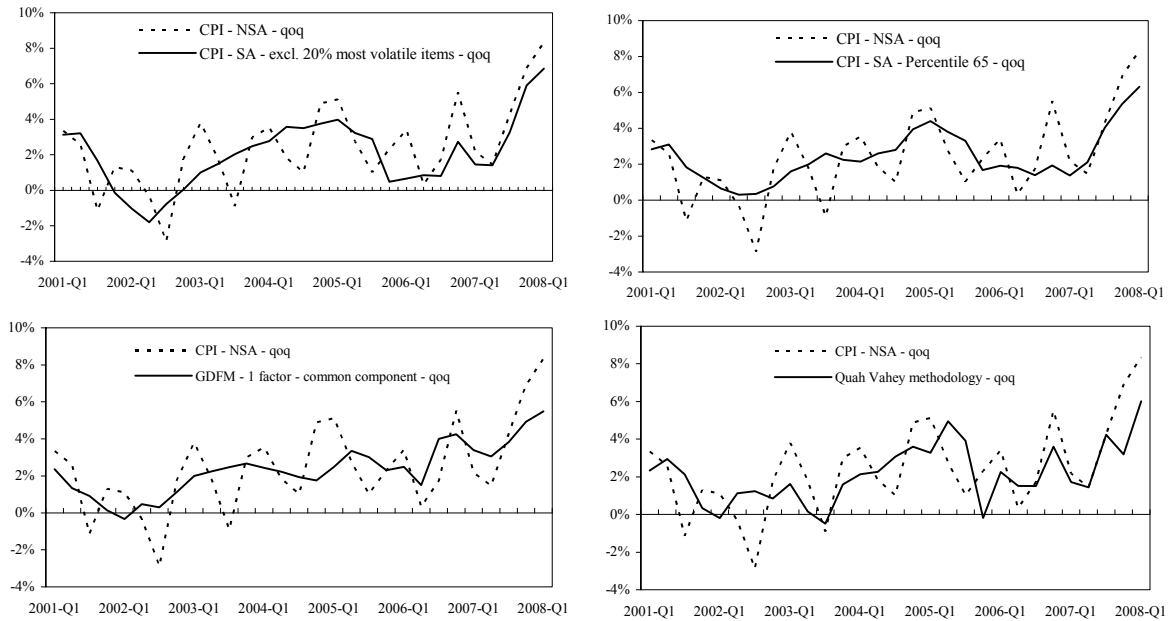
Source: State statistics Committee of Ukraine and Staff Calculations.
1/ This figure shows only four of the six core inflation indicators calculated in the paper. The 10-15 percent trimmed index indicator shows developments very similar to those of the core inflation indicator based on the 65th percentile of the distribution of the monthly price changes. Developments in the core inflation indicator excluding energy have followed very closely the CPI over the recent period.

- They generally do not exhibit a significant bias compared to the CPI. While in the case of trimmed mean indicators the absence of bias is imposed ex-ante, this is not the case for core inflation indicators calculated using the exclusion measures, the GDFM, and the structural VAR approach. Exclusion measures perform worse than the other approaches according to this dimension, reflecting notably the protracted nature of energy and food prices shocks over the period.

- Most measures are substantially less volatile than the CPI. The trimmed means, weighed median and GDFM indicators perform particularly well, with a reduction in volatility (measured by the standard deviation of the monthly change of the core inflation indicator) approaching 50 percent compared to the headline CPI. [16] The Quah and Vahey approach leads to a volatile core inflation indicator (more volatile than the seasonally-adjusted CPI). This also applies to some exclusion measures. The core inflation indicator recently introduced by the Ukrainian authorities performs well in this dimension.

Table I.2. Core Inflation Measures: Summary Statistics
Period from Jan-02 to Dec-07 (m-o-m rates)

	CPI	CPI-SA	EXCL-1	EXCL-2	TRIM-25	PERC-65	Q&V	GDFM	*UKR-auth*
				Descriptive statistics					
Mean	0.77	0.77	0.71	0.64	0.74	0.78	0.69	0.80	*0.62*
Maximum	2.9	2.6	2.9	2.5	2.3	2.0	2.8	1.9	*2.0*
Minimum	-1.8	-1.5	-1.9	-1.0	-0.2	0.0	-1.1	-0.4	*-0.7*
Std. Dev.	1.0	0.72	0.80	0.65	0.52	0.50	0.85	0.55	*0.53*
				Correlations					
Corr. CPI	1.00	0.80	0.74	0.51	0.58	0.55	0.50	0.58	*0.47*
Corr. CPI-SA	0.80	1.00	0.94	0.61	0.74	0.71	0.61	0.71	*0.63*
	Deviation from reference series (24-month centered moving average) over Jan-02 to Dec-06								
RMSE	2.2	2.2	2.8	2.4	2.0	2.1	2.9	2.0	*2.2*
MAD	1.8	1.8	2.4	2.1	1.5	1.8	2.2	1.5	*1.7*

Source: Staff estimates.

57. **Core inflation indicators track more or less closely fluctuations in the CPI.**
Correlations between the core inflation indicators and the seasonally-adjusted CPI range between 0.5 and 0.9. These numbers should be interpreted with care: while core inflation indicators should show some correlation with the CPI, a very strong correlation would imply that core inflation has little additional content. The correlation between the CPI and core inflation indicators is, however, an important information for the analysis of fluctuations in the core inflation indicators: a given discrepancy between core and headline inflation should not be interpreted in the same way for strongly and poorly correlated core inflation measures.

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[16] For trimmed means indicators, most of the gain in terms of volatility reduction is obtained after a relatively modest trim. Brischetto and Richards (2006) reached a similar conclusion when studying the properties of core inflation indexes for Australia, the United States, Japan and the euro area.

58.   **A comparison of core inflation indicators to long-term trend measures of inflation shows significant differences between the indicators.** Following Bryan and Cecchetti (1994) and Bakhshi and Yates (1999) the underlying inflation indicators are compared to a moving average of actual inflation over a given period. The deviation is measured by the root mean squared error (RMSE) and the mean absolute deviation (MAD) of the core inflation indicator π_t^c relative to the 24-month centered moving average of headline inflation π_t^* (formulas 9). The last two rows of Table I.2 confirm the good statistical properties of trimmed means, weighted median, and GDFM indicators. They also show that the core inflation indicator introduced by the Ukrainian authorities performs better in this dimension than other, more simple, exclusion measures calculated in this paper.

$$RMSE = \sqrt{\frac{\sum_{t=1}^{T}(\pi_t^c - \pi_t^*)^2}{T}} \quad \text{and} \quad MAD = \frac{\sum Abs(\pi_t^c - \pi_t^*)}{T} \qquad (9)$$

59.   **The last step is to assess if the gap between core inflation indicators and headline inflation helps predict the future direction of inflation.** To investigate whether core inflation developments include information on the future path of inflation, equation 10 is estimated on quarterly data over the period 2001-2007. In the equation, π denotes the headline inflation rate and π^c the core inflation rate. The regression results provide information on how the gap between core and headline inflation is closed over the h following quarters. A positive b parameter implies that headline inflation converges towards core inflation. The regression is estimated with h taking values from 4 to 8 quarters, which corresponds to the relevant horizon for monetary policy.

$$\pi_{t+h} - \pi_t = a + b \cdot (\pi_t^c - \pi_t) + \varepsilon \qquad (10)$$

60.   **Results show significant differences in the predicting power of the various indicators** (Table I.3). The best results are obtained with the GDFM indicators, for all the time horizons considered. Headline inflation also tends to converge towards trimmed mean and weighed median indicators, especially for relatively long horizons (18 to 24 months). Exclusion measures also include some information content of on future developments in headline inflation. This however applies only to indicators excluding a significant proportion of the CPI basket.[17]

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[17] Granger causality tests between headline CPI inflation and the core inflation indicators for various time horizons show evidence of Granger causality from trimmed mean and GDFM core inflation indicators to CPI developments. There is no evidence of Granger causality running from the CPI to core inflation indicators.

Table I.3. Regression Results

Estimation period: 2001:Q4 – 2007-Q4

Core inflation indicator:	Excl-1	Excl-2	Trim-15	Perc-65	GDFM	Q&V	*UKR-auth*
1-year ahead							
Parameter *b*	-2.6**	1.4*	0.0	0.0*	2.0***	-0.9	*1.4***
R2	0.2	0.2	0.1	0.1	0.4	0.1	*0.1*
1½-years ahead							
Parameter *b*	-13**	1.3*	1.9*	2.0*	2.1***	-0.7	*2.0***
R2	0.6	0.3	0.2	0.2	0.3	0.1	*0.2*
2-years ahead							
Parameter *b*	-13**	1.2	2.5**	2.1**	1.5**	0.0*	*1.6***
R2	0.5	0.2	0.2	0.2	0.3	0.0	*0.1*

Source: Staff estimates.

61.   **Overall, the analysis confirms the appealing features of trimmed mean indicators.** Table I.4 summarizes the performance of core inflation indicators relative to the Roger and Wynne criteria. While exclusion measures perform very well in the first four criteria, which are mainly related to simplicity, their statistical properties tend to be poorer than for most of other measures. The opposite applies to the GDFM-based core inflation indicator, which has sound statistical properties, but scores low on several dimensions due to its complexity. This makes this indicator clearly better-suited for internal use. The table highlights the limitations of the core inflation estimates derived from the model-based Quah and Vahey approach which, notwithstanding its theoretical underpinnings, tends to have below-average statistical properties. Overall, the comparison highlights the good properties of the trimmed mean and weighted median indicators, which perform well on many dimensions.

Table I.4. Properties of the core inflation indicators

	Exclusion measures	Trimmed mean, Weighed median	GDFM model	Quah and Vahey
Understandable	✓			
Timeliness	✓	✓	✓	✓
Reproducibility	✓	✓		
Not revised	✓	✓		
Theoretical basis				✓
Unbiased 1/		✓	✓	
Volatility	✓	✓	✓	
Track record		✓	✓	✓
Forward-looking	✓	✓	✓	

Source: Staff estimates. 1/ absence of bias is imposed ex ante for trimmed mean and weighed median

Conclusions

62.   **The analysis points to a significant increase in core inflation since the beginning of 2007.** This paper calculates core inflation in Ukraine using various techniques. It shows that the application of standard techniques to Ukrainian data leads to core inflation indicators with acceptable statistical properties. The core inflation indicators confirm that while adverse price shocks have played a role, the acceleration of prices observed in the last two years mainly reflects mounting underlying inflationary pressures.

63.   **The construction and publication of a core inflation indicator in Ukraine is a step in the right direction**. This indicator, based on the exclusion of selected volatile CPI items, has sound statistical properties. The authorities should use it to explain inflation developments and policies. Given the limitations of exclusion-based measures of core inflation, the authorities should develop other indicators for internal analytical purposes. More generally, and considering that core inflation indicators are only one of many instruments that can be used to analyze inflation, other tools (models, indirect indicators of inflation) should be used in conjunction with core inflation measures to get a better gauge of inflation pressures.

REFERENCES

Bagliano, F.C., and Morana, C. (2003): "A Common Trends Model of UK Core Inflation," Empirical Economics, Springer, vol. 28(1), pages 157-172, January.

Bakhshi, H., and Yates, A. (1999): "To Trim or Not to Trim? An Application of a Trimmed Mean Inflation Estimator to the United Kingdom," Working Paper No. 97 (London, Bank of England).

Ball, L. and Mankiw, N.G. (1994): "Asymmetric Price Adjustment and Economic Fluctuations," Economic Journal, 104 (423), pp. 247-261.

Ball, L. and Mankiw, N.G. (1995): "Relative-Price Changes as Aggregate Supply Shocks," Quarterly Journal of Economics, 110 (1), pp. 161-193.

Brischetto, A., and Richards, A.: (2006): "The Performance of Trimmed Mean Measures of Underlying Inflation," Reserve Bank of Australia Research Discussion Paper 2006-10. Sydney: Reserve Bank of Australia.

Broda, Christian, 2001, "Coping with Terms-of-Trade Shocks: Pegs versus Floats," American Economic Review, Vol. 91, No. 2, pp. 376-380.

Bryan, M.F., and Cecchetti, S.G. (1994): "Measuring Core Inflation," in Monetary Policy, ed by N. Gregory Mankiw (Chicago, University of Chicago Press for National Bureau of Economic Research), pp. 195–215.

Bryan, M.F., Cecchetti, S.G., Wiggins, R.L. (1997): "Efficient inflation estimation," Working Paper 9707, Federal Reserve Bank of Cleveland.

Edwards, Sebastian and Eduardo Levy Yeyati, 2003, "Flexible Exchange Rates as Shock Absorbers," NBER Working Paper 9867.

Forni, M., Hallin, M., Lippi, M., and Reichlin, L. (2000): "The generalized dynamic factor model: identification and estimation," The Review of Economics and Statistics 82, 540-554.

Harberger, Arnold, 1950, "Currency Depreciation, Income and the Balance of Trade," Journal of Political Economy, Vol. 58, pp. 47-60.

Hausmann, Ricardo, 1999, "Managing Terms of Trade Volatility," PREM Economic Policy Note No. 18, Washington DC: World Bank.

International Monetary Fund, 2001, "Stabilization and Savings Funds for Nonrenewable Resources, Experience and Fiscal Policy Implications," IMF Occasional Paper 205. Washington: IMF, 2001.

Laursen, Sven and Lloyd Metzler, 1950, "Flexible Exchange Rates and the Theory of Employment," Review of Economics and Statistics, Vol. 32, pp. 281-299.

Mankikar, A., and Paisley, J. (2004): "Core Inflation: A Critical Guide," Bank of England Working Paper No. 242.

Obstfeld, Maurice, 1982, "Aggregate Spending and the Terms of Trade: Is There a Laursen-Metzler Effect?," Quarterly Journal of Economics, Vol. 97, pp 251-270.

Pujol, T., and Griffiths, M. (1998): "Moderate Inflation in Poland: A Real Story," in: C. Cottarelli and G. Szapáry, eds., 197-229.

Quah D. et Vahey S.P. (1995): "Measuring Core Inflation," The Economic Journal, September, 105, pp. 1130-1144.

Roger, S. (1997): "A robust measure of core inflation in New Zealand, 1949-96," Reserve Bank of New Zealand Discussion Paper Series, No. 7 (March).

Roger, S. (2000): "Relative Prices, Inflation and Core Inflation," IMF Working Paper, No. 58 (March), International Monetary Fund.

Roger, S. and Stone, M. (2005): "On Target? The International Experience with Achieving Inflation Targets," IMF Working Paper, No. 163 (August), International Monetary Fund.

Sédillot, F. and Le Bihan, H. (2002): "Implementing and interpreting indicators of core inflation: the case of France," Empirical Economics, Springer, vol. 27(3), pp. 473-497.

Silver, M. (2006): "Core Inflation Measures and Statistical Issues in Choosing Among Them," IMF Working Paper WP/06/97, International Monetary Fund.

Stavrev, E. (2006): "Measures of underlying inflation in the euro area: Assessment and role for monetary policy," IMF Working Paper WP/06/197, International Monetary Fund.

Stock, J.H. and M.W. Watson (1989): "New indexes of coincident and leading economic Indicators," NBER Macroeconomic Annual, 351-393.

Svensson, Lars and Assaf Razin, 1983, "The Terms of Trade and the Current Account: The Harberger-Laursen-Metzler Effect," Journal of Political Economy, Vol. 91, No. 1, pp.97-125.

Wynne, Mark A. (1999): "Core inflation: a review of some conceptual issues," European Central Bank Working Paper # 5.

Appendix I

Unit Root Tests

Variable	Test Specification	Lag	ADF Test Statistic
CIS Steel	Levels	1	-1.166172
	First Differences	1	-7.225545 ***
Coal	Levels	1	-2.404629
	First Differences	1	-11.554020 ***
Iron ore	Levels	12	-1.275411
	First Differences	11	-2.843506 *
Nickel	Levels	1	2.482078
	First Differences	0	-11.393450 ***
Tin	Levels	2	-1.382131
	First Differences	1	-10.052380 ***
Energy	Levels	2	-0.196228
	First Differences	1	-17.64168 ***

*, **, *** denotes rejection of the null hypothesis that the series contain a unit root at the 10, 5 and 1 percent significance level, respectively.

Appendix II

Johansen Cointegration Test for System Comprising CIS Steel, Coal, and Iron Ore

Sample (adjusted): 1994M12 2007M02
Included observations: 147 after adjustments
Trend assumption: Linear deterministic trend
Series: CIS COAL ORE
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.125955	32.73123	29.79707	0.0223
At most 1	0.083912	12.94159	15.49471	0.117
At most 2	0.000395	0.058056	3.841466	0.8096

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.125955	19.78964	21.13162	0.0762
At most 1	0.083912	12.88353	14.2646	0.0817
At most 2	0.000395	0.058056	3.841466	0.8096

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CIS	COAL	ORE
0.043276	-0.028861	-0.062374
0.040282	-0.215396	0.016849
0.010883	-0.011196	-0.082166

Unrestricted Adjustment Coefficients (alpha):

D(CIS)	-0.957236	-0.308139	0.087373
D(COAL)	0.050416	0.404726	0.012078
D(ORE)	0.735406	-0.113302	0.026156

1 Cointegrating Equation(s):	Log likelihood	-1054.131

Normalized cointegrating coefficients (standard error in parentheses)

CIS	COAL	ORE
1	-0.666891	-1.441298
	-0.7195	-0.47809

Adjustment coefficients (standard error in parentheses)

D(CIS)	-0.041426
	-0.01901
D(COAL)	0.002182
	-0.00561
D(ORE)	0.031826
	-0.00872

Appendix III

VEC Estimation Output

Sample (adjusted): 1994M12 2007M02
Included observations: 147 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1		
CIS(-1)	1		
COAL(-1)	-0.666891		
	-0.7195		
	[-0.92689]		
ORE(-1)	-1.441298		
	-0.47809		
	[-3.01471]		
C	-34.44167		

Error Correction:	D(CIS)	D(COAL)	D(ORE)
CointEq1	-0.041426	0.002182	0.031826
	-0.01901	-0.00561	-0.00872
	[-2.17905]	[0.38864]	[3.65135]
D(CIS(-1))	0.570949	0.007408	0.011106
	-0.0776	-0.02291	-0.03558
	[7.35791]	[0.32328]	[0.31216]
D(CIS(-2))	-0.163623	0.00717	-0.069986
	-0.08052	-0.02378	-0.03692
	[-2.03203]	[0.30154]	[-1.89574]
D(COAL(-1))	-0.082765	0.5554	-0.031241
	-0.28845	-0.08518	-0.13225
	[-0.28693]	[6.52036]	[-0.23623]
D(COAL(-2))	1.06117	-0.067829	-0.196223
	-0.29044	-0.08577	-0.13316
	[3.65367]	[-0.79084]	[-1.47358]
D(ORE(-1))	0.325801	-0.078076	-0.062906
	-0.17799	-0.05256	-0.08161
	[1.83042]	[-1.48541]	[-0.77085]
D(ORE(-2))	0.317329	0.081938	-0.048968
	-0.17793	-0.05254	-0.08158
	[1.78348]	[1.55946]	[-0.60027]
C	0.090801	0.0722	0.459141
	-0.45289	-0.13374	-0.20764
	[0.20049]	[0.53986]	[2.21124]

R-squared	0.4019	0.294307	0.112247
Adj. R-squared	0.37178	0.258768	0.06754
Sum sq. resids	3943.083	343.8543	828.8572
S.E. equation	5.326115	1.572823	2.441926
F-statistic	13.34322	8.281346	2.510727
Log likelihood	-450.3464	-271.0432	-335.7107
Akaike AIC	6.236006	3.796506	4.676336
Schwarz SC	6.398751	3.95925	4.83908
Mean dependent	0.739167	0.152104	0.346122
S.D. dependent	6.719772	1.82685	2.528817

Determinant resid covariance (dof adj.)		401.8837
Determinant resid covariance		339.7761
Log likelihood		-1054.131
Akaike information criterion		14.70926
Schwarz criterion		15.25853

Appendix IV

VAR Estimation Output (Model including REER)

Sample (adjusted): 1999Q1 2007Q4
Included observations: 36 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	STEEL	GDP	CPI	REER
STEEL PRICE (-1)	-0.139852	0.035885	0.035654	-0.012403
	-0.1907	-0.02087	-0.02059	-0.04481
	[-0.73336]	[1.71977]	[1.73169]	[-0.27682]
STEEL PRICE (-2)	-0.096998	0.007104	0.054015	-0.012991
	-0.20266	-0.02218	-0.02188	-0.04762
	[-0.47861]	[0.32035]	[2.46863]	[-0.27282]
GDP (-1)	0.756867	-0.203583	-0.130056	0.229629
	-1.79392	-0.19629	-0.19368	-0.42148
	[0.42191]	[-1.03717]	[-0.67150]	[0.54481]
GDP (-2)	-0.687268	-0.00936	-0.048058	0.439867
	-1.65632	-0.18123	-0.17882	-0.38916
	[-0.41494]	[-0.05165]	[-0.26874]	[1.13031]
CPI (-1)	-1.348061	0.005837	0.422768	0.878607
	-1.33277	-0.14583	-0.14389	-0.31314
	[-1.01148]	[0.04003]	[2.93810]	[2.80583]
CPI (-2)	-1.938811	-0.135708	0.28712	-0.126283
	-1.49435	-0.16351	-0.16134	-0.3511
	[-1.29743]	[-0.82997]	[1.77963]	[-0.35968]
REER (-1)	0.114623	0.139601	0.028246	0.108543
	-0.71825	-0.07859	-0.07755	-0.16875
	[0.15959]	[1.77633]	[0.36425]	[0.64321]
REER (-2)	-1.056323	-0.043913	-0.052774	0.064104
	-0.60917	-0.06665	-0.06577	-0.14313
	[-1.73403]	[-0.65881]	[-0.80242]	[0.44788]
C	14.39286	2.317475	0.690264	-2.902786
	-6.62538	-0.72494	-0.71531	-1.55665
	[2.17238]	[3.19679]	[0.96499]	[-1.86477]
R-squared	0.224453	0.231313	0.599149	0.312667
Adj. R-squared	-0.005339	0.003554	0.480378	0.109012
Sum sq. resids	5835.914	69.86958	68.0256	322.1578
S.E. equation	14.70187	1.608652	1.587283	3.454239
F-statistic	0.976766	1.015603	5.044578	1.535282
Log likelihood	-142.6706	-63.01779	-62.53636	-90.52919
Akaike AIC	8.426144	4.000988	3.974242	5.5294
Schwarz SC	8.822024	4.396868	4.370122	5.925279
Mean dependent	4.268493	1.734887	2.894807	0.313197
S.D. dependent	14.66278	1.611518	2.201965	3.659457

Determinant resid covariance (dof adj.)	12411.76
Determinant resid covariance	3927.16
Log likelihood	-353.2892
Akaike information criterion	21.62718
Schwarz criterion	23.2107

Appendix V

Appendix 5. VAR Estimation Output (Model Including Trade Balance)

Sample (adjusted): 1999Q1 2007Q4
Included observations: 36 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	STEEL	GDP	CPI	TB
STEEL PRICE (-1)	-0.070807	0.028426	0.038803	0.085541
	-0.19019	-0.02058	-0.01901	-0.04721
	[-0.37230]	[1.38155]	[2.04159]	[1.81204]
STEEL PRICE (-2)	0.048497	0.016401	0.066354	0.052177
	-0.19999	-0.02164	-0.01999	-0.04964
	[0.24249]	[0.75803]	[3.32003]	[1.05110]
GDP (-1)	-0.375769	-0.220637	-0.182782	0.299727
	-1.75897	-0.19029	-0.17578	-0.43659
	[-0.21363]	[-1.15948]	[-1.03983]	[0.68651]
GDP (-2)	-1.080276	0.056286	-0.049513	0.054031
	-1.68539	-0.18233	-0.16843	-0.41833
	[-0.64096]	[0.30870]	[-0.29397]	[0.12916]
CPI (-1)	-1.092936	-0.08775	0.444198	-0.606349
	-1.30269	-0.14093	-0.13018	-0.32334
	[-0.83898]	[-0.62266]	[3.41212]	[-1.87526]
CPI (-2)	-1.463554	0.023089	0.33094	1.234448
	-1.30274	-0.14093	-0.13019	-0.32335
	[-1.12344]	[0.16383]	[2.54203]	[3.81763]
TRADE BALANCE (-1)	-0.283363	-0.062872	-0.087131	0.496026
	-0.6293	-0.06808	-0.06289	-0.1562
	[-0.45028]	[-0.92352]	[-1.38550]	[3.17561]
TRADE BALANCE (-2)	0.267921	0.020351	0.014958	0.083621
	-0.63551	-0.06875	-0.06351	-0.15774
	[0.42158]	[0.29600]	[0.23552]	[0.53012]
C	14.42699	2.150805	0.735438	-2.146363
	-6.98172	-0.7553	-0.69771	-1.73294
	[2.06639]	[2.84763]	[1.05408]	[-1.23857]
R-squared	0.14162	0.168327	0.619887	0.579588
Adj. R-squared	-0.112715	-0.078095	0.507261	0.455022
Sum sq. resids	6459.224	75.59469	64.50618	397.9421
S.E. equation	15.46708	1.673261	1.545677	3.839088
F-statistic	0.556824	0.683084	5.503945	4.652848
Log likelihood	-144.4972	-64.43539	-61.58014	-94.33196
Akaike AIC	8.527623	4.079744	3.921119	5.740665
Schwarz SC	8.923502	4.475624	4.316999	6.136544
Mean dependent	4.268493	1.734887	2.894807	2.259127
S.D. dependent	14.66278	1.611518	2.201965	5.200422

Determinant resid covariance (dof adj.)	20299.44
Determinant resid covariance	6422.87
Log likelihood	-362.1443
Akaike information criterion	22.11913
Schwarz criterion	23.70265

II. STRENGTHENING UKRAINE'S FISCAL FRAMEWORK[18]

Core Questions, Issues, and Findings

Why is there a need for a stronger fiscal framework in Ukraine?
Ukraine has a history of low fiscal deficits and its public debt is very low, but a closer examination of fiscal developments reveals some shortcomings: incomplete fiscal coverage may hide an underlying fiscal position less favorable than thought; the experience of the recent years has shown difficulties in implementing policy priorities; and fiscal policy has not contributed to smooth fluctuations in economic activity.

How should Ukraine's fiscal framework be strengthened?
Ukraine needs to improve its fiscal framework along three lines: it should (i) expand fiscal coverage to the general government sector and, ultimately, to the whole of the public sector (including public enterprises); (ii) better take into account cyclical developments in the formulation of policies, including by relying on structural fiscal balance indicators; and (iii) strengthen the existing medium-term fiscal framework to make it fully functional.

Why and how should Ukraine broaden fiscal coverage?
Providing policy makers with a full picture of government finances is key to control the size and quality of public spending and to assess fiscal risks. Extending fiscal coverage to the general government sector does not involve major technical difficulties and can be envisaged in the short term, but the coverage of public enterprises will take more time. The authorities could start by focusing on the financing requirements of public enterprises, while scrutinizing intensively a subset of enterprises that pose significant fiscal risks.

Why and how should Ukraine calculate structural fiscal balance indicators?
Given the absence of flexible exchange rate, Ukraine's fiscal policy has a key role to play in the management of demand pressures. A greater reliance on structural fiscal balance indicators would help calibrate adequate policies from a demand management perspective and to assess fiscal risks. In the case of Ukraine, such indicators should correct for the influence of the cycle, but also for the composition of growth and developments in key commodity prices. These indicators suggest a significant loosening of the fiscal stance in the recent years, and that the underlying fiscal position may be less favorable than thought.

**Why and how should Ukraine introduce a medium-term budgetary framework?**
A fully-functional MTBF in Ukraine would help implement the government's structural reform agenda while respecting fiscal constraints, and enhancing coordination with the NBU. Given recent trends in government spending, Ukraine should articulate its framework around multi-annual expenditure ceilings. The ceilings should initially be defined in real terms and reflect fully costed policy proposals.

[18] Prepared by Laurent Moulin, Daria Zakharova, and Mark Flanagan.

A. Introduction

64.   **Ukraine's fiscal framework has unquestionable strengths.** The budget code provides a sound legal framework, which clearly defines the roles and responsibilities in the budgetary process. Ukraine compares favorably to other transition economies in the strength of its checks and balances; in particular, significant deviations from the budget generally require legislative approval, and large slippages from the approved targets are relatively rare.[19] These strengths are supported by a broad consensus in the country about the importance of low government deficit and debt.

65.   **This framework has delivered impressive results from a fiscal sustainability perspective.** Since 2000 the general government deficit has on average been below 2 percent of GDP. In a context of robust growth in economic activity and high inflation—real GDP growth has averaged 7½ percent since 2000 and nominal GDP more than 20 percent—this has translated into a sharp fall in the debt-to-GDP ratio, from about 40 percent in 2000 to 12 percent of GDP in 2007, one of the lowest ratios among CEE and CIS economies (Figure II.1).

Figure II.1. Ukraine: Government deficit and debt
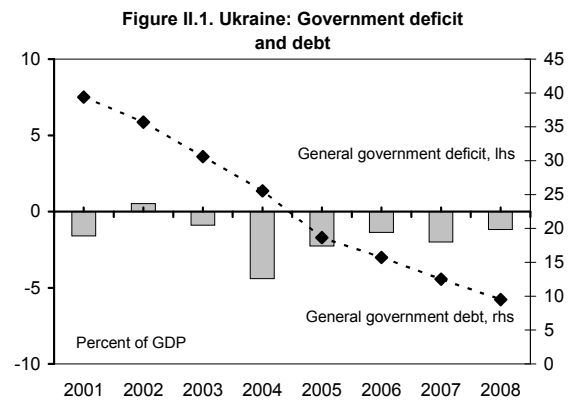
66.   **However, fiscal policy has not contributed to smoothing the impact of economic shocks.** The implicit fiscal response function of the authorities has put a strong weight on deficit stability, leaving little room for macroeconomic stabilization, even via automatic stabilizers. Expenditure targets are frequently adjusted compared to initial plans, via supplementary budgets, to match revenue surprises. Such behavior has given fiscal policy a strong pro-cyclical orientation (Figure II.2). In recent years fiscal loosening has contributed to the surge in inflation, which in March 2008 reached an eight-year high of 26 percent.

Figure II.2. Fiscal policy has been pro-cyclical
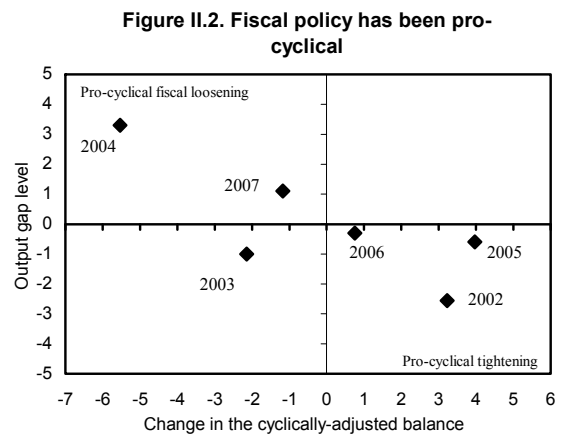
67.   **The current fiscal position may well be less favorable than thought.** The low deficit and debt of the last few years largely reflect the effects on government revenue of

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[19] This assessment is based on the assessment of Ukraine's fiscal institutions in line with the criteria defined by Fabrizio and Mody (2006).

strong growth and improvements in the terms of trade, both of which cannot be counted on to continue or could even reverse. Also, the share of quasi-fiscal activities uncompensated in the budget, has risen, notably in the energy sector. Finally, Ukraine, like many other countries, has an overhang of unfunded social commitments (reflecting notably social mandates foreseen by law that have been either partially fulfilled or ignored), which pose significant risks to future budget developments.

68.   **The authorities have also faced difficulties in implementing their announced policy priorities, leading to an unsustainable trend in government spending.** While all governments since 2005 have expressed the intention to reduce Ukraine's high tax burden in the medium term, instead both the expenditure and revenue to GDP ratios have continued to increase (Table II.1), and the ratio of general government spending to GDP has risen from 35 percent to 45 percent since 2001 (Figure II.3). Similarly, while the authorities have repeatedly underlined the importance of infrastructure investment for future growth, actual capital spending is substantially lower than in neighboring countries.

Table II.1. Ukraine: medium-term budgetary projections

	2006	2007	2008	2009	2010	2011
(Percent of GDP)						
Consolidated government: total expenditure 1/						
2004 medium-term projection	26.7	27.4	27.4			
2005 medium-term projection		30.5	29.8	29.2		
2006 medium-term projection			31.2	30.8	30.8	
2007 medium-term projection				32.3	32.0	31.3

Sources: Ministry of Finance; and Fund staff estimates and projections.
1/ According to the Ukrainian authorities' definition.

69.   **Such weaknesses are problematic, especially as fiscal policy challenges are set to grow.** In the medium term Ukraine is likely to face large external shocks (trade, terms of trade, capital flows) with important economic effects that should be more effectively countered by fiscal policy. As spending pressures—notably on pensions and health—continue to increase, greater fiscal control will be needed to curb government spending and create space for the authorities' comprehensive Program of Action.[20] There will also be a need, in the transition to and during inflation targeting, for close coordination with monetary policy, which would be facilitated by credible multiannual fiscal plans.

70.   **This Chapter argues that strengthening Ukraine's fiscal framework would help to make policy more effective in both the short and long run, thereby increasing the resilience of the economy to shocks and more generally enhancing economic performance.** It suggests operational improvements along three lines:

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[20] The comprehensive Program of Action covering the areas of health, education, social protection, the environment, tax and expenditure reforms, the management of state property, and energy efficiency.

- **Expanding fiscal coverage.** Providing policy makers with a full picture of the situation of government finances would help assess fiscal risks and could improve the composition of public spending, while controlling its size. Section III reviews the current situation and proposes to gradually widen fiscal coverage in Ukraine, starting by compiling fiscal accounts for the general government.

- **Greater use of structural fiscal balance indicators.** This would improve policymakers' understanding of fiscal developments and help them calibrate adequate policies from a demand-management perspective. Section V calculates such indicators for Ukraine. They adjust the fiscal position for the effects of the economic cycle, the composition of growth, and fluctuations in key commodities prices.

- **Strengthening the medium-term expenditure framework (MTEF).** This would facilitate the implementation of policies while keeping budgetary variables on a sustainable path. Section IV reviews the current situation in Ukraine and, based on best international practices, proposes concrete measures to make a MTEF fully operational in Ukraine.

Figure II.3. Ukraine: Revenue and Expenditure Level and Composition 1/
(In percent of GDP)
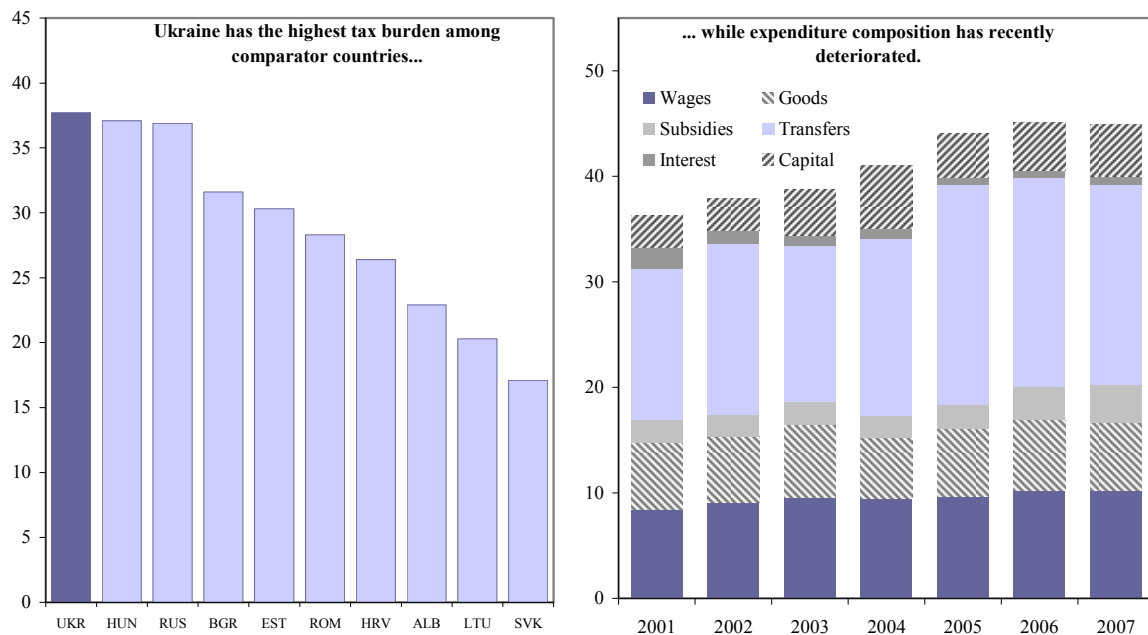
Source: Ukrainian authorities; Government Finance Statistics (IMF); IMF country documents.
1/ 2007 or latest available year.

B. EXPANDING FISCAL COVERAGE IN UKRAINE

71. **Fiscal coverage in Ukraine is limited (Figure II.4):**[21]

- The budget covers central and local governments (the "consolidated government") which represent about 30 percent of GDP.

Figure II.4. Non-Financial Public Sector and official statistics in Ukraine

In grey: consolidated government (Ukrainian definition)

- Draft budgets for 4 social funds are presented to parliament together with the budget, but are not, in practice, subject to parliamentary review or discussion. These funds execute some 15 percent of GDP in total spending and have been one of the primary recent sources of increase in the size of Ukraine's general government sector (Figure II.5).

- Budget documents do not cover Ukraine's large public enterprise (PE) sector, home to extensive quasi-fiscal activities (QFAs). The quasi-fiscal deficit in the energy sector alone is projected at almost 3¼ percent of GDP in 2008; the government has also provided explicit and implicit loan guarantees to PEs that could amount to as much as 2 percent of GDP (Figure II.6).

Figure II.5. The size of extra-budgetary funds has increased markedly

Source: Ukrainian authorities, Staff estimates
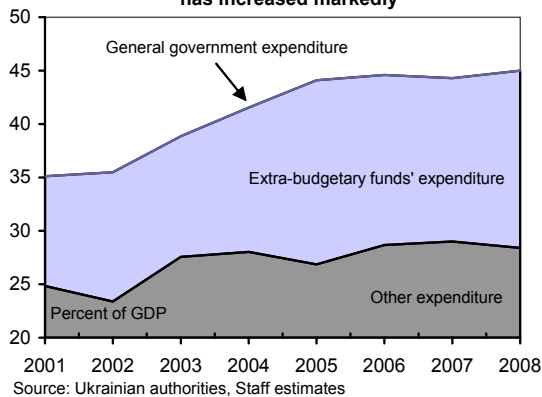
Figure II.6. Quasi-fiscal deficits remain large, and are on the rise

Source: Ukrainian authorities, Staff estimates

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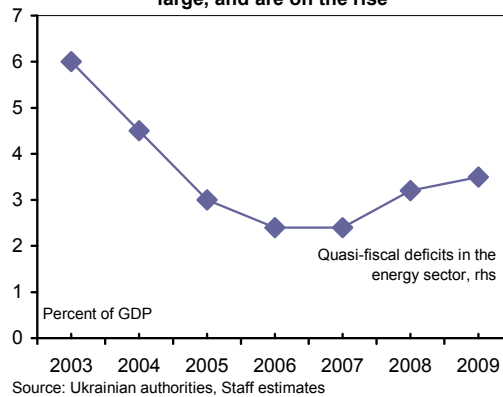
[21] The term *fiscal coverage* describes the extent of compilation and presentation of public sector accounts as defined in the Fund's *Government Finance Statistics* framework of 2001 (*GFS 2001*). For the purposes of fiscal coverage, local budgets consist of regional (oblast), municipal, and rayon budgets.

72.   **Current trends make expanding fiscal coverage a priority.** Lack of comprehensive fiscal coverage may lead to an underestimation of fiscal risks and delay the correction of hidden fiscal imbalances. The insufficient fiscal coverage appears to have played a role in the continued expansion in the size of the general government, which has hampered the achievement of other policy priorities. Under unchanged policies and current demographic projections, such trends are likely to continue, with the risk of social expenditure crowding out other expenditure categories.

73.   **In Ukraine, broadening fiscal coverage involves two steps**. A first step is the compilation of fiscal accounts for the general government sector (including extrabudgetary funds). A second step is to widen coverage to the whole of the non-financial public sector (including PEs).[22] While the first step could be completed within relatively short delays, the second one is likely to be a more gradual and lengthy process. The ultimate aim is that all government operations that have a measurable macroeconomic impact should be covered by fiscal statistics.

Widening fiscal coverage to the whole of the general government sector

74.   **There is no major obstacle to the compilation of fiscal accounts for the general government sector in Ukraine.** Information on the fiscal developments in the extra-budgetary social funds is already available, including for transfers with the central government.[23] Information on the budget plans of these funds is also available, so that fiscal projections for the general government could be prepared and introduced in budget documentation. Information on separate sub-sectors should however remain available as it is important for diagnosing the sources of potential fiscal problems.

75.   **A reasonable objective would be to compile and publish fiscal accounts for the whole of the general government sector in 2009.** This would cover fiscal developments in the years up to 2008 and fiscal plans for 2009. In the following years, budget documents should systematically provide a comprehensive picture of the situation of the general government. To ensure proper monitoring, procedures should be established to ensure that intra-annual (monthly, quarterly) budget reports cover the whole of the general government sector.

76.   **In a first step the authorities could keep the accounts on a cash basis, but could gradually shift to accrual accounting in future.** Fiscal accounts based on cash revenues and expenditures have the advantage of focusing the government's attention on its financing

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[22] The general government sector is the reference for the analysis and surveillance of public finances in the European Union. Most Latin American countries compile fiscal aggregates for the whole of the NFPS, reflecting a history of using PEs for fiscal purposes.

[23] The accounting classification used by the social funds is currently not identical to that of the consolidated budget. While making the two classifications fully consistent might take some time, an imperfect consolidation could yet be put in place in the interim.

constraint. But with governments becoming less and less liquidity constrained, including in Ukraine, there is a growing tendency to separate the time of a fiscal action from the time it is paid for, so that the cash records of the transaction do not always capture the timing or size of the impact of the action on the economy, or potential fiscal risks. The extension of fiscal coverage to social security expenditure would make a shift to accrual accounting more desirable.

Expanding Fiscal Coverage to Public Enterprises

77.   **International experience offers some lessons about expanding fiscal coverage to the NFPS**:

- As discussed in IMF (2007), full coverage may not always be necessary, but partial coverage requires a careful selection of enterprises that pose risks. Key indicators of risk include whether the PE holds a monopoly or near monopoly positions in strategic sectors (e.g., water, energy, natural resource extraction); size (as measured, e.g., by employment or transfers from the budget); vulnerability to external shocks; and sizable known contingent liabilities. Other criteria include, inter alia, the extent of uncompensated QFAs; explicit or implicit government guarantees to borrowing; special regimes or pricing policy that undermine profitability; and opaque accounting and audit practices. [24]

- The experience of other countries (Box II.1) also provides some important lessons for the process of effective monitoring of PEs: (i) strong commitment and joint buy-in from the ministry of finance, line ministries, and PEs are required for the monitoring to be effective; (ii) monitoring should be carried out by a single responsible agency; (iii) monitoring and reporting should be transparent and open to public scrutiny, including parliament; and (iv) monitoring systems should be well integrated and sufficiently simple to expedite timely and accurate data submission.

78.   **Based on this experience, the extension of fiscal coverage to PEs in Ukraine would need to address several issues:**

- **Extent of coverage**. A recent IMF study on fiscal risks posed by PEs in Ukraine revealed that they tend to suffer from weak financial performance due to wide-spread under-pricing, the lack of an adequate incentive scheme for managers, and weak commercial orientation (see Table I.4 in IMF 2007 (2)). This would suggest broad coverage. But given the large size of the PE sector, 4332 companies in 2008, full consolidation is not feasible in the short term. And the sheer size of the sector would likely impede its full effective consolidation into government accounts. It may

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[24] Other factors are: relations with the government; managerial independence; governance structure; financial conditions and sustainability - see IMF 2007.

therefore be preferable to begin by monitoring all PEs by focusing mainly on their financing requirements, while scrutinizing more intensively a subset of PEs that are deemed to pose significant fiscal risks.

- **Selecting companies to monitor more intensively**. Based on the criteria mentioned above, and given the importance of quasi-fiscal deficits in the energy sector, key PEs of this sector should be covered (Naftohaz, power generation and distribution companies, coal companies). UkrZaliznytsya (Ukrainian railroads), UrkAvtoDor (Ukrainian Road Construction Company), and telecommunication companies would be other prime candidates for a more close monitoring.

- **Responsibility for monitoring**. In 2008, the 4332 state enterprises were monitored or supervised by 95 different agencies.[25] This fragmentation is not compatible with effective monitoring. The Department of Public Enterprise Finances, Property Relations, and Entrepreneurship (DPEFPRE) at the Ministry of Finance (MOF) should be given full responsibility for the financial monitoring of PEs in Ukraine, in light of its role in managing Ukraine's assets and liabilities.

- **Information collection**. Summary information on the financial performance and plans by companies with government share of 50 percent or more is collected by the Department of Public Enterprise Finances, Property Relations, and Entrepreneurship (DPEFPRE) at the Ministry of Finance (MOF). This summary information, however, is not sufficient to carry out a comprehensive risk assessment of these companies. Key financial information on the PEs should be collected on a quarterly basis, including the main sources of revenue and expenditure (e.g. wage bill), profit and loss and cash flow statements, balance sheets, and annual reports.

- **Information disclosure**. Budget documents should summarize state enterprise performance, plans and risks. And periodic reports scrutinizing and analyzing enterprise performance should be made available to the legislature and general public.

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[25] The State Property Fund (SPF) manages state property undergoing privatization. Key strategic firms, such as Naftohaz, are under supervision of the Cabinet of Ministers. Other state property is under control of ministries and other bodies.

Box II.1. Monitoring State Owned Enterprises (SOEs) in Turkey

While central government has been monitoring the SOE system for years, Turkey began systematic reporting on SOEs to the Fund under the stand-by arrangement in 2000. Financial and employment data were collected on eight companies that received sizable transfers from the central government. The eight SOEs were mainly in the energy, agriculture, and transportation sectors. The initial monitoring system was paper-based with SOEs mailing their financial and employment statements to the Treasury (UT) in hard copies. In 2002, the UT started collecting data via the Internet. SOEs directly upload standardized tables onto the UT website. The online data collection and monitoring system led to some cost-savings and allowed an expansion of the number of enterprises monitored from 8 to 27 by 2004. Subsequent privatizations reduced the number of monitored SOEs to 22 (out of 29 total). Nevertheless, current coverage is nearly universal with the 22 monitored SOEs covering 99 percent of total SOE sales, 95 percent of total transfers received from the central government, and 100 percent of total SOE primary balance.

At present, the UT carries an aggregation of data across SOEs. The type and periodicity of the collected data are presented in Table 1. In addition to better managing fiscal risks, a more focused oversight of SOEs has helped to improve the efficiency of their operations.

Table 1. Turkey: Data Collected from SOE's
(within the context of SOE monitoring system)

Type of Data	Timeframe	Scope	Explanation
Primary balances	Monthly	SOEs in CGS	Cash and deposit balances, debt and receivables used to derive primary balance from below the line.
Primary balances	Yearly	All SOEs	All financial data required to calculate primary balances of SOEs, including profit/loss statements, investment, change in stocks, net tax and interest payments, etc. and sources of these data, including balance sheets, income statements, cash flow statements, etc.
Cash flows	Monthly	SOEs in CGS	Used to determine change in cash, deposits and other cash-equivalent accounts of SOEs, sources of cash receipts within the period, whether from operational activities or borrowing, and the use of cash in terms of sales or administrative expenses or purchases of tangible assets, etc.
Bank credits	Monthly	All SOEs	The change in the bank credit balance of SOEs within the period and the source of that change in terms of new borrowing or credit payments, interest or exchange rate differential or commission fee accruals to existing credits.
Debts and receivables	Quarterly	All SOEs	All debt or receivables figures of SOEs in a detailed way to demonstrate the type of these debts, debtors, and creditors.
Employment level	Monthly	All SOEs	The number and type of personnel employed in SOEs, entrance and attrition figures during that period.
Employment costs	Monthly	All SOEs	The employment costs of SOEs in terms of wages and salaries, premiums, bonuses, severance pays, insurance and pension payments undertaken by the employers, and other personnel expenditures.
Company specific data	Varies	Varies	Weekly, monthly, quarterly, or yearly tables whether including sector or company specific data, such as agricultural purchases, energy prices, and sales.

Source: Turkish authorities.

C. Structural Fiscal Balance Indicators for Ukraine

79.   **Large within-year revisions to expenditure targets have given fiscal policy a strong pro-cyclical orientation**. In the last two years, revisions of expenditure targets have resulted in upward adjustments to expenditures to match larger-than-expected increases in revenues (which reflected buoyant economic activity, higher inflation, and favorable developments in the terms of trade). In 2006, government expenditure was 2½ percent of GDP higher than planned in the initial budget; in 2007, two budget revisions lifted nominal government spending roughly 5 percent of GDP above the initial target (Table II.2).

Table II.2. Ukraine: Within Year Changes in the Budget

	2006			2007			
	Budget	Supp. Budget	Outcome	Budget	Supp. Budget 1	Supp. Budget 2	Preliminary Outcome
	(Percent of GDP)						
Expenditure	44.7	45.0	45.1	47.4	45.8	44.9	44.5
Change compared to initial budget		*0.3*	*0.4*		*-1.6*	*-2.5*	*-2.9*
of which: numerator effect (higher expenditure)		*0.3*	*2.5*		*1.6*	*3.4*	*4.8*
of which: denominator effect (higher GDP)		*0.0*	*-2.1*		*-3.2*	*-6.0*	*-7.7*

Sources: Ministry of Finance; NBU; and Fund staff estimates and projections.

80.   **Better consideration of the macroeconomic effects of fiscal policy would improve policymaking.** The macroeconomic effects of external shocks could be mitigated by allowing automatic stabilizers to work and by more active policy measures as needed. In particular, in 2007-08 higher-than-expected inflation could have been more actively countered by a tighter fiscal stance. In 2008, tax revenues may well be higher than envisaged in the budget, partly reflecting unanticipated inflation. Pressures for spending those extra-revenue while keeping the deficit at a low level are high, but the risks posed by the ongoing increase in inflation expectations and an emerging wage-price spiral call for fiscal restraint and saving the revenue overperformance.[26]

Reasons for the Procyclical Bias in Fiscal Policy

81.   **Ukraine's pro-cyclical fiscal policy seems rooted in political economy factors.** Research provides two main explanations for a procyclical fiscal policy. First, the government may lose access to international capital markets during downturns: this forces it to cut spending and raise taxes in bad times, the opposite being observed in good times. Second, during booms pressures arise from various groups to spend, rather than save, temporary increases in revenues. The government is then forced to cut spending and raise taxes in less favorable cyclical phases to ensure medium-term fiscal sustainability. Given the relaxation of financing constraints and the intensification of political competition over the recent years, the second explanation has clearly grown in importance in Ukraine.

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[26] Additional expenditure would come on top of the automatic spending increases stemming from the application of existing indexation rules for the minimum wage and social transfers.

82.   **The standard policy prescription for a politically driven pro-cyclical fiscal policy is to strengthen domestic fiscal institutions.** The basic idea is that fiscal arrangements should favor an adequate reaction of fiscal policy to cyclical fluctuations: saving higher tax revenues in good times, bringing the fiscal balance above the medium-term target of the government. These arrangements rely on more or less constraining devices. Hard options involve the introduction of binding institutional rules, which limit the discretion of fiscal authorities (Box II.2). Softer approaches consist of measures that push the authorities to improve transparency, and to take better account of macroeconomic developments in the formulation of their policies.

83.   **A softer approach to improving fiscal institutions would suit Ukraine better at present**. The high volatility of growth and inflation, and Ukraine's vulnerability to large external shocks may leave even well-defined numerical rules inadequate in some circumstances and potentially destabilizing in others (for instance in the event of an externally-driven economic downturn, or of a sudden stop in capital inflows). The introduction of numerical fiscal rules could however be considered once key pre-conditions are fulfilled:

- A transparent and sound accounting framework: Numerical fiscal rules should be based on well defined accounting conventions and reporting procedures. To avoid circumvention and, ultimately, a loss of credibility of the fiscal rule, a key pre-requisite is the publication on a timely basis of accounts for general government finances and of clear information on the financial situation of public enterprises.

- A strong commitment from the government to respect the rule. Even a well-defined fiscal rule would not work if not backed by sufficient political commitment. This point underscores the need for political consensus in designing and implementing a fiscal rule.

- Less volatile inflation and growth. The large volatility of growth and inflation and the vulnerability of the Ukraine economy to external shocks pose considerable challenges for the design and implementation of numerical fiscal rules. A change in Ukraine's monetary framework would be a key step towards lower volatility in growth and inflation.

84.   **The soft approach could be centered around more attention to cyclical developments in the formulation of policies.** Budgets should better explain the economic rationale behind the budgetary targets, which should be set not only to ensure an acceptable level for the deficit, but also to mitigate cyclical fluctuations. They should provide information on the position of the economy in the cycle and on the economic impact of the measures introduced in the budget. To this aim, the authorities could calculate and make a greater use of structural budget indicators as they formulate the budget and assess budgetary developments. These indicators provide information on the underlying fiscal position and

changes in them can be used as a proxy, albeit imperfect, for the effect of changes in the stance of policy on macroeconomic economic activity. The following section calculates such indicators for Ukraine.

Box II.2. Institutional Devices to Reduce the Pro-cyclicality of Fiscal Policy?

Empirical literature has demonstrated the benefits of stronger institutions for reducing the pro-cyclicality of fiscal policy. Such devices include:

1/ Numerical fiscal rules. While the primary aim of such rules is to limit the size of deficits and debts, some of them are explicitly designed to minimize the pro-cyclical bias in fiscal policy. Examples are the rules that define ex ante the use of the extra revenues accruing during good times (France), the numerical rules based on deficit ceilings defined in cyclically-adjusted terms (Denmark, Sweden), or those based on expenditure ceilings (the Netherlands). Recent empirical work shows that countries in which rules are designed in such a way to avoid or reduce conflicts with the stabilization function of fiscal policy exhibited on average less pro-cyclical policies.

2/ Stabilization and Rainy-day funds. The aim of such funds is to address the fiscal problems created by the instability in government revenue. The basic idea is that the buildup of revenue in a fund during good times permits to draw resources for bad times without the need to implement pro-cyclical policies. By helping to put aside some revenues such funds also help reducing the potential pressures for larger expenditure. Rainy-day funds, currently in place in several US states, and stabilization funds, which are typically found in countries with large exhaustible resources (e.g. oil), fall in this category.

3/ Improving intergovernmental relations. In federal countries, autonomous regional governments typically have little incentives to run counter-cyclical policies, and their pro-cyclical actions can easily overcome the stabilizing efforts undertaken by the federal government. Institutional reforms to limit pro-cyclical fiscal behavior in federal countries therefore generally consist in the introduction of rules that govern the relationship between the different levels of government. This does not apply to Ukraine, where the main source of pro-cyclicality stems from the central government budget.

Structural Balance Indicators for Ukraine

1) A cyclically-adjusted balance for Ukraine.

85.   **Cyclically-adjusted fiscal balance indicators estimate the fiscal balance if output were at its potential level.** They are calculated as the difference between the actual budget balance (b) and the output gap (OG) times the estimated budgetary sensitivity to the cycle ε.[27] This sensitivity is computed as the difference between the elasticity of general government revenue (R) and expenditure (E) to the cycle (respectively α_r and α_e), weighted by their share in GDP (Y):

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[27] This is the approach followed by the OECD and the European Commission to calculate cyclically-adjusted balance (Girouard and André, 2005, and European Commission, 2006).

$$b^* = b_y - \varepsilon \cdot OG_t, \ \text{with} \ \varepsilon = \alpha_r \cdot \frac{R}{Y} - \alpha_e \cdot \frac{E}{Y} \qquad (1)$$

86.   **In Ukraine, the budgetary sensitivity to the cycle is high, reflecting the large ratio of government revenue to GDP.** To calculate this sensitivity, tax-specific elasticities are set for the personal income tax, social security contributions, the corporate income tax, and indirect taxes.[28] The individual elasticities are then aggregated taking into account the share of each tax in total government revenue in Ukraine. With the exception of unemployment benefits, public expenditure are assumed not to be affected by the cycle. The calculation shows that an increase in the output gap by 1 percentage point of GDP leads to an improvement in the CAB by 0.47 percent of GDP (Table II.3).

Figure II.7. The fiscal stance in Ukraine
Change in the CAB and change in the output gap

87.   **This indicator confirms that since 2002 the fiscal stance has been strongly pro-cyclical.** This applies independently of whether cyclical developments are measured using the level or change in the output gap (Figure II.2 and II.7).
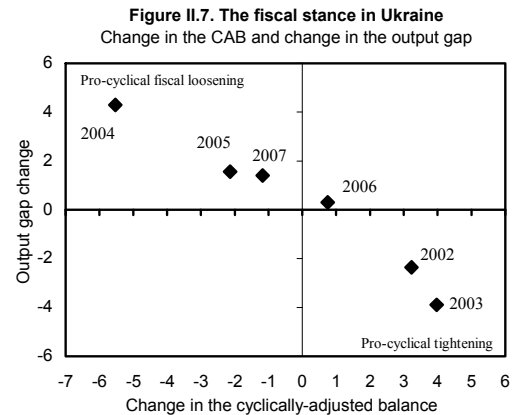
Table II.3. Budgetary sensitivity to cyclical fluctuations in Ukraine

	Personal income tax	Corporate Tax	Social Contribution	Indirect Taxes	Non tax revenue	Total revenue	Total expenditure	Budget Balance
Elasticity to output (1)	1.3	1.4	0.7	1.0	1.0	1.0	-0.06	-
Share in Ukrainian GDP (2)	5.1%	4.9%	11.6%	13.8%	9.0%	44.4%	45.5%	-
Sensitivity (3)	0.07	0.07	0.08	0.14	0.09	0.44	-0.03	0.47

Notes: (1) Average of new EU Member States; (2) Ukrainian data; (3) Calculated as (1)*(2).
Source: European Commission and staff estimates.

2) Alternative estimates of the structural balance.

88.   **While useful, cyclically-adjusted balance indicators ignore a range of non-permanent factors which influence the fiscal balance:**

- They ignore the effects of the composition of economic growth on tax yields, which can be sizeable as economic expansions based on the domestic components of growth

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[28] These elasticities for Ukraine are proxied by the average of those calculated by the European Commission (2006) for the recently acceded EU Member States. Another possibility would have been to rely on elasticities calculated using Ukrainian data. However, given the short time series, it was considered that elasticities calculated on Ukrainian data would be less reliable than those estimated on the basis of a sample of neighboring countries. Moreover, the estimates could be distorted by the large discretionary changes in Ukraine's tax system over the period. An alternative would have been to proxy the budgetary sensitivity by the ratio of government revenue in GDP, as is frequently made for emerging economies. This would have led to an estimate of the budgetary sensitivity very close to that calculated here.

are generally significantly more tax-rich than those based on a trade boom. Ukraine is no exception: the tax burden, and indirect taxes in particular, ha on average risen in the years where domestic demand grew faster than GDP (Figure II.8).

- The CAB does not capture the fiscal consequences of fluctuations in the terms of trade. For those countries where the production of a specific commodity is a substantial share of output, an increase in the world price of this commodity translates into higher tax revenues from the companies involved in producing the commodity, but also indirectly through multiplier effects.

89. **There are good reasons to take these factors into account when assessing fiscal developments in Ukraine.** The dynamism of growth in recent years has been primarily based on the internal components of growth: over the period 2004-2007, the ratio of domestic demand to GDP rose from 92 to 106 percent. Moreover, Ukraine's terms of trade have improved by about 25 percent since 2003, despite the convergence of imported gas prices towards international levels. This mainly reflected the increase in steel prices, which are now well above their long-term trend.

Figure II.8. Influence of gowth composition and terms of trade on the tax burden
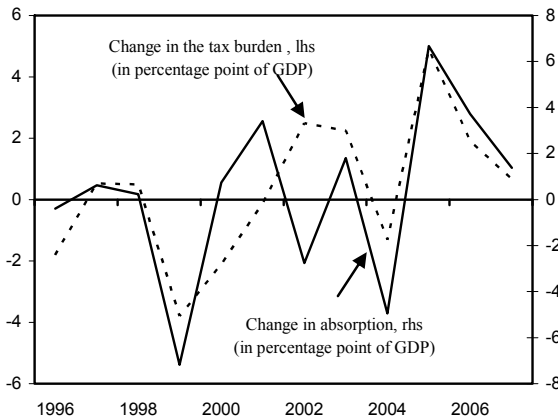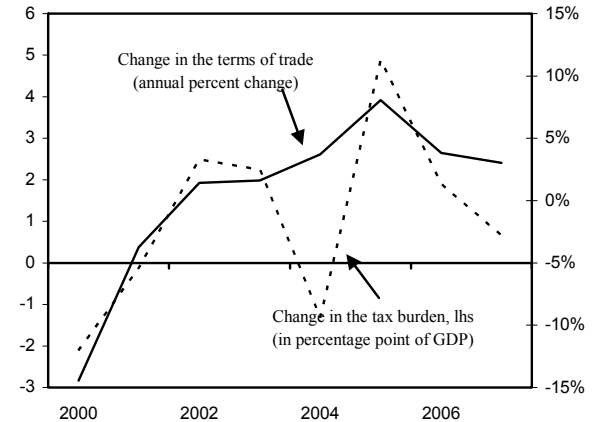
90. **Taking these factors into account raises two difficulties:**

- The underlying level of the variables is uncertain. While estimating the effects of an increase in absorption or terms of trade on the budget is possible, there is a genuine uncertainty on the structural level of absorption and of terms of trade. For instance, the "underlying" level of terms of trade depends, inter alia, on the equilibrium level of commodity prices, which is unobservable.

- There is a risk of overlap in capturing the various effects. For instance, an increase in steel prices has a direct impact on taxes paid by the steel sector, but also possibly

indirectly as the redistribution of the higher profits related to the terms of trade movements stimulate domestic demand and output, and therefore lead to an increase in absorption and the output gap.

91. **Taking this into account, two alternative indicators are calculated.** The first one corrects for fluctuations in the level of absorption. The second one corrects for the fiscal impact of fluctuations in the terms of trade, but only for those commodities the price of which is strongly suspected to be currently misaligned compared to fundamentals.

i) Correction for the Composition of Growth

92. **The calculation of the cyclically-adjusted balance is amended to capture the influence of growth composition.** As in IMF (2007, 3), this involves adding a term to (1) to capture the larger impact on revenue of output gap increases that have their origins primarily in excess domestic demand. The structural balance (*b**) is then calculated as the difference between the actual budget balance (*b*) and two terms measuring respectively the output gap (*OG*) and the "absorption gap" (*AG*) (see equation 2). The latter is the difference between the observed level of absorption (*A*), and an estimate of the sustainable level of absorption (*AP*), calculated using the staff's estimate of the equilibrium level of the current account (*CAP*) and taking into account developments in incomes and transfers (IT).

$$b^* = b_y - \alpha \cdot OG_t - \beta \cdot AG_t, \quad \text{with: } AG_t = A_t - AP_t = YP_t - CAP_t + IT_t \qquad (2)$$

93. **The budgetary sensitivities in equation (2) are set taking into account the likely response of various taxes to fluctuations in the output and absorption gaps.** As in IMF (3), it is assumed that indirect taxes, which primarily depend on developments in domestic demand, respond to changes in the absorption gap. The budget sensitivity to the absorption gap is therefore set at 0.15 (the share of indirect taxes in GDP). Other government revenue (income and corporate taxes, social contributions, and other revenue) are assumed to respond to the changes in the output gap. The budget sensitivity to the output gap is therefore set at 0.32. These choices allow to make the indicator robust to the fact that the output and absorption gaps tend to be correlated: the modified structural balance will fluctuate in line with the CAB in case the output gap and the absorption gap show parallel developments.

94. **Structural balance estimates using this approach point to a significant loosening of the fiscal stance over the recent period.** The structural balance would have deteriorated by about 2 percent of GDP since 2005 (Figure II.9).
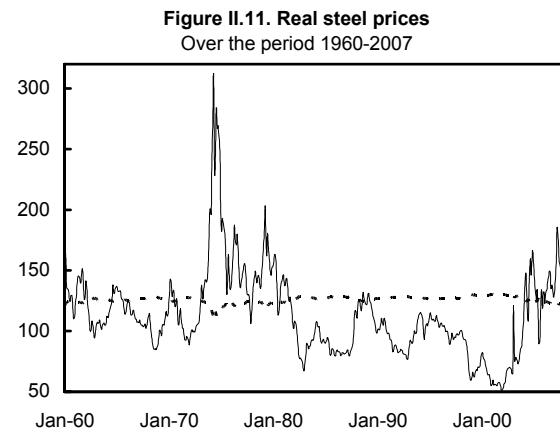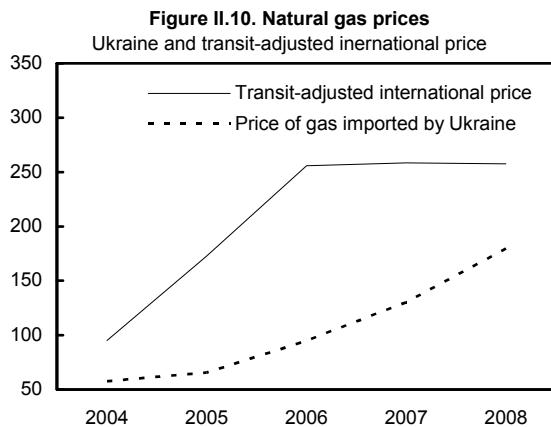

Figure II.9. Structural Balance in Ukraine
Percent of GDP
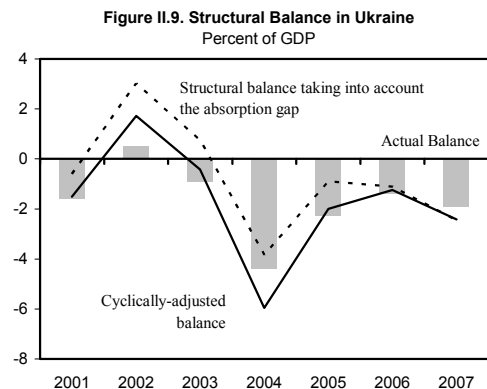
ii) Correction for Movements in the Terms of Trade[29]

95.   **To correct for terms of trade movements, an additional term is added to (1), covering steel and gas prices movements (equation 3).** Steel and gas are key components in exports and imports, respectively, and have both been out of line with their norms, and remain so (Figures II.10 and II.11). The additional term may be thought of as capturing an "income gap," responsible for a direct impact on revenue of swings in the terms of trade. That is, in Ukraine the exchange rate does not respond to fluctuations in the terms of trade, which implies that significant gains (or losses) from movements in commodity prices accrue to the companies producing (or using) the commodities concerned. This has an indirect fiscal effect, as the redistribution of the higher (lower) profits related to the terms of trade movements affect domestic demand, output and absorption gaps and, in turn, tax receipts. But this also has a direct fiscal effect, via taxes on profits and wages in the sector concerned. Hence the additional term.

$$b^* = b_y - \varepsilon \cdot OG_t - \chi \cdot TTG, \text{ with: } TTG = X_{steel} \cdot \left(\frac{steel}{steel^*} - 1 \right) - M_{gas} \cdot \left(\frac{gas}{gas^*} - 1 \right) \quad (3)$$

With X_{steel} and M_{gas} respectively steel exports and gas imports as a share of GDP.

Figure II.10. Natural gas prices
Ukraine and transit-adjusted inernational price

Figure II.11. Real steel prices
Over the period 1960-2007

96.   **The budgetary sensitivities in equation (3) are again set taking into account the likely response of various taxes to fluctuations in the output and absorption gaps.** To capture the direct fiscal effect mentioned above, in equation (3), the budgetary sensitivity to the terms of trade gap is calculated as the sum of the sensitivities of corporate, income and

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[29] The methodology used here builds on the framework proposed by Turner (2006).

payroll taxes (0.22).[30] This implicitly assumes that an increase in the price of a commodity leads to an equivalent increase in profits and wages in the sector concerned. It is assumed, with a view to avoid double counting, that the indirect "multiplier" effects of terms trade fluctuations is already captured by the output gap term in equation 3.[31]

97. **According to this approach, the underlying fiscal position would be significantly worse than indicated by other measures** (Figure II.12). According to this measure, Ukraine's structural balance would have deteriorated by 2 percentage points of GDP in 2007. In addition, with a structural deficit of the order of 4 percent of GDP, Ukraine's structural fiscal position would be significantly more vulnerable than generally thought.

Figure II.12. Structural Balance in Ukraine
Percent of GDP
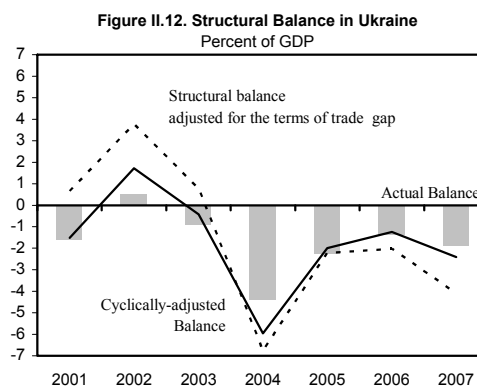
D. IMPLEMENTING A MEDIUM-TERM EXPENDITURE FRAMEWORK IN UKRAINE[32]

98. **A fully-functional MTEF in Ukraine could help address several of the identified problems with the fiscal framework.** It could help direct scarcer revenue to the highest priority uses, and therefore support government intentions to reduce the tax burden and implement key structural reforms. It could strengthen the management of medium-term spending risks. Finally, it could facilitate coordination with the central bank, which is key in the perspective of a shift to a monetary framework based on inflation-targeting.

99. **An MTEF would provide a strong public policy anchor and ensure much needed continuity and stability in fiscal policy decisions.** This would be particularly important in the environment of high political turnover of the recent years.

100. **Ukraine's Budget Code provides the basis for the preparation of a medium-term framework with each annual budget.**[33] However, in practice, the framework is largely indicative: it does not receive much attention in parliament and does not serve as a basis for policy setting on a rolling basis. As a result, the framework has little impact on the design of annual budgets or on the direction of longer-term fiscal policy.

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[30] The terms of trade gap term in equation 3 already accounts for the respective weight of steel export and gas imports in Ukrainian GDP.

[31] Some residual overlap with production and absorption gaps may yet exist, however, since the absorption gap in part depends on energy prices.

[32] A MTEF generally consists of a top-down resource envelope, a bottom-up estimation of the current and medium-term costs of existing policy and, ultimately, the matching of these costs with available resources, in the context of the annual budget process (World Bank (1998), page 46).

[33] See Article 38 (1g).

101.   **The government has the intention to develop medium-term budget plans with clear fiscal and spending goals and to introduce a modern results-oriented budgeting system.** The primary objective of these reforms is to transform the budget policy into an effective instrument of social and economic progress supporting efficient markets (see section 3.1 of the draft *Program of Action*).

Best Practice and International Experience with MTEFs

102.   **MTEFs have become an essential tool of longer-term strategic policy planning in a majority of the OECD and EU countries**. Based on international experience, a number of key conditions for the effectiveness of MTEFs can be identified (IMF 2001 and EC 2007):

- **A clear policy statement.** An MTEF should be based on well defined macro-fiscal policy objectives (e.g. achieving debt sustainability, contributing to macroeconomic stability, etc.).

- **Sufficient time horizon.** Generally a fiscal framework covering three to four budget years should be sufficient for effective medium-term planning.

- **Broad fiscal coverage.** The MTEF should cover the broadest relevant level of government to allow a consideration of full implications of new policy measures. A proper coordination between various levels of general government would also be required to ensure ownership of fiscal targets by all actors involved in fiscal policy (Tables II.4 and II.5).

- **Realistic macroeconomic assumptions.** A crucial element in MTEFs is the capacity to produce realistic revenue and expenditure estimates for the plan period. A case can be made for cautious assumptions on GDP growth in order to avoid an ex ante upward pressure on multi-annual public expenditure plans.

- **Clear link between the MTEF and the annual budget law.** The first out-year estimate of expenditure in the MTEF should become the basis of budget formulation and negotiations in preparation of the following year's budget. The MTEF targets should be vetted by the legislature to ensure that they are in line with the overall macro-fiscal and structural reform objectives.

Improving the effectiveness of Ukraine's MTEF

103.   **Several elements of an effective MTEF are already in place, or within reach in Ukraine**. The existing time frame of three years is appropriate; the government has an action plan, which can readily be translated into an appropriate policy statement; as discussed in Section II, fiscal coverage can readily be expanded (at least to general government); and as

discussed in Section III, better fiscal indicators would improve macro-fiscal analysis and could be easily calculated.

104.   **Key issues remain to make the MTEF credible and functional:** (i) settling enormous contingent liabilities which threaten to seriously undermine out-year budget projections; (ii) costing the many out-year budget proposals (both capital and current components) and improving forecasting capacity; and (iii) defining appropriate expenditure ceilings.

i) Contingent liabilities

105.   **Operating an effective MTEF in Ukraine will require some strategy for dealing with large contingent liabilities.** Ukraine's constitution and other laws include several social mandates that are either only partially fulfilled or ignored (for instance, guarantees of the right to free education, healthcare, and public housing). According to some estimates, fulfilling all these social mandates could increase recurrent government expenditure by some 10 percent of GDP. These commitments come on top of the potential fiscal cost of the ongoing compensation for the lost savings, the stock of which is estimated in a range [10-20] percent of GDP. Ignoring these issues, some of which are subject to legal proceedings at present, would undermine the execution of a renewed MTEF, and almost certainly its credibility.

106.   **There are some options the government could consider to deal with the contingent liability problem.** For the lost savings—a stock problem—a plan for gradual repayment could be embedded within the MTEF.[34] The recurrent contingent liabilities pose more of a difficulty. Without a resolution, an outer year planning contingency could help with the legal uncertainty, but such contingencies should be kept well below 10 percent of GDP. Ultimately some resolution is therefore required, and the move to a stronger MTEF should be leveraged to help plan a sustainable resolution to the problem.

ii) Forecasting and costing capacity

107.   **The sizeable recent deviations of macroeconomic and fiscal outturns from projections indicate the need to review the macro-fiscal forecasting process**. Kyobe and Danninger (2005) discuss key characteristics of forecasting practices, namely, formality, organizational simplicity and transparency. In the case of Ukraine, the transparency dimension has been problematic, as "conservative" forecasts have been seen as a means to overcome a lack of political consensus about the level of spending growth and the macro role of fiscal policy. Building such a consensus is ultimately necessary, and would likely be helped by greater transparency about macro scenarios. Greater transparency, in turn, involves

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[34] See Flanagan (2008, forthcoming), for a discussion of the key considerations in formulating a gradual repayment of the lost savings.

more scenario analysis in budget documentation, and enhancing the role of independent forecasters (e.g., at the simplest level, by presenting their views alongside official forecasts in budget documentation).

108. **Ukraine needs to develop its capacity to produce cost estimates over a multiannual horizon**. At present there is no clear link between recurrent and capital budgets in Ukraine, implying notably that medium-term projections may not include sufficient provisions for the future operation and maintenance costs of new investments. In addition, most of the policy measures announced in the medium-term program of the government have not been costed, which would be necessary to underpin credible medium-term budgetary forecasts.

iii) Expenditure ceilings

109. **Given recent trends in government spending, Ukraine should articulate its framework around multi-annual expenditure targets.** Given the importance in Ukraine to keep some flexibility in fiscal policy (see discussion in paragraphs 21-22), the MTEF should foresee the possibility of revisions to expenditure targets on a rolling basis, taking into account latest developments in growth and inflation. At a later date, harder targets, and even an expenditure rule, could be considered.

110. **In the short run, the expenditure targets should be set in real terms.** This would avoid the budget being unduly affected by the significant unexpected deviations of actual from forecast inflation, which has characterized Ukraine in the past two years (Box II.3). It would also help to protect priority spending.[35] Within-year adjustment to nominal ceilings should be limited and carried out in line with a pre-defined schedule (e.g., as part of a mid-term review), so as to reduce pressures for frequent fine-tuning of the nominal ceilings. As inflation is brought under control, the authorities could consider setting the ceilings in nominal terms. This would promote stronger fiscal discipline, transparency in fiscal policy, and help reduce fiscal pro-cyclicality.

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[35] To promote better transparency and credibility of real targets, Ukraine could use a GDP deflator to convert expenditure ceilings from real to nominal.

Box II.3. Real vs. Nominal Expenditure Targets 1/

International practice with accounting for inflationary effects on government expenditure varies across countries. A survey of OECD countries suggests that a majority of countries with medium-term expenditure targets set these targets in nominal terms. However, some countries with generally recognized good practice for medium-term budgeting rely on targets set in real terms. For example, in Finland and the Netherlands, four-year ceilings are determined in real terms, and converted into nominal terms shortly before the preparation of the annual budget is initiated.

Countries with high and variable inflation benefit from setting expenditure ceilings in real terms. This avoids large swings in real expenditure and protects priority spending.

The choice of deflator varies across countries. A case can be made for using a deflator based on government expenditure, since such deflator would ensure that expenditure under the ceiling becomes neither squeezed nor expanded by error in inflation forecasting. Such an approach has been taken by Finland. However, an expenditure deflator can be less transparent than a CPI or a GDP deflator, since it is usually calculated by the Ministry of Finance and not by an independent body (such as the central bank or a statistical agency). The methodology for calculating an expenditure deflator is also more likely to come under pressure for revision from various line ministries, potentially undermining the credibility of expenditure ceilings. This was one reason why the UK has switched to nominal ceilings, while the Netherlands opted for using a national income deflator.

Cross-country experience suggests that expenditure targets set in nominal terms promote stronger fiscal discipline and are more transparent. The process of recalculating a real ceiling into nominal terms renders such point of reference more ambiguous due to the possible disagreements on the definition of the deflator. Frequent changes in the method for translating the ceiling from real to nominal could reduce fiscal discipline and transparency. Once inflation has been brought down to single digits and made less volatile, Ukraine should consider switching to expenditure ceilings set in nominal terms. In addition, nominal expenditure ceilings could also help in implementing a counter-cyclical fiscal policy—an important operational advantage in Ukraine. For example, a temporary positive demand shock would increase inflation, compared to forecast, and reduce expenditure in real terms, thereby contributing to the work of automatic stabilizers on the expenditure side of the budget.

1 Based on Ljungman, 2008.

Table II.4. EU-25 Practices: The Use of MTEFs 1/

	Percentage of the EU-25 Countries with MTEFs
1. Countries where medium-term framework covers:	
a. 3 budget years	50%
b. 4 budget years	35%
c. 5 budget years	15%
2. MTBF covers:	
a. General government	70%
b. Central government and social security	10%
c. Central and local government	5%
d. Central government only	15%
3. Ex-ante coordination among general government sub-sectors in setting budgetary targets:	
a. Yes	53% 2/
b. No	47% 2/
4. Type of framework:	
a. Flexible rolling	80%
b. Fixed	20%
5. Formal monitoring of budgetary targets with regular reports:	
a. Yes	30%
b. No	70%

Source: European Commission, 2007
1/ Twenty of the EU-25 Member States have MTEFs.
2/ As a percentage of countries in which the MTEF covers all or several general government sub-sectors.

Table II.5. OECD Practices: The Use of MTEFs

	Percentage of the OECD Countries
1. Countries where a MTEF is a legal requirement	50%
2. Countries with expenditure rule	50%
a. targeting a nominal expenditure ceiling	23%
b. targeting a real expenditure ceiling	7%
c. targeting a nominal spending growth rate	7%
d. targeting a real spending growth rate	10%
3. Counties with multi-year expenditure targets / ceilings	70%
4. Expenditure targets / ceilings are revised	
a. Every year	37%
b. Every two years	3%
c. After each election or a new government is formed	13%
5. Expenditure targets / ceilings cover	
a. three budget years	20%
b. four budget years	20%
c. five budget years	10%
5. MTEF is based on growth assumption with margin of prudence	21%
6. Multi-year cost estimates are made for all new spending	56%
7. MTEF is made available to the public	63%

Sources: OECD / World Bank Budget Practices and Procedures Survey

REFERENCES

European Commission (2006): Public Finances in EMU, European Economy N° 3.

European Commission (2006): Public Finances in EMU, European Economy N° 3.

Fabrizio, S. and Mody, A., "Can Budget Institutions Counteract Political Indiscipline?" (May 2006). IMF Working Paper No. 06/123

Flanagan, M., (2008, forthcoming): "Resolving Large Contingent Fiscal Liabilities," forthcoming IMF Working Paper.

Girouard, N., and André, C., (2005): "Measuring cyclically-adjusted budget balances for OECD countries," OECD Working Paper no. 434.

Government of Ukraine, 2007, *Program of Action of the Cabinet of Ministers of Ukraine*, "The Ukrainian Breakthrough: For People, Not For Politicians," draft paper.

IMF, 2001, "Manual on Fiscal Transparency," Fiscal Affairs Department.

IMF, 2004, "Public Investment and Fiscal Policy," FAD Board Paper (www.imf.org).

IMF, 2004 (2), "Ukraine: Report on the Observance of Standards and Codes—Fiscal Transparency Module," International Monetary Fund Country Report No. 04/98.

IMF, 2005, "Public Investment and Fiscal Policy—Lessons from Pilot Case Studies," FAD Board Paper, (SM/05/118).

IMF, 2007, "Public Enterprises and Fiscal Risk—Lessons from the Pilot II Country Studies," FAD Board Paper (SM/07/368).

IMF, 2007 (2), "Ukraine: Selected Issues," IMF Country Report No. 07/47.

IMF, 2007 (3), "Bulgaria: Selected Issues," IMF Country Report No. 07/390.

Kyobe, A. J., and Danninger, S., "Revenue Forecasting - How is it done? Results from a Survey of Low-Income Countries," IMF Working Paper No. 05/24.

Ljungman, G., 2008, "Expenditure Ceilings—A Survey," *mimeo*, International Monetary Fund, Fiscal Affairs Department.

Turner, D. (2006): "Should Measures of Fiscal Stance be Adjusted for Terms of Trade Effects," OECD Economic Working Paper, OECD, Working Paper No 519.

World Bank, 1998, *Public Expenditure Management Handbook,* edited by Cheryl Williamson Gray.