

INTERNATIONAL MONETARY FUND

**Oil Market Developments and Issues**

Prepared by the Policy Development and Review Department

In cooperation with the Fiscal Affairs, International Capital Markets, Research, and Statistics  
Departments, and in consultation with other Departments

Approved by Mark Allen

March 1, 2005

|  | Page |
|--|------|
| I. Introduction .....  | 5    |
| II. Recent Oil Price Increases in Perspective and Prospects for the Future ..... | 7    |
| A. Significance of Recent Price Movements .....                                  | 7    |
| B. Factors Behind Price Increases and Prospects for the Future .....             | 9    |
| The role of commodity trading .....  | 11   |
| C. What Hinders Investment in the Oil Sector?.....                               | 13   |
| Background .....   | 13   |
| Obstacles to investment .....  | 14   |
| Prospects for future investment .....  | 16   |
| Conclusions.....   | 18   |
| III. The Impact of Oil Market Developments on the Global Economy .....           | 19   |
| A. Impact of Recent Price Movements .....  | 19   |
| Global effects .....   | 19   |
| The likely impact of the higher prices so far .....                              | 20   |
| Recycling and possible impact on financial markets.....                          | 21   |
| B. What if—the Likely Impact of Much Higher Oil Prices.....                      | 22   |
| Introduction.....  | 22   |
| Impact of much higher oil prices on advanced economies.....                      | 23   |
| Impact on emerging market and developing countries .....                         | 24   |
| IV. Impact of Higher Prices on Exporters .....                                   | 25   |
| V. Financing Needs for Developing Countries from Higher Oil Prices .....         | 31   |
| A. Estimates of the Incremental Potential Financing Gap.....                     | 32   |
| B. The Mix between Adjustment and Financing .....                                | 32   |

|  |    |
|--|----|
| C. Projected Need for Additional Use of Fund Resources .....   | 33 |
| VI. Policy Response to Higher Oil Prices.....  | 34 |
| A. Background .....  | 34 |
| B. Near-Term Policy Responses .....  | 35 |
| Net petroleum exporters.....   | 35 |
| Net petroleum importers .....  | 41 |
| Short-run domestic petroleum pricing .....   | 43 |
| C. External Financing and Use of Fund Resources .....  | 43 |
| D. Selected Structural Issues.....   | 44 |
| Domestic petroleum price and taxation regimes.....   | 44 |
| Oil revenue issues and investments in the oil sector.....  | 45 |
| Oil funds.....   | 47 |
| E. Transparency .....  | 49 |
| VII. The Scope for Producer and Consumer Action and Cooperation .....                                  | 51 |
| VIII. Progress on Data Transparency Issues in Oil Markets .....  | 52 |
| Data production.....   | 53 |
| Main weaknesses in the data.....   | 53 |
| Progress so far.....   | 54 |
| Looking ahead.....   | 55 |
| IX. Issues for Discussion .....  | 56 |
| Tables   |    |
| 1. Global Oil Market: Demand, Capacity, and Prices.....  | 10 |
| 2. Impact of Nominal Oil Price Hikes .....   | 22 |
| 3. Impact of an \$80 Price of Oil in 2005.....   | 24 |
| 4. Impact on GDP Growth in Developing and Emerging Market Net Oil Importing<br>Countries.....          | 24 |
| 5. Hydrocarbon Net Exporting Countries' Oil and Natural Gas Export and Fiscal Revenue<br>in 2003 ..... | 26 |
| 6. Oil and Gas Export and Revenue Windfalls.....   | 27 |
| 7. Impact of the Change in Hydrocarbon Revenue on Key Indicators.....                                  | 28 |
| 8. Impact of the Change in Hydrocarbon Revenue on Key Fiscal Indicators, by Income<br>Group .....      | 30 |
| 9. Share of the Windfall Saved in Special Funds.....   | 30 |
| 10. Impact of Higher Oil Prices .....  | 32 |
| 11. Adjustment/Financing Mix in 2005 .....   | 32 |
| Figures  |    |
| 1. Selected Prices of Crude Oil .....  | 7  |
| 2. Oil Intensity .....   | 8  |
| 3. OPEC Crude Oil Production with Total and Spare Production Capacity.....                             | 13 |

|   |    |
|---|----|
| 4. Total Global Drilling Rigs and Real Petroleum Spot Price .....   | 15 |
| 5. Spread Between the West Texas Intermediate and Dubai Fateh Crude Oil Spot Price,<br>and the Average Petroleum Spot Price ..... | 16 |
| 6. Proven World Oil Reserves Excluding Canadian Oil Sands; and OPEC and Non-OPEC<br>Crude Oil Reserves .....                      | 17 |
| 7. Average Petroleum Spot Price and Excess Capacity .....   | 21 |
| 8. Transparency in Uses of the Hydrocarbon Windfall .....   | 31 |

Boxes

|   |    |
|---|----|
| 1. Recent Changes in Composition and Activities of Energy Traders and Investors ..... | 12 |
| 2. Hotelling's Rule for Optimal Resource Management .....                             | 37 |
| 3. Managing Natural Resource Windfalls—Country Experience.....                        | 40 |
| 4. Domestic Petroleum Price Reform .....  | 46 |
| 5. Oil Funds—Selected Examples .....  | 48 |

Many Fund Departments have been involved in recent work on oil market developments and issues that forms the basis for this paper. Sections II and III are based on work by the Research Department, with contributors Kalpana Kochhar, Hossein Samiei, Sam Ouliaris, Doug Laxton, Ranil Salgado, Hussein Allidina, and Paul Nicholson. Section II also draws on analysis by the International Capital Markets Department into financial market influences on energy prices, with Todd Groome, Renzo Avesani, and William Lee contributing and draws upon a Research Department paper on obstacles to oil sector investment that will be issued to the Board; and section III draws on the December 2000 Research Department paper issued to the Board “The Impact of Higher Oil Prices on the Global Economy” (SM/00/275). Section IV is based on work by the Policy Development and Review Department. Contributors were Corinne Deléchat, Gerard Almekinders, Ales Bulir, Wes McGrew, Anton Op de Beke, and Paul Nicholson. Section V is also based on work by the Policy Development and Review Department. Contributors were Geert Almekinders, Helaway Tadesse, Abebe Selassie, and Corinne Deléchat. Section VI draws on joint work by the Fiscal Affairs Department and the Policy Development and Review Department. The main contributors were Juha Kähkönen, Alan MacArthur, and Rolando Ossowski. Section VII draws on joint work by the staffs of the IMF, the International Energy Agency, and the G-20 Secretariat, previously issued for the Board’s information as EBS/04/157. Section VIII draws on work by the Statistics Department and the Policy Development and Review Department. Contributors include Lucie Laliberté, Paul Armknecht, Cor Gorter, Anthony Pellechio, Silvia Matei, Juha Kähkönen, and Ketil Hviding; it also draws on “Progress on Data Transparency Issues in Oil Markets,” which was issued to the Board for information on February 2, 2005 (FO/DIS/05/12). Finally, Wes McGrew of the Policy Development and Review Department has carried the main burden of combining the recent Fund staff work into the present Board paper.

## I. INTRODUCTION

1. **The sharp increase in the oil price over the past year prompts several questions.** Why have prices risen, and what are the prospects for the future? What is the expected impact on the global economy and individual countries? How are oil exporters using the additional revenue, and how will oil-importing countries cope with the higher prices? Are data weaknesses and obstacles to investment hindering the smooth functioning of the global oil market? What advice does the Fund staff offer to countries in response to higher oil prices? Is there scope for producer and consumer action and cooperation, and what is the Fund doing in response to oil market developments?

2. **This paper combines much of the recent work that the Fund staff has done to shed light on these questions.** Future staff work will include an essay in the Spring 2005 World Economic Outlook that will assess the key risk factors that could lead to continued tight conditions in the oil market. The essay will also include a box evaluating the quality of oil market data and a box on oil price volatility. The September 2004 *Global Financial Stability Report* reviewed the main characteristics of the major energy markets. That will be updated in the April 2005 *Global Financial Stability Report*, which will also include a discussion of volatility and of arbitrage by energy traders.

3. **The discussion in this paper of the causes and consequences of recent oil price increases, and the appropriate policy response, is framed by the volatility and uncertainty that characterize the oil market.** Volatile prices arise from supply and demand that are both highly inelastic in the short run, with the result that even small shocks can have large effects on price. The difficulty of predicting long-run supply and demand creates uncertainty about future prices. Further, even current supply and demand data are lacking, which results in additional uncertainty. These features of uncertainty and volatility of prices make it difficult to reach simple conclusions about how oil producers and consumers should respond to price changes.

4. **The main conclusions of the paper are as follows:**

- **The recent oil price increase needs to be kept in perspective.** While the recent episode has seen record-high nominal prices for crude oil, the price increase is small compared to the two oil price shocks in the 1970s, and in real terms the prices are well below historical peaks. Moreover, the oil intensity of consumption and production—particularly for advanced economies—is now significantly lower than in the 1970s. Finally, the durability of the price increase is uncertain, given uncertainties about medium- and long-term supply and demand behavior.
- **The recent surge in oil prices seems to be the result of a secular increase in demand from North America and Asia, combined with historically low excess capacity and heightened concerns about supply disruptions.** While the higher oil price appears to contain a significant risk premium, there is no firm evidence that increased speculation has contributed to that.

- **The oil market is likely to remain tight over the medium term.** Demand is projected to grow rapidly, but prospects for increased production are uncertain. Although higher oil prices, if they persist, should encourage investment in the oil sector, impediments remain. These include the experience with the large capacity overhang in the 1980s, the high cost and long gestation periods of investment in the sector, and uncertainties about the long-run demand response to higher prices.
- **The impact of the higher oil price on the global economy is likely to be limited.** Staff estimates suggest that, on present oil price projections, global activity could be  $\frac{1}{4}$ – $\frac{1}{2}$  percentage points lower than otherwise in 2005. Even in the highly improbable event that oil prices rise to as high as \$80 per barrel, the lower oil intensity and improved policy credibility over the past few decades should prevent the world economy from suffering a recession comparable to that following the oil shocks in the 1970s.
- **While most oil-importing developing countries should be able to manage, the oil shock will leave some countries even more vulnerable.** The incremental financing needs of oil-importing developing countries are large, but the bulk of the resulting financing gap is expected to be offset by policy adjustments, endogenous changes (for example, in the exchange rate), and reserve drawdown. The Fund stands ready to deal with residual country-specific financing needs as they arise.
- **Oil-exporting countries saved most of their estimated \$200 billion in higher oil export revenues in 2004.** This was reflected in higher current account balances, reduced external debt, and higher international reserves. The fiscal revenue windfall was about half the size of the export revenue windfall, and governments saved about two-thirds of the extra revenues on average.
- **Fund staff has advised member countries to respond prudently, given the uncertain outlook for prices.** It has identified general principles that should guide policy responses, although each country's response will need to take into account its specific circumstances, including its degree of access to international capital, strength of underlying monetary and fiscal regimes, exchange rate regimes, and levels of external debt and other financial vulnerabilities. For example, exporters should smooth their public spending response to higher prices and attempt to find a judicious balance between spending and saving the windfall. Some oil importers will be in a position to finance the higher cost of petroleum imports in the short run, while others will have to adjust more rapidly.
- **Consuming and producing countries can contribute to stability in oil markets by strengthening policies to promote energy sustainability and efficiency and working to reduce unnecessary obstacles to oil sector investment.** Dialogue between consumers and producers could also help promote stability, including through adequate exchange of information on future supply and demand trends.

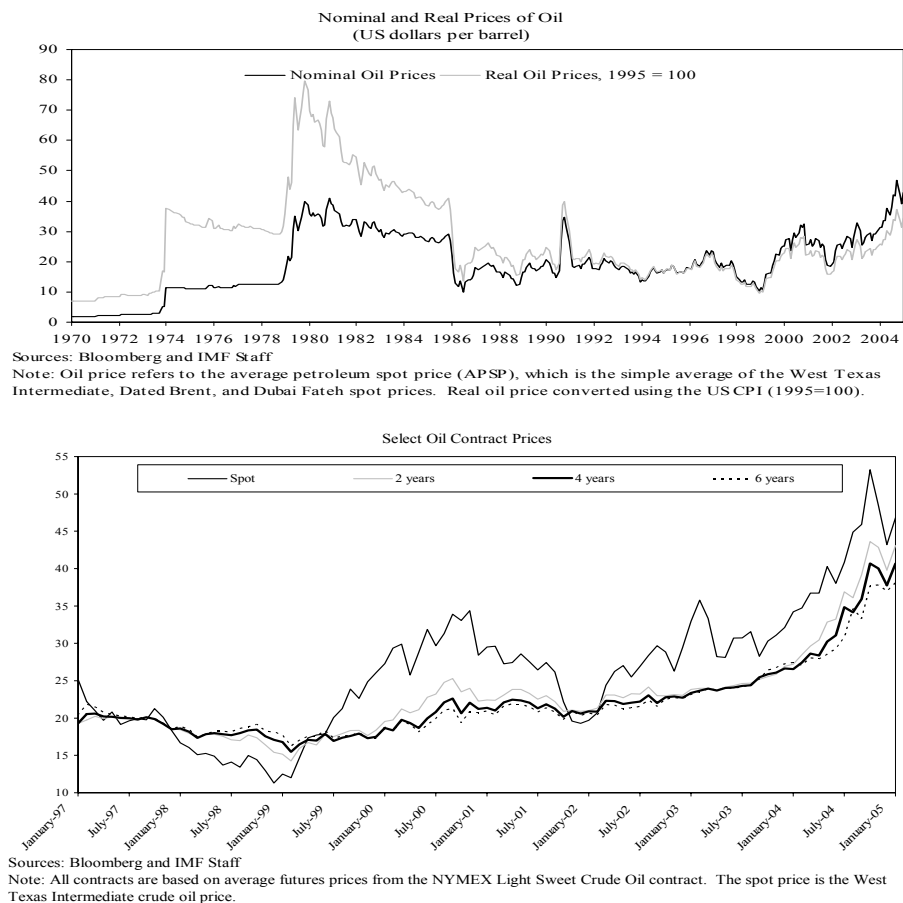
- **The Fund is supporting international efforts to improve oil market data, given the importance of timely and accurate data for the functioning of the oil markets.** Two initiatives by the international community to improve oil data and transparency are the Joint Oil Data Initiative (JODI) and the Extractive Industries Transparency Initiative (EITI).

## II. RECENT OIL PRICE INCREASES IN PERSPECTIVE AND PROSPECTS FOR THE FUTURE

### A. Significance of Recent Price Movements

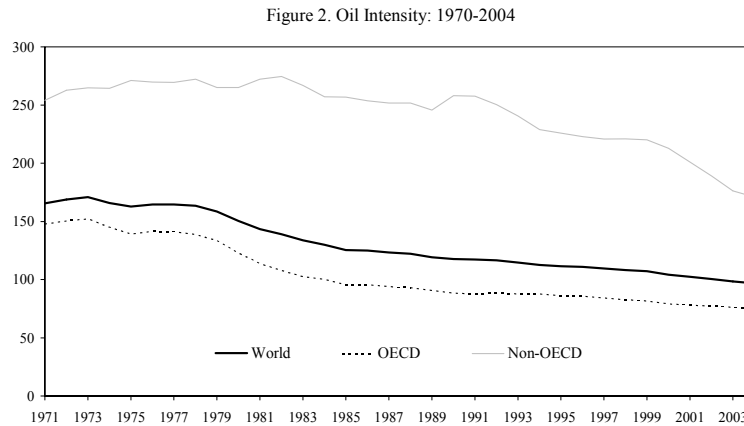
5. **The recent oil price increases have been substantial, but should be kept in perspective.** The average price of crude oil has risen by more than 40 percent since the beginning of 2004 to \$44.95 in January 2005, surpassing the record nominal high set during the Iraq invasion of Kuwait in 1990 (Figure 1).<sup>1</sup> In real terms, however, the price is still well

Figure 1. Selected Prices of Crude Oil



<sup>1</sup> Unless noted otherwise, all references to the oil price are to the equally weighted average petroleum spot price (APSP) of three different grades of oil, namely West Texas, Brent, and Dubai crude.

below its historical peak. Moreover, the price increase is relatively small compared to the 1970s. While oil prices more than tripled in the two oil shocks in the 1970s, the WEO projection for the 2005 oil price is 55 percent above its 2001–03 average. Also, the oil intensity of consumption and production—particularly for advanced economies—is now significantly lower than in the 1970s, suggesting that the macroeconomic impact of the increase may also be lower (Figure 2).<sup>2</sup>



Source: IEA and IMF staff estimates

\* Oil intensity is measured as thousands of tons of oil consumed per billion U.S. dollars of real GDP (1995 terms).

**6. The price increase has a perceived permanent component, and volatility has risen.**

- About 95 percent of the increase in spot prices since the beginning of 2004 has fed through to end-2006 futures prices, and 60 percent to end-2010 prices (Figure 1). This suggests a significant permanent component in the recent price increases, although futures prices have proved to be rather poor predictors of future spot prices.
- Price volatility has increased but has remained within historical ranges.<sup>3</sup>

**7. The oil market is characterized by long lags in the response of supply and demand, which fuels volatility and uncertainty of prices.** On the demand side, it requires years for consumers to switch to less energy intensive technologies in response to higher prices, and future demand is difficult to predict. On the supply side, investment is expensive

<sup>2</sup> Figure 2 shows that oil intensity is lower in OECD than non-OECD countries in terms of oil consumed per dollar of GDP at market prices. However, in purchasing power parity terms, it is comparable between the two groups.

<sup>3</sup> Measures of both historical spot price volatility and implied volatility (derived from options on oil futures) rose on average in 2004 compared with 2003, but were lower than historical peaks seen during the 1990–91 Gulf War and after the September 11 terrorist attack in 2001.



and there are long gestation lags before it translates into higher production capacity. Further complications arise because of the structure of oil production, with 50 percent of output and 70 percent of reserves under the control of a cartel, and part of production in the public sector and part in private hands. Finally, production of crude is only part of the story—converting crude to a refined consumer product is another facet of the market with its own characteristics, regulations, and dynamics.

## **B. Factors Behind Price Increases and Prospects for the Future**

8. **The recent increase in oil prices seems to be the result of a secular increase in demand from North America and Asia, combined with historically low excess capacity and heightened concerns about supply disruptions.**

9. **The world economic recovery has been the main factor underpinning the rapid increase in oil demand.**<sup>4</sup> Global demand grew 3.3 percent or 2.7 mbd in 2004, the highest growth rate since 1976. While demand from the United States and other OECD countries has been strong, demand from Emerging Asia has been growing about three times as fast as in the OECD countries since the fall of 2003. In particular, oil demand by China has been surging, outstripping real GDP growth. This demand growth was largely unanticipated, as typically oil demand has lagged output growth. Notwithstanding the higher oil prices, demand will continue to grow strongly, reflecting global expansion and rapid economic development in Asia (especially China and India). The bulk of this growth will most likely come from the transportation sector, which remains highly dependent on oil.

10. **The price impact of the supply concerns has likely been magnified by historically low spare capacity.** At about 2 million barrels per day, end-2003 global spare capacity for crude oil production was already lower than at any time since 1991. In 2004, sustained strong demand and supply disruptions reduced spare capacity further, despite an increase in OPEC production. Also, in October 2004 inventories of heating oil in industrial countries were some 20 million barrels below their five-year average. Although demand and capacity projections are subject to significant uncertainties, Table 1 shows likely ranges for the expected evolution through 2010 of capacity, demand, excess capacity, and price, based on IEA and IMF staff projections.

---

<sup>4</sup> The decline of the US dollar also likely played some role, as dollar-denominated commodity prices typically move inversely with the effective dollar exchange rate.

Table 1. Global Oil Market: Demand, Capacity, and Prices

|  | Dec-02 | Dec-03 | Dec-04 | Dec-05  | Dec-10 |
|--|--------|--------|--------|---------|--------|
| Capacity 1/                                  | 79.9   | 80     | 81.7   | 83.3    | 93     |
| Demand 1/                                    | 76.9   | 78.1   | 80     | 81.5-82 | 89-93  |
| Excess Capacity                              | 3      | 1.9    | 1.7    | 1.3-1.8 | 0-4.0  |
| Excess Capacity in Percent of Total Capacity | 3.8    | 2.4    | 2.1    | 1.6-2.2 | 0-4.3  |
| Average Price 2/                             | 25.0   | 28.9   | 37.8   | 46.5    | 38.8   |

Sources: IEA, US Department of Energy, and IMF Staff calculations

1/ Million barrels per day; excludes Natural Gas Liquids.

2/ Annual Average Petroleum Spot Price of West Texas Intermediate, Brent Crude, and Dubai Fateh.

11. **In part, today’s limited spare capacity is the result of low investment during the 1990s, owing to low average real oil prices of that period.**<sup>5</sup> At \$19, the average real crude oil price in the 1990s was only one half of that in the 1980s. With this in mind, many investors are fearful of repeating the mistakes of overinvestment in the 1970s and early 1980s. Until recently, private oil companies used an oil price in the range of \$18–20 in their investment decisions, but these assumptions now appear to have been revised upward. Given high and rising exploration costs, high volatility may also have contributed to producers’ reluctance to engage in major crude oil projects with uncertain payoffs. As for oil products, the scarcity of refining capacity reflects not only low investment but also a mismatch between available refineries and the type of crude oil being pumped at the margin.

12. **While based on futures markets oil prices are expected to fall to the \$35–40 range in the medium term, the likelihood of continued low levels of spare capacity indicates that oil prices are likely to remain sensitive to unanticipated shifts in supply and demand.** Projections of demand and supply of crude oil suggest that spare capacity may remain low through 2010, as the current set of capacity expansion and replacement projects is expected just to keep pace with demand. Moreover, the world’s dependence on OPEC output is likely to rise as the growth in oil production from non-OPEC countries is expected to slow. According to the reference scenario in the International Energy Association’s (IEA) *World Energy Outlook 2004*, OPEC’s market share will rise from 37 percent in 2002 to 53 percent in 2030. These projections assume that sufficient investments will be made in a timely manner.<sup>6</sup>

<sup>5</sup> Section II.C discusses the factors hindering investment in the oil sector in more detail.

<sup>6</sup> The Organization of Petroleum Exporting Countries (OPEC) is considered to be the “swing producer,” with a crude oil production capacity of approximately 29 million barrels per day (mb/day). Moreover, OPEC’s Middle East members own 65 percent of remaining global proven reserves. OPEC’s effective spare capacity (defined as production available in 30 days and sustainable for 90 days) was recently estimated by the IEA to be less than 1 mb/day, which is well below its spare capacity level of 6 to 7 mb/day for much of 2002. Most of the medium-term growth in capacity is expected to be in non-OPEC exporting countries, such as Russia.

13. **Improved data on both oil supply and demand could help smooth the functioning of the oil market, although the short-term inelasticity and the longer-term uncertainties about supply and demand will remain.** The reduction of uncertainty attached to current supply and demand would likely reduce price volatility and lead to better investment and consumption decisions. Section VIII discusses the quality of oil market data and international efforts to improve it in some detail.

#### **The role of commodity trading**

14. **Over the last decade, the volume of trading in financial instruments linked to oil or energy-related commodities has increased sharply on both commodity exchanges and in over-the-counter markets.** In diversifying their portfolios, institutional investors, including investment banks, pension funds, and hedge funds, have allocated more capital to alternative investments, including commodities (Box 1).

15. **Nevertheless, there is little evidence that the entry of more non-commercial traders into energy markets has raised price volatility beyond historical norms.** The implied volatility embedded in the pricing of options on oil futures—a measure of the perceived oil price volatility and risk—has since May 2004 risen to the upper limit of the trading range observed over the last decade. However, intraday volatility seems to have increased significantly, including discontinuous jumps in bid and ask prices. Related to this increase in intraday volatility, some market participants have found it increasingly difficult to execute market orders in an efficient manner. The issue of volatility will be addressed in the April 2005 *Global Financial Stability Report*.

16. **There is no firm evidence that the increase in oil prices is a result of increased speculation.** While the increased prominence of macro hedge funds involved in commodity trading might suggest an increase in speculative activity, much of the capital from institutional investors is invested in relatively passive index funds that track spot and future commodity prices. These index funds are heavily weighted in energy products, where futures markets are among the most liquid. Moreover, analysts believe that investors focus on

### **Box 1. Recent Changes in Composition and Activities of Energy Traders and Investors**

Rapid growth in trading of financial instruments linked to energy-related commodities has been led by a broad range of institutions, including investment banks, hedge funds and pension funds, as well as traditional energy companies.<sup>1/</sup> In addition to commodity exchanges, over-the-counter markets (OTC) have developed to accommodate the demand for more customized instruments. The growth of non-commercial trading in energy products has improved the efficiency (better price discovery) and liquidity of these markets.<sup>2/</sup>

The CFTC classifies traders into two categories, non-commercial and commercial traders. Commercial traders are the larger group (65 percent of open interest on the NYMEX in September 2004), and contain those companies “engaged in business activities hedged by the use of the futures or options markets.” Many new entrants (e.g., pension or hedge funds) have different investment horizons and objectives (e.g., trading gains rather than hedging production or distribution) than traditional activities of commercial traders. In the view of many experienced investors and commodity traders, the CFTC classification scheme is imprecise, and the positions of noncommercial and commercial traders do not necessarily reflect speculative and non-speculative activities.

Macro hedge funds, which typically aim to arbitrage market inefficiencies, have grown more prominent. Their style contrasts with commodity trading firms that rely primarily on statistical and directional models. Financial firms (e.g., major investment banks) bring additional capital and trading expertise, which has deepened and broadened both exchange-traded and OTC markets. They also bring more products, like indices, and hedging or trading opportunities, facilitating greater investor participation. In the wake of utility deregulation, specialized energy trading firms have become active in arbitrating power or energy-related markets throughout the supply chain connecting inputs (e.g., oil, gas, and coal) with commercial and retail energy outputs (e.g., electricity). These firms employ active trading strategies on exchanges and OTC markets that partly integrate price movements in otherwise separate markets (e.g., electricity, natural gas, and power).

The low real and nominal interest rate environment and relatively poor performance of traditional asset classes have spurred investors’ interest in alternative investments, including commodities and energy-related products. Much of the new capital has been invested in index funds, frequently linked to the Goldman Sachs Commodity Index (GSCI), which is heavily weighted in energy-related products. Investments by pension funds, mutual funds, and hedge funds in these investment vehicles or products increases the demand for short-dated futures contracts, which are the constituents of the GSCI, resulting in upward pressure on these prices.

---

<sup>1/</sup> Chapter II of the September 2004 *Global Financial Stability Report* describes some of these changes in greater detail, and they will be discussed further in the April 2005 *Global Financial Stability Report*.

<sup>2/</sup> Commercial traders (e.g., exploration and production firms and refiners and distillate distributors) can hedge revenues related to their production and distribution in a more liquid and cost-effective manner. The use of market instruments such as futures contracts traded on organized exchanges (e.g., the NYMEX), which started in 1983, and more recently on OTC markets, rather than longer-term bilaterally negotiated contracts commonly used prior to exchange-traded futures, allows for more efficient price discovery and risk sharing among a broader group of market participants.

perceived structural changes in underlying supply and demand conditions that warrant increased medium- and longer-term investments rather than on near-term prospects.

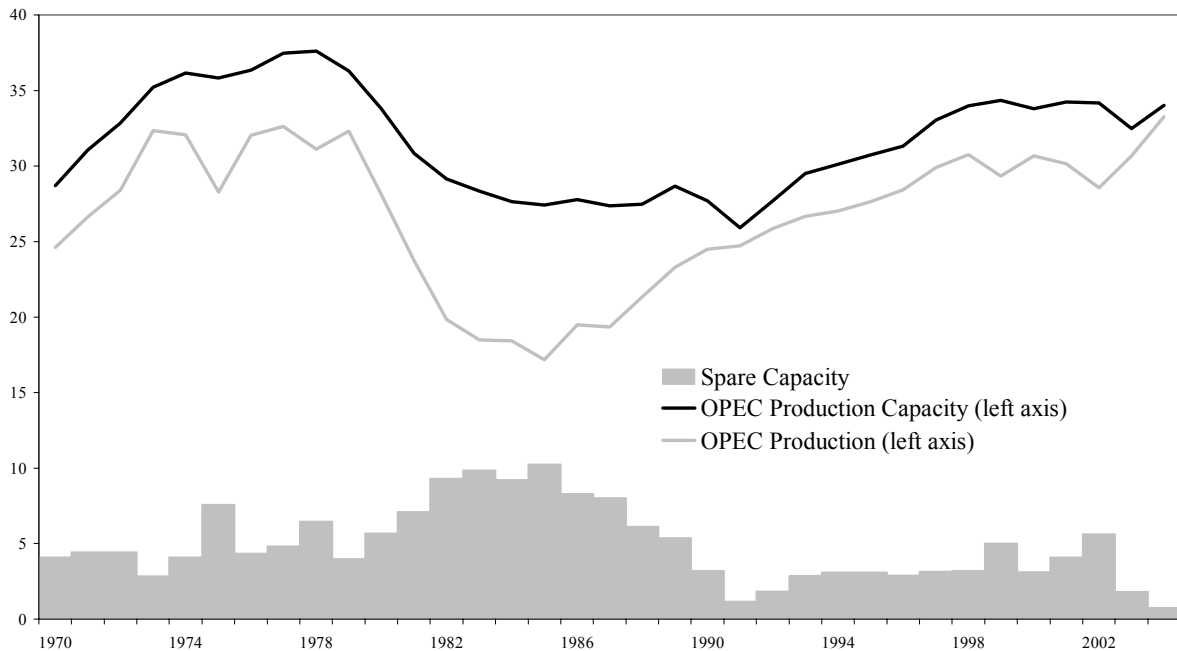
17. **Policies to expand markets, including derivative markets, would promote efficiency and might help reduce price volatility.** Broader and deeper markets would improve liquidity and price setting. The risk for investment in new capacity would be reduced if longer-term financial hedging instruments existed. Derivative markets should result in an improved distribution of risk, thus providing some safeguard against disruptive market behavior. Indeed, market liquidity should improve from the increase in capital from institutional investors and other non-commercial traders.

### C. What Hinders Investment in the Oil Sector?

#### Background

18. **Following substantial increases during the 1970s and early 1980s, productive capacity in the oil sector has stagnated relative to the growth in global oil demand.** In particular, OPEC's current capacity is lower than 1978 levels, despite some recent pickup (Figure 3).

Figure 3. OPEC Crude Oil Production with Total and Spare Production Capacity--Million Barrels Per Day



Sources: United States Dep't of Energy, International Energy Agency, and IMF staff

19. **The resulting reduction in spare capacity has increased the sensitivity of oil prices to actual/potential supply disruptions.** Higher demand for OPEC oil has been met by significant draws on OPEC surplus capacity—estimated at around 10 mbd in 1985. Global spare capacity fell below 1.5 mbd at the end of 2004.

20. **Demand for crude oil is likely to grow steadily in the medium- to long-term, requiring large upstream investments conservatively estimated by the IEA at around \$90 billion per year.** A significant part of the increase in demand is projected to come from rapidly growing Asian economies. The IEA projects demand to rise by around 38 mbd by 2030, although that may be conservative. With non-OPEC production expected to increase by only 7 mbd over this period, the call on OPEC will double relative to today. In addition to meeting future demand, increased investment is needed to provide adequate spare capacity in the oil market and reduce price volatility. The upcoming WEO chapter on the oil market will discuss long-run demand projections and spare capacity.

21. **However, given the experience with over-investment in the 1970s, producers are likely to follow a cautious approach to investment decisions.** Those decisions are complicated by demand and price uncertainties and the long gestation periods for investment in the oil sector. Furthermore, while some spare capacity is beneficial to the world economy as a whole, it is not easy to implement mechanisms that would ensure the benefits accrue to the producers who finance the investment costs of such capacity. Given their large share of oil reserves and low production costs, the behavior of Middle Eastern members of OPEC is key to future capacity expansion in the oil sector. Although non-OPEC countries have an incentive to respond to the higher prices by increasing investment and production, they are ultimately constrained by their lower reserves.

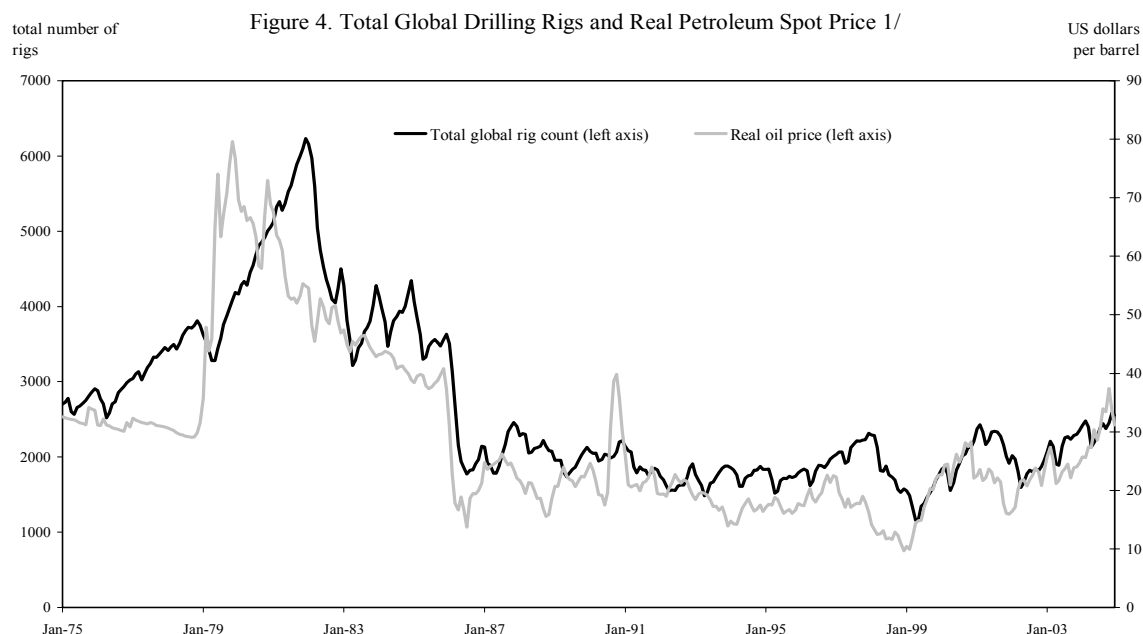
22. **Against this background, this section examines prospects for investment in the medium term and identifies potential obstacles to investment by international and national oil companies (IOCs and NOCs).** These include: those affecting all investors, such as the level and volatility of prices and the size of spare capacity; those specifically affecting NOCs, for example funding and technological obstacles; those limiting investment opportunities for IOCs, such as limits on foreign investment and taxation policies in oil-exporting countries; and lastly those relating to environmental regulations (especially in downstream projects).

## **Obstacles to investment**

### *Price and demand uncertainties*

23. **Low, volatile, and unpredictable real oil prices over the past two decades inhibited upstream investment.** In the absence of detailed investment data, especially for OPEC members, investment is proxied by a measure of rig activity (Figure 4). Volatile and unpredictable prices—against the background of large swings of the 1970s and 1980s—blur the distinction between transitory and permanent price changes and hence permanent cash flows. While price uncertainty is a fact of life, in the case of oil, given the large upfront

outlays, long gestation periods, and irreversible nature of investment, uncertain cash flows tend to delay additions to productive capacity. Uncertainty regarding future prices is further compounded by the difficulties of predicting long-term crude oil demand and its sensitivity to the rate of development and adoption of new technologies. For example, lower-than-expected demand in the 1980s led to significant increases in spare capacity among OPEC members, which has made their investment policies more cautious.



Sources: Baker Hughes and IMF staff  
1/ Adjusted by the US CPI (1995 = 100)

### *Specific constraints in oil-exporting countries*

24. **Competing demands for social and infrastructure expenditures and, in some cases, high public debt levels have limited the funds available for investment in the oil sector.** NOCs are generally required to compete with other state-owned companies and the broader public sector for funds, with the final allocation not necessarily based on contribution to revenues or profitability. The share of NOCs in global oil production is about 45 percent.

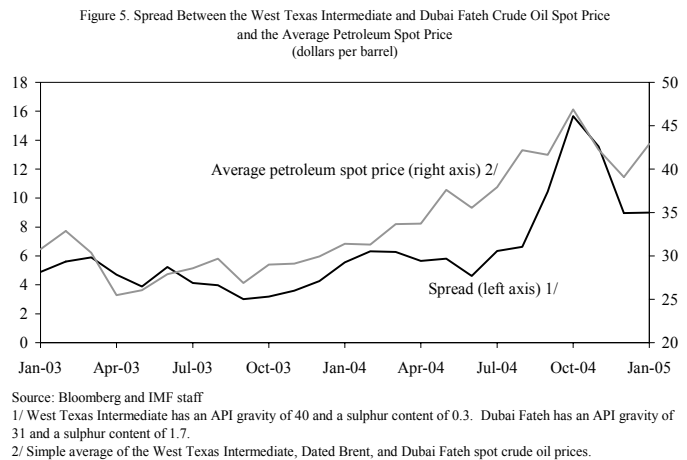
25. **Limited openness to foreign investment is often a major disincentive for international oil companies.** Major oil exporters like Saudi Arabia and Kuwait (and outside the Middle East, Mexico) remain largely closed to foreign investment, while in other countries (such as Iran) complex production-sharing and buyback deals discourage IOC involvement. For their part, IOCs may have contributed to the problem by failing fully to

appreciate the nature of the host countries' dependence on oil and their strategic objectives. Limited foreign investment has also prevented some countries from fully benefiting from the major technological advances that have taken place in the past two decades in the oil sector. Uncertainty about licensing and fiscal terms of host governments could also impede foreign investment. Frequent changes that retrospectively affect the taxation of sunk investments force investors to raise their hurdle rates for future investment decisions to levels that are high enough to accommodate the higher perceived risk.

### *Downstream investment*

26. **Downstream investment (pipelines, refineries, and tankers) has also lagged behind** the growth in global oil demand in recent years, contributing to bottlenecks in derivative products markets (such as gasoline and distillates) and weakening the ability of the oil market to deal with temporary imbalances. Global oil refining capacity is only slightly above 1980s levels. Shipping charges also rose substantially in 2004.

27. **The shortage of existing refining capacity is particularly marked in heavy crude oil.** This bias has contributed to a significant rise in light-heavy crude oil price spreads in the past year, when the marginal barrel from OPEC was heavy, and light sweet crudes were in limited supply due to temporary supply disruptions (Figure 5).



28. **The main obstacle to downstream activity in industrial countries has been environmental considerations.** This is especially the case in the United States, where strict environmental standards make it difficult to justify new refineries. The last refinery built in the United States was in 1976. Even when investment is allowed, environmental regulations and policies may drive up capital costs.

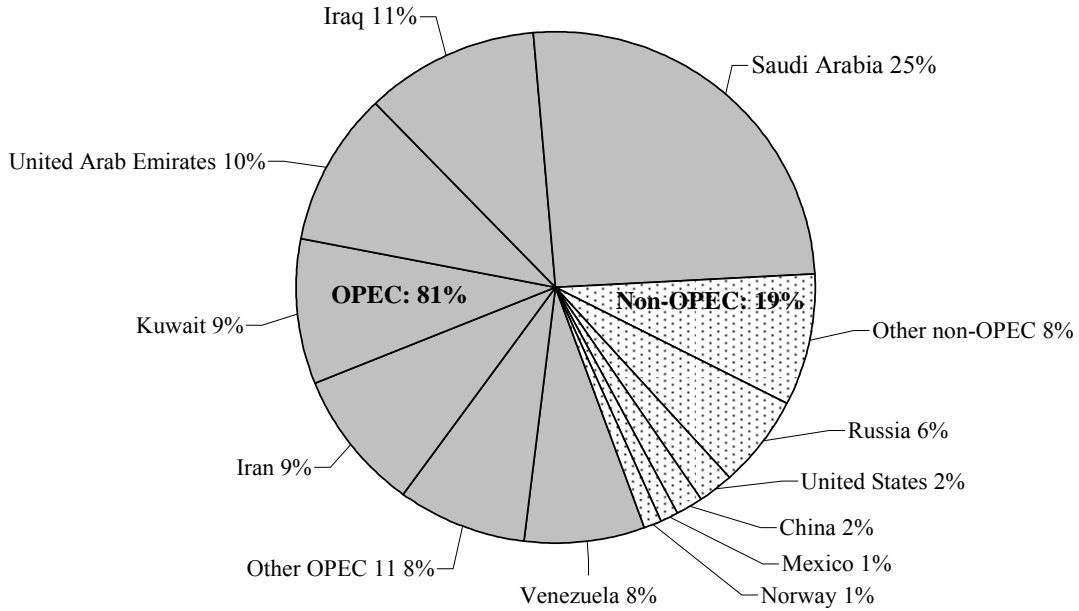
### **Prospects for future investment**

#### *OPEC producers*

29. **OPEC's share of world production will likely increase over the long term.** The location of proven world crude oil reserves is far more concentrated in OPEC countries—especially those in the Middle East—than current world production, with OPEC presently controlling around 80 percent of proven oil reserves (70 percent including Canadian tar sands). Moreover, non-OPEC reserves are being depleted at a faster rate than those available to OPEC (Figures 6). Also, OPEC has a significant cost advantage over non-OPEC producers, which is expected to widen as non-OPEC producers try to preserve their reserve base by moving into more costly off-shore projects.

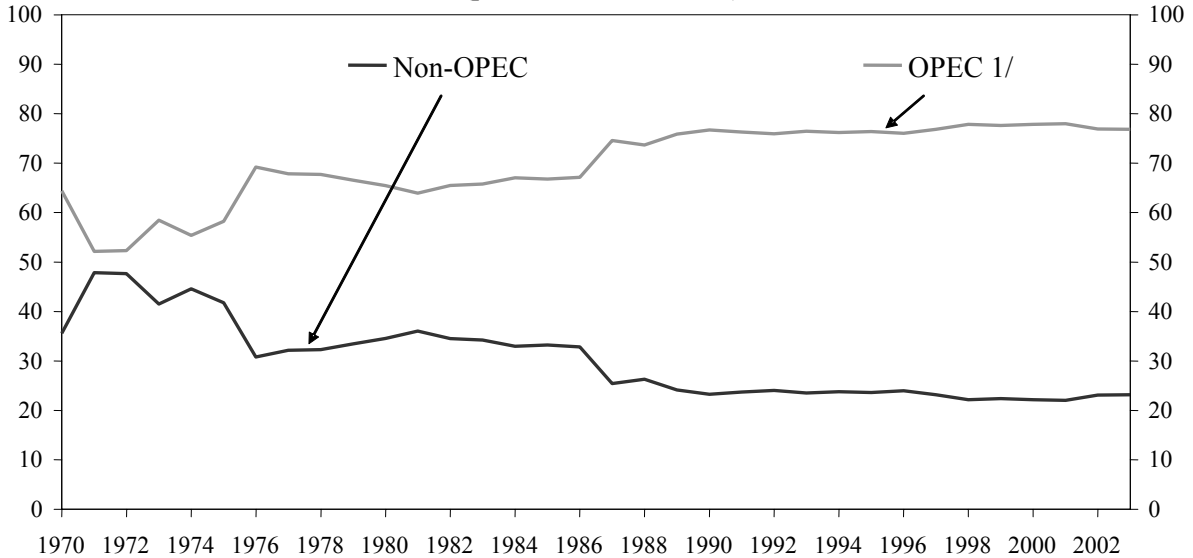


Figure 6. Proven World Oil Reserves Excluding Canadian Oil Sands  
(Percent of Total: 1212.9 billion barrels)



Sources: U.S. Dept of Energy and IMF staff

OPEC and Non OPEC Crude Oil Reserves  
(percent of World total)



Sources: British Petroleum Statistical Review and IMF staff

Note: Numbers above may not match the numbers presented in the pie chart due to disparities between data sources.

1/ OPEC prior to 1979 is an estimate based on petroleum reserve growth rates for various regions.

30. **OPEC's official policy is to balance the market and maintain oil price stability.** This policy is based on the idea that prices should be sufficiently high to provide adequate revenue and incentives for additions to capacity, but not so high as to encourage aggressive supply responses from non-OPEC producers and permanent shifts by consumers toward non-conventional sources of oil (for example, Canadian tar sands) or alternative energy sources.

31. **Looking ahead, OPEC's targeted level of spare capacity may not be sufficient to stabilize the market.** Given the experience with the spare capacity overhang of the 1980s, OPEC is likely to follow a wait-and-see approach. It has indicated that it will continue to be the "supplier of last resort" and aim for at least 1.5 million barrels of spare capacity. This level, however, is unlikely to be sufficient to stabilize prices and deal with potential supply disruptions, judging by the size of past interruptions: the 1978/79 Iranian revolution and embargo resulted a shortfall of approximately 5.6 mbd for a period of 6 months, while the 1991 Gulf crisis reduced output by over 4 mbd. That suggests a level of spare capacity in excess of 3 to 4 mbd might be needed to act as a stabilizing influence on markets.

#### *Non-OPEC producers*

32. **Non-OPEC oil producing countries' investment behavior will ultimately be constrained by their access to proven reserves.** According to the IEA, non-OPEC production will likely peak by 2010. While Russia's output has increased significantly since the 1990s, it appears to be leveling out. Substantial capacity increases are likely only in West Africa. Meanwhile, high oil prices should encourage non-OPEC producers to increase capacity, but uncertainties regarding OPEC's investment behavior and its ability to produce low cost oil would remain a disincentive.

33. **IOC drilling activity seems to have increased recently, but there is insufficient evidence to suggest they are ramping up investment plans.** While oil company indebtedness is at low levels and dividends and buybacks have increased, capital expenditure has only modestly grown. IOCs may also be constrained by years of cost cutting—owing to low oil prices—which has resulted in shortages of qualified staff and equipment. IOCs also appear to be cautious in revising their price expectations. While long-dated futures prices remain above \$30 and prospects for demand remain strong, major oil companies' pricing assumption is in the \$20 to 25 range, reflecting historical averages.

#### **Conclusions**

34. **Although persistently higher oil prices should encourage investment in the oil sector, many impediments remain and the market is likely to remain tight over the medium term.** While it is possible that oil market constraints will loosen as improvements in technology boost non-OPEC oil reserves or raise energy efficiency and reduce demand for OPEC oil, such improvements are difficult to predict and cannot be counted on. On the other hand, if demand grows more rapidly than projected, in particular in countries like China and India, there will be further upward pressure on prices.

35. **As for downstream investment, refinery capacity in industrial countries will likely remain constrained by environmental concerns.** Additions to refining capacity, therefore, will likely be concentrated in developing countries. Countries like India are already exporters of refined products and demand for their exports may increase over time.

### III. THE IMPACT OF OIL MARKET DEVELOPMENTS ON THE GLOBAL ECONOMY

#### A. Impact of Recent Price Movements

##### Global effects

36. **The increase in oil prices will have a negative impact on global growth, and increase prices in general.** However, the impact is likely to be moderate compared with previous shocks because real prices remain low relative to earlier shocks and oil intensity has fallen, because the higher prices largely reflect higher demand, and because of improved macroeconomic policies and sounder financial situations in many emerging market and developing countries.

37. **The increase in petroleum prices will tend to have a contractionary impact on world demand and growth in the near term.** The propensity to save of net petroleum exporters is likely to be higher than that of importers, particularly given the size of the windfall accruing to some of the petroleum exporters with relatively low absorptive capacity, at least in the short run. Even in countries that are self-sufficient in oil, the short-run impact on aggregate demand may be negative as there will be an internal transfer of income to the petroleum sector. Further, while oil exporters clearly stand to benefit from the direct impact of higher oil prices, lower domestic demand elsewhere and second-round effects (higher inflation, lower global growth, and higher interest rates) may cause overall activity to decline for some oil-exporting countries.

38. **Higher crude oil prices raise inflation in all countries, with the magnitude depending in part on the extent of labor market rigidities and the ability of producers to pass on cost increases to consumers.** For a permanent 20 percent increase in crude oil prices, according to IMF (2000),<sup>7</sup> core inflation after one year would be higher by 0.3 percentage point in the United States and euro area, 0.6 percentage point in Latin America, and 0.7 percentage point in Asia, with that increase fading over time. Asia tends to experience the largest increase in inflation because of a rapid pass through of oil price rises to domestic prices.

39. **Over time, the impact on activity and inflation will also depend on policy responses and supply-side effects.** Higher interest rates could slow activity further. On the

---

<sup>7</sup> This draws from "The Impact of Higher Oil Prices on the Global Economy," IMF Research Department, December 2000 (SM/00/275), which presents estimates of a permanent increase in oil prices of \$5 a barrel.

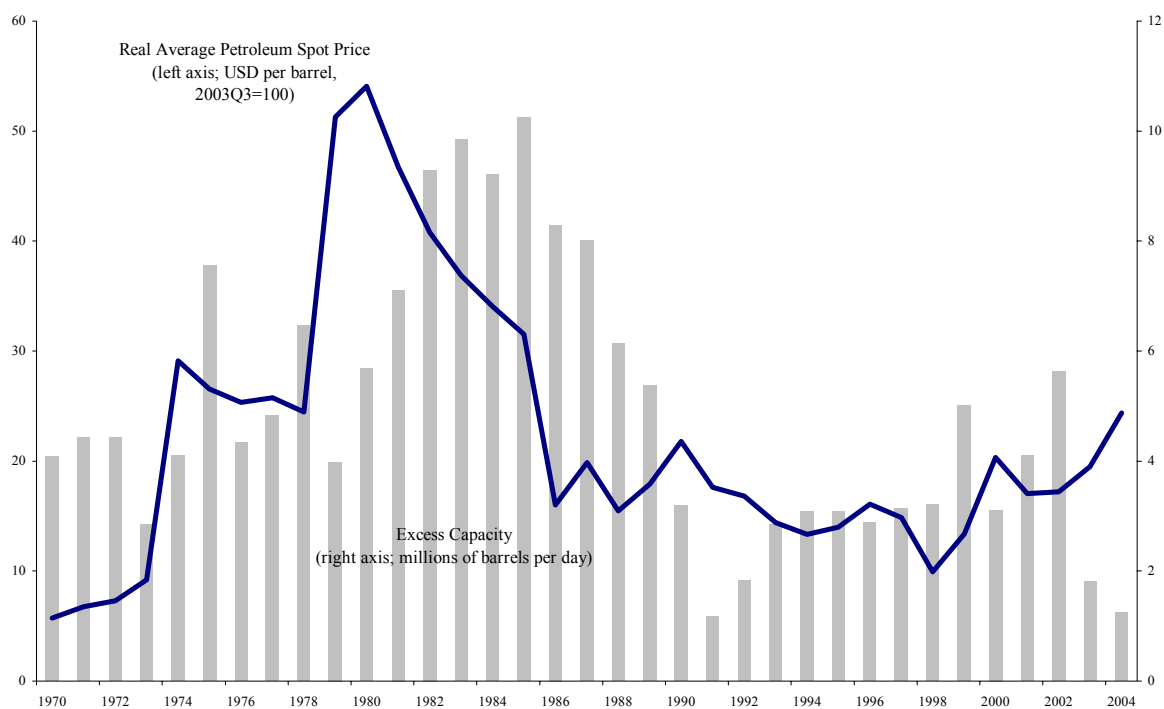
supply side, production costs will rise, possibly causing profit margins to decline. Again, this effect will be weaker than in the past for industrial countries owing to reduced dependency on oil, but could still be significant for developing countries with relatively high oil intensity (such as China and India). For oil-importing developing countries with limited access to capital markets, domestic absorption, in particular investment, could also fall because oil imports will crowd out other imports, with implications for future growth.

### **The likely impact of the higher prices so far**

40. **A number of factors suggest that the economic impact of the most recent increase in oil prices will be less severe than in the past if oil prices stabilize or fall in the period ahead.** Estimates suggest that global activity could be 0.2–0.5 percentage points lower than otherwise in 2005. A number of important developments since the 1970s influence this outcome:

- To date, the magnitude of the shock has been smaller both in terms of the increase in and level of real oil prices. Currency appreciation vis-à-vis the U.S. dollar has also mitigated the impact of higher oil prices in local currency terms for the euro area and a number of other countries.
- In addition, much of the increase in oil prices so far reflects—and to a large extent, its effects have been moderated by—increased global aggregate demand. As a result, its additional impact on world activity is likely to be smaller than if it were caused primarily by an exogenous supply shock (as in the 1970s).
- Oil intensity has fallen significantly in the past two decades in most countries.
- Inflation expectations are more anchored owing to greater monetary policy credibility and cost-push pressures are limited, reflecting mostly negative output gaps worldwide.
- Most industrial economies have become more flexible—particularly labor markets—and financial sophistication—including from hedging practices—has increased.
- Owing to the increased role of market forces—including price liberalization in industrial countries—high oil prices are likely to be less persistent with prices more responsive to weakening global growth than in the 1970s. For example, excess capacity seems to be a much stronger factor in determining oil prices than in the past (Figure 7).

Figure 7. Average Petroleum Spot Price and Excess Capacity



Source: Bloomberg, International Energy Agency and staff estimates

41. **Over the longer term and depending on the duration and extent of the price increases, there will be incentives for suppliers of energy to increase production and investment, and for oil consumers to shift towards other sources of energy.** Oil exporters in particular face longer-term challenges of using their windfall gains wisely, maintaining the competitiveness of their non-oil sectors (“Dutch disease”) and the momentum for structural reforms.

42. **The increase in international petroleum prices also results in a transfer of world income from net importers to net exporters.** The magnitude of the transfer is discussed in section IV.

### **Recycling and possible impact on financial markets**

43. **Compared with the 1970s, the recycling of oil revenues is likely to be a much less prominent issue.** The windfall is much smaller and the propensity to consume of oil exporters is likely higher than in the past. Indeed, the impact of the oil price increase in 2004 on the trade balance for advanced countries is estimated at around -0.3 percent of GDP, which is less than 1/10 of the average effect attributable to the two oil price shocks in the 1970s (Table 2). The smaller impact reflects both the reduced dependency of industrial countries on crude oil compared to the 1970s as well as the significantly smaller percentage increase in prices relative to the past. At the same time, financial markets are more integrated

and more countries have access to international capital markets. This should facilitate the recycling process.

Table 2. Impact of Nominal Oil Price Hikes  
(\$ unless otherwise stated)

|           | Oil Prices             |                         |        |                | Direct Impact on Net Trade Balance of Advanced Countries |                |
|-----------|------------------------|-------------------------|--------|----------------|--|----------------|
|           | Pre-hike <sup>1/</sup> | Post-hike <sup>2/</sup> | Change | Percent change | \$ billions  | Percent of GDP |
| 1973-1974 | 3.3                    | 11.6                    | 8.3    | 252            | -88  | -2.6           |
| 1978-1980 | 12.9                   | 35.9                    | 23.1   | 179            | -232   | -3.7           |
| 1989-1990 | 17.9                   | 28.3                    | 10.4   | 58             | -38  | -0.2           |
| 1999-2000 | 18                     | 28.2                    | 10.3   | 57             | -96  | -0.4           |
| 2003-2004 | 28.9                   | 37.8                    | 8.9    | 31             | -97  | -0.3           |

Source: IMF staff estimates

<sup>1/</sup> The average price in the first year of each episode.

<sup>2/</sup> The average price in the last year of each episode, except that 1990 is the average price for the second half of the year.

44. **Accordingly, the impact on financial markets—in particular dollar-denominated assets, which remain the major form in which oil proceeds are held—should also be limited.** While information on the composition of asset holdings is sketchy, there have not yet been significant inflows into U.S. securities markets from oil exporters. Oil exporters represented a small share of foreign inflows into U.S. securities last year: of \$30 billion in average monthly inflows into U.S. treasury securities during 2004, only \$1.5 billion came from OPEC nations. Of the \$76 billion average of total monthly inflows in 2004, approximately \$2.5 billion originated from oil-exporting countries—in contrast to around \$30 billion originating from Asia. This is an approximation derived from the published data and does not include any transactions through London, for which information on final buyers is not available. Information on other currency holdings is even more limited and drawing conclusions about specific currencies is difficult. However, given that the total increase in the oil exporters' revenues is relatively small (around \$10-15 billion per month for oil exports), a sizable effect on currency markets is unlikely.

## B. What if—the Likely Impact of Much Higher Oil Prices

### Introduction

45. **Simulation results (based on the MULTIMOD model) suggest that a rise in oil prices to about \$80—although very unlikely barring a major unforeseen event—would have considerable adverse effects on most countries, but also illustrate that such an increase is unlikely to throw the world economy into a recession comparable to that following the 1970s shocks.** Given the balance of global supply and demand, it would likely require a large supply shock to drive prices to \$80 per barrel, unlike the current price

increase, which has been driven in large part by demand. While it is hard to estimate the impact of much higher prices with any precision (especially for developing countries), simulation results provide some insight into the likely scenarios. In estimating the potential impact of higher prices, the changes in the oil intensity of economic activity and the gains in monetary policy credibility since the 1970s are taken into account.

46. **The effect of a rise in prices in 2005 to \$80 per barrel (a level close to the average of the late 1970s and early 1980s in real terms) is estimated to reduce industrial country growth by  $\frac{1}{2}$ – $\frac{3}{4}$  percentage points**, with the effect rising to over  $1\frac{1}{2}$  percentage points if the shock persists longer and confidence is affected in a manner comparable to previous large oil shocks.

47. **The impact on activity in developing countries could be in the  $1$ – $1\frac{1}{2}$  percent range, but for some countries, it could approach or surpass 3 percent**, especially if external financing were an issue, the shocks were persistent, or confidence were adversely affected. The global impact could be mitigated if activity among oil exporters rises more rapidly than assumed here.

48. **These effects, while certainly not negligible, would be rather limited compared with those experienced following the 1970s shocks.** This reflects the changes in the global environment—oil intensity and policy credibility—over the past two decades. At the same time, however, it should be recognized that there are downside risks to the estimates—for example, confidence could be affected significantly, the shock could persist longer than assumed here, or financing current account deficits could be a major issue.

#### **Impact of much higher oil prices on advanced economies**

49. **This section considers the effect on advanced economies of oil prices rising to \$80 per barrel in 2005 and declining thereafter back to the baseline by 2009—reflecting lower activity and demand for oil, and higher supply.** The section also briefly considers a scenario with prices rising to \$120. The results do not explicitly take into account domestic petroleum pricing issues, which could have implications for the degree of substitution and fuel conservation efforts.

50. **A rise to \$80 per barrel would reduce U.S. GDP growth by about 0.8 percent in the first year, with a somewhat smaller effect for the euro area, Japan, the United Kingdom, and industrial countries as a group** (Table 3). The impact is more pronounced in the U.S. due to higher oil intensity compared to the other countries.

Table 3. Impact of an \$80 Price of Oil in 2005  
(Deviations from the WEO baseline in percentage points)

|                          | CPI Inflation | Real GDP Growth |
|--------------------------|---------------|-----------------|
| United States            | 1.3           | -0.8            |
| Euro Area                | 0.9           | -0.6            |
| Japan                    | 0.9           | -0.7            |
| United Kingdom           | 0.9           | -0.4            |
| All Industrial Countries | 1.0           | -0.6            |

Source: Estimates by IMF staff

51. **The impact of higher oil prices on real GDP growth will be greater for increases perceived to be persistent rather than transitory, and may be higher if business and consumer confidence is damaged.** Estimates suggest that GDP growth would be 0.3-0.5 percentage points lower for increases seen as persistent. While it is difficult to predict the effects of uncertainty on confidence, based on experience of the 1970s, a severe fall in confidence could reduce U.S. GDP growth by a further 0.8 percentage points (relative to the base case) in the first year.

52. **In the face of a much larger shock, inflationary expectations may increase significantly and credibility may be threatened.** For example, if the price of oil were to rise to \$120, U.S. CPI inflation could rise above 5 percent in the first year and GDP growth decline by 2.3 percentage points. In that case delaying interest rate hikes could be costly if inflation expectations were to ratchet upwards, and could result in lower output over the medium term to re-anchor inflation expectations at low levels.

### Impact on emerging market and developing countries

53. **While it is difficult to estimate the final impact on activity of a rise in prices, especially given uncertainties about the policy response and external financing, the near-term impact of a rise in prices to \$80 per barrel in emerging market and developing country regions is likely to be larger than for advanced countries** (Table 4). These results are based on very simple models that capture the impact on consumption and investment of real income losses and the impact on exports of weaker industrial country

Table 4. Impact on GDP Growth in Developing and Emerging Market Net Oil Importing Countries 1/  
(in percentage points)

|                            | Base Case | Higher Persistence |
|----------------------------|-----------|--------------------|
| <b>Total</b>               | -0.8      | -1.3               |
| Africa                     | -0.9      | -1.4               |
| Central and Eastern Europe | -0.8      | -1.2               |
| CIS and Mongolia           | -1.0      | -1.7               |
| Developing Asia            | -0.8      | -1.3               |
| Western Hemisphere         | -0.8      | -1.4               |
| Newly Industrialized Asian | -0.7      | -1.2               |
| HIPC                       | -1.7      | -2.7               |

1/ Estimates by IMF staff

growth, both owing to higher oil prices. Interest rate and supply-side effects—which are likely to take longer to have an impact—are incorporated only judgmentally.



54. **These results suggest that the overall effect on activity in oil-importing developing and emerging countries (including the newly industrialized Asian economies) could be in the range of 1–1.5 percent of GDP, depending on the persistence of the shock.**

55. **Three broad categories of country can be identified.**

- In the first group—countries with strong external positions and some room for maneuver in fiscal policy, the impact on activity is unlikely to be higher than the ranges reported above, as the external vulnerabilities and risks of a crisis in these countries are insignificant.
- In the second group, which consists of those countries with lower reserve ratios relative to the impact of the shock, where external financing needs may be greater, activity could be affected by more than estimated above. For the countries in this group, to the extent there will be efforts to finance the deficit in international capital markets (to mitigate the impact on activity), interest rate spreads could increase. Borrowing countries could, in addition, be hurt by higher global interest rates, although the transfer of resources from oil-exporting countries could mitigate this effect. To reduce external vulnerabilities and risks of financial crises, macroeconomic adjustment and supporting policies would be needed.
- The third group of countries, those with low per-capita incomes, already high external debts, and limited access to international capital markets (including the HIPC), typically would find it difficult to absorb any impact and would need grants and concessional assistance to avoid drastic and destabilizing macroeconomic adjustments.

#### IV. IMPACT OF HIGHER PRICES ON EXPORTERS

56. **This section is based on a staff review of net oil exporters' response to the oil windfall in 2004—05, with a focus on the extent to which they spent or saved the windfall.** The staff work was done mainly in September 2004 through a survey of area department desks, and does not incorporate the final outcomes for the full year 2004. The results should therefore be seen as preliminary estimates. They should also be seen as countries' short-run responses, which might differ from their responses over a longer period if there are lags in spending windfalls.

57. **Net exporters of hydrocarbons are receiving substantial windfall gains from the high oil and gas prices** (Tables 5 and 6).

- The overall export windfall from higher oil and gas prices for net hydrocarbon exporters is estimated to have been \$200 billion in 2004 and projected at \$280 billion

Table 5. Hydrocarbon Net Exporting Countries' Oil and Natural Gas Exports and Fiscal Revenues in 2003

| Country Name               | Oil and Gas Exports as a percent |                  | Country's fiscal oil and gas revenue as share |
|----------------------------|----------------------------------|------------------|---|
|                            | Of world oil and gas exports     | Of country's GDP | Of country's GDP                              |
| Saudi Arabia               | 13.5                             | 38.3             | 28.1  |
| Russian Federation         | 11.8                             | 17.0             | 6.0   |
| Norway                     | 6.5                              | 18.4             | 12.2  |
| United Arab Emirates       | 4.7                              | 36.8             | 35.8  |
| Iran, Islamic Rep.         | 4.3                              | 19.8             | 16.3  |
| Nigeria                    | 4.3                              | 46.1             | 28.0  |
| Algeria                    | 3.9                              | 36.2             | 26.4  |
| United Kingdom             | 3.8                              | 1.3              | 0.4   |
| Netherlands 1/             | 3.4                              | 4.0              | n.a.  |
| Venezuela, Rep. Bol.       | 3.3                              | 24.6             | 23.0  |
| Kuwait                     | 3.0                              | 44.8             | 48.1  |
| Mexico                     | 3.0                              | 3.0              | 7.9   |
| Indonesia                  | 2.4                              | 6.3              | 4.5   |
| Canada                     | 2.4                              | 1.7              | 0.2   |
| Libya                      | 1.9                              | 47.6             | 40.5  |
| Iraq 1/ 2/                 | 1.6                              | 38.4             | n.a.  |
| Qatar                      | 1.5                              | 47.0             | 24.9  |
| Oman                       | 1.5                              | 43.1             | 35.4  |
| Angola                     | 1.4                              | 65.3             | 28.3  |
| Malaysia                   | 1.2                              | 7.4              | 4.3   |
| Kazakhstan                 | 1.1                              | 23.6             | 6.2   |
| Argentina                  | 0.9                              | 4.3              | 1.7   |
| Bahrain, Kingdom of        | 0.8                              | 53.9             | 24.4  |
| Syrian Arab Republic       | 0.7                              | 19.3             | 14.4  |
| Brunei Darussalam          | 0.6                              | 80.0             | 29.1  |
| Denmark                    | 0.6                              | 1.8              | 0.7   |
| Vietnam                    | 0.6                              | 9.8              | 5.3   |
| Trinidad and Tobago        | 0.6                              | 34.4             | 11.5  |
| Yemen, Rep.                | 0.5                              | 30.5             | 23.6  |
| Colombia                   | 0.5                              | 4.4              | 2.9   |
| Egypt, Arab Rep.           | 0.5                              | 3.9              | 0.8   |
| Turkmenistan               | 0.5                              | 26.6             | 9.3   |
| Equatorial Guinea          | 0.5                              | 96.6             | 23.7  |
| Ecuador                    | 0.4                              | 9.7              | 13.2  |
| Azerbaijan                 | 0.4                              | 31.5             | 15.2  |
| Congo, Rep.                | 0.3                              | 59.1             | 20.4  |
| Sudan                      | 0.3                              | 12.3             | 9.5   |
| Gabon                      | 0.2                              | 42.6             | 16.2  |
| Cameroon                   | 0.2                              | 7.6              | 4.5   |
| Côte d'Ivoire              | 0.1                              | 4.9              | 1.3   |
| Bolivia                    | 0.1                              | 6.1              | 4.6   |
| Papua New Guinea           | 0.1                              | 13.0             | 4.6   |
| Uzbekistan                 | 0.1                              | 3.8              | 5.2   |
| Congo, Dem. Rep.           | 0.0                              | 4.4              | 1.4   |
| Chad                       | 0.0                              | 8.3              | 0.5   |
| <b>Total: 44 Countries</b> | <b>90.1</b>                      |                  |   |

Source: IMF staff

1/ Not in the original survey sample

2/ Numbers according to the U.S. Department of Energy

Table 6. Oil and Gas Export and Revenue Windfalls

|  | Oil and Gas Export Windfall 1/ |                     |                               |                     | Oil and Gas Revenue Windfall 2/ |                     |                               |                     |
|--|--------------------------------|---------------------|-------------------------------|---------------------|---------------------------------|---------------------|-------------------------------|---------------------|
|  | 2004                           |                     | 2005                          |                     | 2004                            |                     | 2005                          |                     |
|  | (in billions of U.S. dollars)  | (in percent of GDP) | (in billions of U.S. dollars) | (in percent of GDP) | (in billions of U.S. dollars)   | (in percent of GDP) | (in billions of U.S. dollars) | (in percent of GDP) |
| High-Income Countries 3/                                 | 53.3                           | 7.8                 | 69.8                          | 9.1                 | 15.2                            | 4.2                 | 25.7                          | 6.0                 |
| Upper Middle-Income                                      | 54.0                           | 6.7                 | 76.9                          | 9.1                 | 45.6                            | 4.6                 | 66.5                          | 6.2                 |
| Lower-Middle Income                                      | 67.1                           | 6.9                 | 93.9                          | 8.9                 | 31.3                            | 2.5                 | 56.1                          | 4.3                 |
| Low-Income Countries                                     | 24.3                           | 11.9                | 40.0                          | 18.0                | 11.2                            | 3.8                 | 21.4                          | 7.1                 |
| Total  | 198.7                          | 8.5                 | 280.6                         | 11.7                | 103.3                           | 3.7                 | 169.8                         | 6.0                 |
| Share of the export windfall captured as fiscal revenue: |                                |                     |                               |                     | 52.0                            |                     | 60.5                          |                     |

Source: WEO, IMF staff

1/ Export windfall is the oil and gas export earnings of the reported year minus 2003 oil and gas export earnings.

2/ Revenue windfall is the oil and gas revenue earnings of the reported year minus 2003 oil and gas revenue earnings. The revenue windfall also includes tax revenue from the domestic sale of oil and gas, which might be important for some countries.

3/ Income level based on World Bank categories using per capita Gross National Income: high income = \$9,386 or more, upper middle income = \$3,086-9,385, lower middle income = \$755 or less.

in 2005, representing 8–12 percent of these countries' GDP, on average. The windfall is defined here as the projected difference in the U.S. dollar value of oil and gas exports in 2004 and 2005 (using WEO price projections for 2005), compared to 2003. The average export windfall masks wide variations for individual countries, from less than 1 percent of GDP in some industrial countries and Mexico to over 30 percent of GDP in Chad and Equatorial Guinea.

- On average, some 50–60 percent of this export windfall accrues to governments as additional revenue.<sup>8</sup> Like the export windfall, the fiscal revenue windfall is defined here relative to the outturn in 2003. The average revenue windfall also masks large variations, with governments in some large oil-producing countries like Kuwait, Nigeria, and Saudi Arabia capturing most of the export windfall and governments in several other countries (including some in the low-income group) receiving only a small part of the windfall.

58. **Countries are generally estimated to have saved the bulk of the export windfall.** Between 2003 and 2004, hydrocarbon export proceeds relative to GDP are estimated to have risen by 3½ percentage points, whereas the current account improved by 3 percentage points. This suggests that the private and public sectors taken together saved more than four fifths of

<sup>8</sup> The revenue windfall also includes tax revenue from the domestic sale of oil and gas, which might be important for some countries. However, producing countries often maintain domestic oil and gas prices relatively constant through subsidies, so that the change in revenue captures for the most part the increase due to higher world prices.

the export windfall.<sup>9</sup> During the same period, the average NIR accumulation was estimated to have been about \$3 billion.

59. **However, governments have allowed the underlying fiscal position, as measured by the non-oil fiscal balance, to weaken somewhat** (Table 7). In a subsample of 28 countries for which the data were available, the non-oil fiscal balance relative to non-oil GDP was estimated to have deteriorated on average by ½ percentage point in 2004. This represents about one third of the average increase in hydrocarbon revenue as a share of GDP during the same period. The deterioration in the non-oil fiscal balance is mostly attributed to countries highly dependent on hydrocarbon revenues (defined here as countries where oil revenue accounted for 10 percent or more of GDP in 2003), where the windfall is associated with a procyclical fiscal policy stance. These countries benefited from a higher windfall, but they also saw their non-oil fiscal balance deteriorate by 1 percentage point of non-oil GDP, compared with an improvement of ¾ points in countries less dependent on oil and gas revenue.

Table 7. Impact of the Change in Hydrocarbon Revenue on Key Indicators  
(In percent of GDP)

|                                      | 2004/2003 1/                |                             |   | 2004/2003 1/    |                |             |                              |
|--------------------------------------|-----------------------------|-----------------------------|---|-----------------|----------------|-------------|------------------------------|
|                                      | Change in:                  |                             | Share of hydrocarbon exports captured in fiscal revenue | Change in:      |                |             |                              |
|                                      | Hydro-carbon export revenue | Hydro-carbon fiscal revenue |   | Expend-iture 2/ | Nonoil revenue | Public debt | Nonoil fiscal balance 2/, 3/ |
| Full sample                          |                             |                             |   |                 |                |             |                              |
| Average                              | 3.4                         | 1.1                         | 32.2  | -1.0            | -0.4           | -6.3        | -0.4                         |
| Median                               | 1.6                         | 0.6                         | 36.5  | -0.7            | -0.5           | -2.7        | -0.1                         |
| Sample size                          | 43.0                        | 42.0                        | ...   | 41.0            | 41.0           | 39.0        | 28.0                         |
| Share of hydrocarbon revenue in GDP: |                             |                             |   |                 |                |             |                              |
| 10 percent or greater                |                             |                             |   |                 |                |             |                              |
| Average                              | 3.7                         | 1.8                         | 49.7  | -1.6            | -0.6           | -7.5        | -1.1                         |
| Median                               | 3.6                         | 1.4                         | 40.3  | -1.7            | -0.5           | -5.3        | -0.3                         |
| Sample size                          | 23.0                        | 23.0                        | ...   | 21.0            | 22.0           | 20.0        | 18.0                         |
| Less than 10 percent                 |                             |                             |   |                 |                |             |                              |
| Average                              | 3.2                         | 0.1                         | 3.4   | -0.5            | -0.2           | -5.0        | 0.8                          |
| Median                               | 0.7                         | 0.2                         | 29.3  | -0.3            | -0.4           | -2.1        | 0.9                          |
| Sample size                          | 20.0                        | 18.0                        | ...   | 20.0            | 19.0           | 19.0        | 10.0                         |

Source: IMF staff

1/ Difference between the estimates for 2004 in percent of 2004 GDP, and the 2003 outturn as a share of 2003 GDP.

2/ Expenditure figures for Libya exclude payments made in 2003 and 2004 on account of the Lockerbie settlement.

3/ In percent of non-oil GDP.

<sup>9</sup> This result, like those in the three following paragraphs, should be interpreted carefully. The estimated and projected changes in external and fiscal balances in 2004–05 reflect not only the higher oil and gas prices, but also other factors, such as exchange rate movements and business cycle effects, as well as the impact of discretionary fiscal policy changes unrelated to the hydrocarbon windfall.

60. **The windfall is also associated with savings in the form of public debt reduction in most countries, and an accumulation of assets in a special fund in 40 percent of the countries.**<sup>10</sup> According to staff estimates, the median reduction in the public debt to GDP ratio was about 3 percentage points in 2004.<sup>11</sup> Highly oil dependent economies showed a median reduction of 4.5 percentage points, compared to 2 percentage points for the other countries. Countries with a special fund (about 40 percent of the sample) are estimated to have saved on average about 6 percent of GDP in 2004, and 8 percent in 2005.

61. **As a share of GDP, low-income countries received a larger export windfall, but governments captured a smaller part of that windfall than in more advanced economies** (Table 8). This may be attributed in part to less efficient tax systems and in part to governance issues (discussed below). However, there is also some evidence that the windfall was associated with a more favorable underlying fiscal stance and a significant reduction in public debt.<sup>12</sup> In contrast, governments in the higher income groups tended to follow modestly expansionary fiscal policies, with the exception of Libya.<sup>13</sup>

62. **Institutional arrangements to handle hydrocarbon revenues vary across countries.** Almost half the countries surveyed use a formal oil fund or a fiscal rule, but only one third of the countries have a formal budget process for handling the oil windfall. Uses of the windfall are subject to parliamentary scrutiny in only 40 percent of the countries. There is some evidence that the existence of a formal mechanism to handle the oil windfall leads to higher savings, as countries with a special fund tend to place most of the oil export windfall in a fund. However, oil funds are not a panacea. The record regarding the capacity of the special funds to insulate spending from hydrocarbon revenue volatility is mixed, and in some cases savings have gone hand in hand with higher borrowing (Table 9).<sup>14</sup> Low-income

---

<sup>10</sup> The results in table 7—in particular the reduction in expenditure and public debt—are due in part to higher GDP arising from higher oil prices.

<sup>11</sup> In the case of public debt, the reduction appears dominated by factors other than the oil windfall in some countries (for example, Argentina). In addition, in some cases the oil fund might be included in the definition of public debt.

<sup>12</sup> Two low-income countries (Cameroon and the Democratic Republic of Congo) have formal PRGF arrangements which also help explain the fiscal discipline. For Cote d'Ivoire, the current political crisis is responsible for the collapse of expenditures.

<sup>13</sup> About one half of the deterioration in the non-oil fiscal balance in Libya was due to the impact of the Lockerbie settlements in 2003 and 2004. However, even after removing these payments from expenditure figures, the deterioration in the non-oil fiscal balance in 2004 still remains the largest in the sample (15 percentage points).

<sup>14</sup> For a review of the experience and fiscal policy implications of such mechanisms, see Davis, J., Ossowski, R., J. Daniel and S. Barnett, 2003 “Stabilization and Savings Funds for Nonrenewable Resources: Experience and Fiscal Policy Implications,” in *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, Davis et al., ed. by J.M. Davis, R. Ossowski, and

(continued)

countries are more likely to lack institutions and mechanisms to handle the oil fund, and not to subject the uses of the windfall to parliamentary approval.

Table 8. Impact of the Change in Hydrocarbon Revenue on Key Fiscal Indicators, by Income Group  
(In percent of GDP)

| Income Group 5/     | 2004/2003 1/                |                             |   | 2004/2003 1/   |                 |             |                               |
|---------------------|-----------------------------|-----------------------------|---|----------------|-----------------|-------------|-------------------------------|
|                     | Change in:                  |                             | Share of hydrocarbon exports captured in fiscal revenue | Change in:     |                 |             |                               |
|                     | Hydro-carbon export revenue | Hydro-carbon fiscal revenue |   | Expenditure 2/ | Non-oil revenue | Public debt | Non-oil fiscal balance 2/, 3/ |
|                     | (In percent)                |                             |   |                |                 |             |                               |
| High Income         |                             |                             |   |                |                 |             |                               |
| Average             | 3.7                         | 1.0                         | 27.2  | -2.0           | -0.8            | -4.0        | -0.1                          |
| Median              | 3.6                         | 0.1                         | 1.4   | -1.6           | -0.6            | -1.8        | -0.2                          |
| Sample              | 9.0                         | 9.0                         | ...   | 9.0            | 9.0             | 7.0         | 7.0                           |
| Upper Middle Income |                             |                             |   |                |                 |             |                               |
| Average             | 3.1                         | 1.4                         | 45.2  | -0.6           | -0.4            | -13.5       | -2.7                          |
| Median              | 1.7                         | 0.7                         | 39.2  | 0.3            | -0.6            | -8.3        | -0.2                          |
| Sample              | 9.0                         | 9.0                         | ...   | 9.0            | 9.0             | 9.0         | 6.0                           |
| Lower Middle Income |                             |                             |   |                |                 |             |                               |
| Average             | 3.3                         | 1.0                         | 29.9  | -0.4           | -0.4            | -2.3        | -0.2                          |
| Median              | 1.4                         | 0.8                         | 54.5  | -0.4           | -0.3            | -2.2        | -0.3                          |
| Sample              | 12.0                        | 11.0                        | ...   | 11.0           | 10.0            | 11.0        | 7.0                           |
| Low Income          |                             |                             |   |                |                 |             |                               |
| Average             | 3.6                         | 0.9                         | 24.2  | -1.3           | -0.2            | -6.5        | 0.6                           |
| Median              | 0.6                         | 0.2                         | 34.1  | -1.7           | -0.2            | -2.6        | 2.1                           |
| Sample              | 13.0                        | 13.0                        | ...   | 11.0           | 12.0            | 10.0        | 7.0                           |

Source: IMF staff

1/ Difference between the 2004 WEO projection in percent of 2004 GDP, and the 2003 outturn as a share of 2003 GDP.

2/ Expenditure figures for Libya exclude payments made in 2003 and 2004 on account of the Lockerbie settlement.

3/ In percent of non-oil GDP.

4/ Income level based on World Bank categories using per capita Gross National Income: high income = \$9,386 or more, upper middle income = \$3,086-9,385, lower middle income = \$766-3,035, low income = \$765 or less.

Table 9. Share of the Windfall Saved in Special Funds 1/

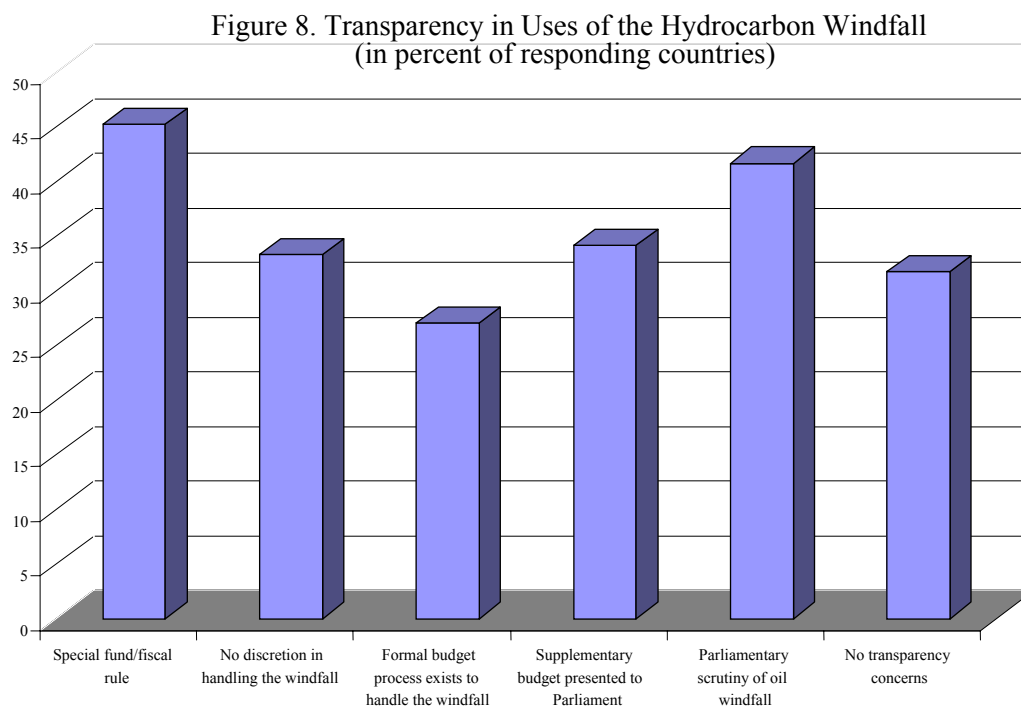
|                                      | Change in hydrocarbon exports 04/03 | Share of revenue saved in special fund | Net fund accumulation (in percent of GDP) | Number of countries |
|--------------------------------------|-------------------------------------|--|---|---------------------|
| Share of hydrocarbon revenue in GDP: |                                     |  |   |                     |
| ≥ 10 percent                         | 58.4                                | 82.6                                   | 7.8                                       | 12                  |
| < 10 percent                         | 38.8                                | 38.5                                   | 1.8                                       | 5                   |

Source: IMF staff

1/ For the 17 countries reporting information on the hydrocarbon fund's position.

A. Fedelino (Washington: International Monetary Fund). See also Section VI.D for further discussion of oil funds.

63. **There appears to be much scope in some countries for improving budgetary transparency in the handling of oil windfall revenues** (Figure 8). For roughly one third of the countries, staff teams have serious transparency concerns, and for another third they have at least some transparency concerns. In most cases, these concerns relate to the manner in which the windfall was used, based on ad hoc decisions and not under parliaments' scrutiny. There are also concerns related to transparency of fiscal oil receipts. In some cases oil revenue accrues to NOCs, where transparency in their accounts may be an issue, and in other cases they accrue directly to the budget. There may also be transparency and data accuracy issues related to IOCs. Transparency issues in the oil sector are discussed in Section VI. E below.



Source: IMF staff survey

## V. FINANCING NEEDS FOR DEVELOPING COUNTRIES FROM HIGHER OIL PRICES

64. **This section looks at the additional financing needs of emerging market and developing countries arising from the recent price increases and the higher expected prices projected for 2005.** It is based on staff estimates for each country done in October 2004, updated to reflect more recent price developments. Given the uncertainties inherent in projections of policy responses, its results should be viewed as approximations.

## A. Estimates of the Incremental Potential Financing Gap

65. **In the absence of policy and other adjustments, the additional financing needs would be sizable.** Area departments estimates of the potential incremental financing gap (before adjustment) are available for 111 member countries.<sup>15</sup> The picture that emerges is as follows:

- The aggregate financing gap for the 111 countries amounts to \$29 billion in 2005, equivalent to 0.5 percent of those countries' combined GDP. China and India account for over one third of the total gap in U.S. dollar terms.
- For 22 countries, the financing gap exceeds 2 percentage points of GDP (Table 10). Small island economies make up 9 of these 22 countries, and a third are African. In the case of 5 countries, the additional financing gap is more than 4 percentage points of GDP.
- The impact of higher oil prices is more pronounced in countries in Sub-Saharan Africa and Middle East and Central Asia, averaging some  $\frac{3}{4}$  percentage points of GDP; the impact on countries in Asia and the Pacific, Europe, and the Western Hemisphere averages closer to  $\frac{1}{2}$  percentage point of GDP.

Table 10. Impact of Higher Oil Prices (share of GDP)

|                     |     |
|---------------------|-----|
| Kiribati            | 7.2 |
| Samoa               | 5.1 |
| Vanuatu             | 4.8 |
| Guyana              | 4.6 |
| Cambodia            | 3.8 |
| Togo                | 3.6 |
| Solomon Islands     | 3.5 |
| Jordan              | 3.4 |
| Tonga               | 3.4 |
| Antigua and Barbuda | 3.1 |
| Moldova             | 2.9 |
| Seychelles          | 2.8 |
| Myanmar             | 2.7 |
| Bhutan              | 2.6 |
| Belize              | 2.6 |
| Mongolia            | 2.5 |
| Maldives            | 2.3 |
| Sri Lanka           | 2.3 |
| Swaziland           | 2.2 |
| Lesotho             | 2.1 |
| Ghana               | 2.0 |
| St. Lucia           | 2.0 |

Sources: IMF staff estimates and WEO

## B. The Mix between Adjustment and Financing

66. **Countries can cover their financing gaps through adjustment (both policy and endogenous—for example, exchange rate changes), reserve drawdown, and additional borrowing.**

Table 11. Adjustment/Financing Mix in 2005 (percent shares)

|                              | Policy-Related Reserves |          | Total Financing |
|------------------------------|-------------------------|----------|-----------------|
|                              | Adjustment              | Drawdown |                 |
| Sub-Saharan Africa           | 40                      | 40       | 20              |
| Asia and the Pacific         | 20                      | 77       | 3               |
| excl. China and India        | 78                      | 8        | 14              |
| Europe                       | 23                      | 62       | 14              |
| Middle East and Central Asia | 45                      | 54       | 1               |
| Western Hemisphere           | 26                      | 31       | 43              |
| Total                        | 24                      | 68       | 8               |
| excl. China and India        | 49                      | 36       | 15              |

Sources: IMF staff estimates and WEO

<sup>15</sup> The incremental financing need is calculated as the deterioration in the current account balance (before adjustment) due to the shock relative to the baseline scenario. The baseline scenario is the most recent of (i) the latest Article IV projections; (ii) the projections in the most recent Fund program; or (iii) the August 2004 WEO projections.



- The aggregate picture in terms of the financing/adjustment mix for 2005 is heavily influenced by China and India. Excluding those two countries, country teams estimate that about half of the additional financing need of \$18.2 billion will be addressed through policy-related and/or endogenous adjustment (Table 11). The bulk of the remaining financing need is expected to be covered through either lower reserve accumulation or drawdown of reserves. Additional borrowing is expected to be limited to around \$2.1 billion. In India and China, the impact of higher oil prices is expected to be absorbed fully by lower reserve accumulation.
- In general, the submissions suggest that countries in Sub-Saharan Africa, Asia and the Pacific (excluding China and India), and the Middle East are likely to rely on adjustment to offset the adverse effect of higher oil prices on the trade balance. However, for some countries this may simply reflect gains from higher commodity export prices rather than policy adjustments.
- If recourse to reserves is as projected (and in the absence of other adjustment), a number of countries would likely face a significant loss of reserve cover. In particular, 13 countries would lose more than 10 percent of their projected end-2004 reserves, of 4 or fewer months of import cover. Six of these countries already have Fund-supported programs in place, and support can be provided to them relatively quickly. If vulnerability is to be minimized, the other countries will need to consider additional policy measures and/or greater financing, including from the Fund.

### **C. Projected Need for Additional Use of Fund Resources**

67. **Staff country team estimates suggest that for the group of 111 countries the Fund could be expected to finance around \$265 million, or 13 percent of the total additional financing requirement in 2005.** These estimates have been obtained as a residual, after the impact of adjustment and other sources of financing have been taken into account. Some 14 members could require such additional use of Fund resources, representing about half of the total financing need of these countries.

68. **This potential need for additional Fund financing is relatively small.** While at first sight this might seem surprising, the impact of the current shock is expected to be more moderate compared with previous shocks because real prices remain low, oil intensity has fallen, and because the higher prices largely reflect higher demand.

69. **But even modest amounts of Fund financing can make a large difference for some member countries.** For example, for the 14 countries expected to require additional Fund financing, this would help replenish a third of their projected reserve loss. The Fund stands ready to provide support for adjustment where justified by specific country circumstances. The Fund's response is discussed further in Section VI.C.

## VI. POLICY RESPONSE TO HIGHER OIL PRICES

70. **This section draws together the main considerations that guide the staff's advice to member countries on the response to an increase in petroleum prices.** While the higher prices recently observed are likely to include a persistent component, there is substantial uncertainty and policies should be cautious, reflecting the asymmetric costs of adjustment. Although the response will need to be tailored to the circumstances of particular countries and the specific nature of the shock, there are general principles that apply to all countries. The analysis covers policies relating to the short-run adjustment to a petroleum price increase, and also structural and transparency advice that underpins good policy design. As such, it is meant to cover principles that would have a lasting value and could guide advice during the current episode and in the future.

### A. Background

71. **Given the uncertainty in oil price projections and the asymmetric costs of adjustment, the policy advice should emphasize the need for caution.** It is difficult to identify the permanent and temporary components of an oil price change with any certainty.<sup>16</sup> Moreover, market predictions have proven wrong in the past. Macroeconomic policies should incorporate suitable cushions, at least until there is more evidence of the likely persistence of higher prices, because of the costs of adjustment. Typically, government spending proves difficult to streamline following expansions, as spending programs become entrenched and take on a life of their own. On the other hand, large expenditure reductions in the face of negative external shocks may lead to social instability, discouraging investment and reducing future growth.

72. **The Fund's policy advice should take into account specific country circumstances.** Petroleum exporters and importers are both heterogeneous groups. This reinforces the case for differentiated policy response across the Fund membership, and for the Fund to support such a response in its surveillance and lending activities. Specifically, as elaborated in what follows, the Fund should:

- In its surveillance of net petroleum exporters, support a judicious mix of saving and spending of the windfall, depending on individual country circumstances, according to the criteria outlined below;
- In its surveillance of net petroleum importers, support increased recourse to market financing to smooth adjustment to the shock by those countries that can do so without

---

<sup>16</sup> Statistical evidence suggests that the uncertainty of long-term price projections is very large and increasing over time (see Cashin, Liang, and McDermott, December, 2000, "How Persistent Are Shocks to World Commodity Prices?", IMF Staff Papers). See also the December 2000 Research Department paper issued to the Board, "The Impact of Higher Oil Prices on the Global Economy" (SM/00/275).

jeopardizing short-term macroeconomic stability and longer-term debt sustainability;  
and

- Explore the scope for increasing its financial support to those importers that are especially hard hit by the shock, but lack adequate access to market financing to smooth the adjustment process over a realistic time period.

73. **As a general principle, the higher petroleum prices should be passed on to domestic users (consumers and intermediate producers) on efficiency and fiscal grounds.** This is elaborated in sub-section D below.

## **B. Near-Term Policy Responses**

### **Net petroleum exporters**

74. **Policy advice to net petroleum exporters on the proportion of the windfall that can be prudently spent needs to take into account the diversity of countries in this group and should reflect several factors:**

- The current macroeconomic situation (aggregate demand, capacity utilization, inflation);
- The size of the oil windfall relative to the economy;
- The size of proven oil reserves in the ground;
- The existing liquidity cushion;
- The external and public debt situation; and
- The capacity to identify and implement good spending programs.

75. **Given the uncertainty about the duration of higher oil prices, oil exporters should react prudently to the inevitable pressures to spend the windfall.** Macroeconomic policies should be conservative in reacting to higher prices whose permanence is uncertain. Such a cautious approach would limit the need to undertake costly adjustment if prices were to fall faster or more sharply than expected. The cost of such adjustment would be particularly large if the economy is not well diversified.

76. **The initial distribution of the windfall in oil-exporting countries will depend on the institutional characteristics of the oil sector, with implications for the appropriate policy response.** In countries where oil production is mostly privately owned, the government will share in the windfall through taxation and in some cases through its equity participation in oil companies. Where a national oil company monopolizes oil production, the

windfall will accrue entirely to the public sector, and the split of the proceeds between the oil company and the government will be determined by the fiscal regime in place.<sup>17</sup>

77. **The terms of trade gain may have an expansionary impact on aggregate demand.** In particular, among countries where there is significant private sector participation in oil production, the oil boom may lead to some expansion of private oil sector investment, with knock-on effects on demand and activity in the non-oil sector, although investment will respond fully only with a lag. The boom may also affect private demand indirectly through wealth effects. These effects may be less pronounced if the oil sector is publicly owned. The resulting surges in private sector demand may raise concerns about inflation and put upward pressure on the currency, especially if the supply response in these economies is constrained by structural rigidities.

78. **A short-run tightening of macroeconomic policies may be appropriate in cases where booming demand raises concerns and the oil-related foreign exchange inflow is large relative to the absorptive capacity of the economy.** The specific mix of fiscal, monetary, and exchange rate policies in these countries will depend on a number of considerations which are summarized in what follows. The windfall may also provide an opportunity to accelerate import liberalization where relevant and other steps to increase the supply response of the economy.

79. **A number of oil-exporting countries could and should use part of the windfall to regularize their relations with creditors or phase out expensive oil-backed loans.** By using part of the oil proceeds, reserve accumulation would be lower, thus reducing the need to sterilize reserves. Moreover, a reduction of external debt would reduce vulnerabilities and possibly the spreads on new loans.

80. **The increase in petroleum revenues, particularly if perceived as in part permanent, will place upward pressure on the real exchange rate of petroleum exporters.** An appreciation of the currency in real terms may hinder the development of the non-petroleum tradable sector and, in particular, could constrain growth, employment creation, and poverty reduction in low-income petroleum-exporting countries. Shifting the composition of government spending toward tradable sectors may attenuate these effects.

---

<sup>17</sup> In some cases the government may receive part of the windfall with a lag. This will be the case in particular if income taxes are significant, as often these taxes are collected on an advance payment basis, with a final settlement occurring in the next tax year. In some countries where the oil sector is in private hands, governments may try to appropriate a larger share of the windfall through the introduction of special taxes, such as export taxes with progressive tax rates that depend on the oil price, as in Argentina.

### *Fiscal policy*

81. **Fiscal policy should smooth the short-run response of public spending to the petroleum windfall, given the uncertainty inherent in price forecasts.** Volatile fiscal policies destabilize aggregate demand, exacerbate uncertainty, and induce macroeconomic volatility. Also, large swings in expenditure reduce its quality and efficiency, and are difficult to manage, given institutional and social constraints on retrenchment of most current spending programs once they are put in place. In a number of countries, expenditure volatility has also been associated with procyclical capital spending. The more dependent on oil revenue the country and the government, the higher the risks associated with procyclical spending of the oil revenues.

82. **The non-oil primary fiscal deficit should be set in a long-term framework, compatible with the sustainable consumption of nonrenewable oil resources, and with a comprehensive coverage.** This would generally imply turning part of the fiscal revenue from extracting oil into assets, the return on which would help sustain fiscal policy in the post-oil period. The share of the windfall to be saved would depend on individual country circumstances. (See Box 2 on insights of Hotelling's rule for optimal resource management by oil exporters.)

#### **Box 2. Hotelling's Rule for Optimal Resource Management**

- Hotelling's central thesis in the economics of exhaustible resources is the "Hotelling rule," which states that the price of an exhaustible resource must grow at a rate equal to the rate of interest, both along the efficient extraction path and in a competitive resource industry equilibrium. Hotelling also asked how extraction and prices would behave under various other market conditions, including monopoly, extraction costs that rise with cumulative output, fixed investments, and uncertainty about reserves or future demand.
- In practice, prices in oil futures markets generally do not follow the Hotelling rule because of uncertainty about future supply and demand conditions. Most of the time prices on oil futures exhibit backwardation (i.e., future prices are lower than spot prices). Relatively higher spot prices reflect the "convenience yield" for holding inventories of (and extracting) oil today as a hedge against supply shortages in the future. Recently developed analytical frameworks that highlight the central role of future uncertainties yield the Hotelling rule as a special case without uncertainty.
- The Hotelling rule is an arbitrage argument based on the notion that competition will lead to the equalization of returns across different assets, such as oil under the ground and above-ground financial assets. The same principles imply that under certain conditions, higher oil prices could justify higher public investment in oil producing countries.

83. **For some countries, higher oil revenues provide an opportunity to increase public spending on priority economic and social goals or, when appropriate, reduce distortive taxes.** For countries with relatively strong financial positions, a sustainable fiscal position (taking into account oil reserves in the ground and net financial liabilities), and a reasonable capacity to identify and implement good spending programs, an increase in the non-oil fiscal deficit would be appropriate, provided it does not lead to excessive demand pressures.

- In countries meeting these conditions, a significant part of the oil windfall could be used to finance additional high-quality expenditures, such as investment in key infrastructure and efficient social spending. In a number of oil-producing countries, important infrastructure gaps hamper the development of the non-oil sector. These countries could use part of the windfall to finance productive investment and public infrastructure with high rates of return. This way, oil in the ground would be turned in part into non-oil capital assets (both physical and human) that could raise the growth rate of non-oil GDP over time. To facilitate this, oil producers should develop a stock of projects from which the highest-yielding ones could be selected.<sup>18</sup>
- The windfall could also facilitate pushing ahead with reform agendas and tackling those structural problems that are a serious impediment to growth, for example in the tax system, the civil service, pension systems, labor markets, and public enterprises. In particular, it could help finance social safety nets to protect vulnerable groups from the impact of such reforms. In countries with significant skills mismatches between labor supply and demand, part of the windfall could also be used to fund education reforms and training programs aimed at reducing such mismatches.
- Countries should give priority to undertaking expenditures that do not give rise to significant permanent commitments. Spending that creates substantial future entitlement programs and recurrent outlays may be difficult to scale down if the need arises in the event of oil price declines. Also, the oil windfall and the opportunities it creates for greater corruption add urgency to the need to improve fiscal transparency and enhance the quality of public spending (see subsection E below).
- The formulation of an overall fiscal policy response to oil price volatility may be aided by a medium-term expenditure framework (MTEF).
  - The policy responses of many oil producers to previous oil windfalls contain cautionary stories regarding the need for prudence and appropriate

---

<sup>18</sup> Higher oil prices do not make public non-oil investment more worthwhile, except insofar as they may lower the cost of capital (adjusted for risk) to the government. To prevent wasteful spending, an effort should be made to avoid launching projects of questionable quality even if higher oil revenues make it possible to undertake them.

expenditure planning. One of the most important fiscal policy lessons to emanate from these experiences is that government spending levels should be adjusted cautiously to sharp rises in oil income (Box 3).

- A MTEF can help improve spending responses to changing oil revenues. Multiyear expenditure planning allows a better appreciation of the future spending implications of present policy decisions, including the recurrent costs of capital spending, thus helping petroleum exporters avoid some of the mistakes of the past. Rising oil revenues make the formulation of MTEFs all the more urgent.
- The Fund should seek to engage oil-producing countries in a discussion of productive ways to increase spending and in improving their capacity to spend well. Within its resource limitations, and in close cooperation with other relevant multilateral and bilateral institutions, the Fund should stand ready to provide technical assistance to these countries to strengthen their capacity to formulate, prioritize, and implement cost-effective spending programs, and to minimize wasteful ones.

84. **Countries with sustainability concerns and precarious financial positions should save more of the oil windfall.** Higher oil prices provide an opportunity to these countries to strengthen their financial positions, reduce vulnerabilities, and improve confidence. Thus, when the next oil price decline sets in, they will be less in need of adjusting abruptly and in a disorderly fashion with potentially serious growth and social consequences. The saving should be through assets held abroad or through reducing gross public debt, taking due account of liquidity needs. A distinction should be made between repaying external or domestic debt given the different macroeconomic implications. Specifically, consideration should be given to the effects on liquidity of repaying domestic debt under conditions of less than perfect capital mobility—this could be expansionary and might imply the need for offsetting monetary policy measures.

85. **Downturns should be prepared for through sufficient financing capacity.** Budgets should incorporate cushions in case the external environment turns out to be less favorable than anticipated, as well as transparent and well-specified mechanisms to deal with revenue windfalls and shortfalls. Governments should also strive to build adequate liquidity, taking into account risk and the cost of liquidity.

86. **Governments that rely heavily on oil revenue should be encouraged to explore the scope to hedge their budgetary oil price risk** (as done in Mexico). Hedging can help governments manage oil price risk by making oil revenue streams more stable and predictable. Countries should be encouraged to start building technical capacity and put in place sound and transparent institutional arrangements to exploit efficiently hedging opportunities. Over time, as the market develops, it may be possible for a number of countries to expand their resort to hedging. Large oil exporters, however, are likely to remain constrained by market size, especially beyond the short-term horizon. Moreover, there may

### Box 3. Managing Natural Resource Windfalls—Country Experience

**The history of managing resource windfalls contains many cautionary stories, along with a few positive examples.** The problems included:<sup>1/</sup>

***Overoptimistic spending.*** Governments frequently did not utilize higher natural resource revenues to reduce budget deficits, and tended to spend them inefficiently. Counting on high current and future income, expenditures were quickly increased to a high level. Budget deficits widened (Mexico, Nigeria). Some countries borrowed heavily against their anticipated future oil income (Algeria, Venezuela). In addition, authorities often granted large wage increases to public sector employees (Trinidad and Tobago, Nigeria, Venezuela) and created new government structures with new positions. Later, financing increased wage bills contributed to higher inflation, as the authorities found it difficult to reverse unsustainable expenditures including subsidies when the windfall subsided.

***Poor investments.*** In expectation of continued revenue from the resource boom, authorities undertook ambitious public investment projects with low economic rates of return, politically attractive payoffs, inadequate screening, and undiversified risk (Algeria, Trinidad and Tobago, Nigeria, Iran, Côte d'Ivoire). Often such projects served the interests of well-connected individuals. The maintenance costs of these large, nonviable projects were underestimated, and following the resource boom, the government faced the difficult trade-off of sharply reducing other expenditures, postponing their implementation, or stopping project maintenance (Nigeria, Mexico, Indonesia). The discontinuation of such projects would leave valuable financial resources wasted and former employees jobless.

***Governance and environmental problems.*** Natural resource booms often promoted rent-seeking behavior, especially under conditions of inappropriately defined property rights and lax law enforcement. Windfall revenue from an export boom also contributed to social problems such as corruption and caused further imbalance in the income distribution. The neglect of the environmental impact of natural resource exploitation led to unrecoverable damages, requiring a high cost of restoration (Nigeria, Ecuador, Indonesia).

***Stop-gap responses in the downturn.*** Following a natural resource boom, stop-gap policies adopted to counteract the resultant economic imbalances tended to have a further negative impact on the economy. After an adverse terms-of-trade movement, the traditional traded goods sector was not in a position to earn the necessary foreign exchange, and authorities employed protectionist policies such as restrictive quantitative controls, import quotas, higher tariffs, and bureaucratic barriers to prevent foreign exchange outflows. Such inward-looking policies hurt the manufacturing sector and made repayment of external debt difficult (Ecuador, Nigeria, Mexico).

#### **Some examples of more successful management**

In **Botswana**, a country with substantial revenue from the diamond industry, the government has limited the financing of recurrent expenditures to non-diamond related revenues. The government has run sizable fiscal surpluses and accumulated deposits at the central bank. Income from foreign assets has helped Botswana face domestic and external shocks.

**Norway** has typically followed sound fiscal and macroeconomic policies. An oil fund, fully integrated into a unitary fiscal system and with high transparency standards, was activated in 1995 (see Box 5).

**Chile** has implemented prudent fiscal policies that have resulted in increased government savings at times of high copper prices. The government has more recently committed to a structural balance rule that explicitly isolates the budget from cyclical variations in copper export prices, i.e., the deviations from a long-term reference price of copper determined by independent experts.

---

<sup>1/</sup> The first part is based on J. Wakeman-Linn et. al., *Managing Oil Wealth: the Case of Azerbaijan* (IMF, 2004).



be political economy issues for authorities who engage in hedging, if ex post it turns out that using the spot market would have been more favorable.

### *Monetary and exchange rate policy*

87. **Real and nominal appreciation of the currency are to be expected, although it may be appropriate to pursue monetary and exchange rate policies that slow the rate of real appreciation.** Provided that the public and private sectors spend at least some portion of their higher oil revenues, real appreciation is inevitable. The monetary authorities should not generally attempt to resist that through unsterilized intervention, since that would bring about the same end result through inflation. However, some amount of sterilized intervention may be appropriate both to slow the rate of appreciation and provide more time for the traded goods sector to adjust and to augment foreign exchange reserves. It may also be appropriate to the extent that there is a transitory component to the oil-related spending increase. That option is constrained in some countries by the absence of sterilization instruments and the quasi-fiscal costs of sterilization.

88. **Careful demand management is also needed to contain the inflationary impact of higher oil prices.** Higher public and private spending fueled by oil revenues is likely to result in strong aggregate demand, in addition to second-round effects from the pass-through to domestic petroleum prices. In response, the authorities may want to counter those effects with some degree of monetary tightening. The need for such tightening is likely to be less when the monetary authorities have a relatively high degree of credibility in containing inflation.

89. **To the extent that the increase in energy prices is judged to be durable, taking into account the inherent uncertainties about future prices, the objective should be to manage a gradual process of real exchange rate appreciation.** If a country has a fixed exchange rate regime, the choice in monetary policy is between sterilized or unsterilized intervention.<sup>19</sup> It will generally not be practicable to rely solely or even mostly on sterilized intervention. Therefore, if the country desires to maintain its exchange rate regime at an unchanged level, it must accept unsterilized intervention and the resulting inflation. In countries with flexible rates, the real appreciation may occur largely through nominal appreciation.

### **Net petroleum importers**

#### *Macroeconomic policies*

90. **For net petroleum importers, the policy response should depend on country specific circumstances including current macroeconomic conditions, the availability of**

---

<sup>19</sup> In countries where the public sector has a monopoly on petroleum production, higher petroleum receipts would remain sterilized to the extent that they were not spent and were deposited abroad.

**financing, whether the burden is primarily carried by the public or private sector, and the constraints posed by external and public debt dynamics.**

91. **Some net petroleum importers will be better placed than others to adjust gradually to the higher costs of petroleum imports.** This includes countries with access to international capital markets and/or a comfortable reserve position, sound debt dynamics, and a high degree of monetary policy credibility and modest inflationary pressures. In such countries the private sector is likely to borrow abroad, effectively recycling savings of petroleum exporters and thereby allowing a more gradual adjustment. Fiscal automatic stabilizers should be allowed to operate subject to considerations of long-run fiscal sustainability. With respect to monetary policy, these countries must be vigilant to prevent a second-round impact of the increase in domestic petroleum prices on wage developments and ultimately the rate of inflation.

92. **Other net petroleum importers will need to adjust more rapidly to the real income transfer entailed by higher prices.** Countries having limited access to foreign financing, low reserve cushions, or high external or public debt burdens, face a more constrained menu of options. There is likely to be less external financing available to their private or public sectors to help cushion their adjustment, and central bank credibility tends to be lower in such countries. This necessitates extra caution in monetary policy. Such countries will have little choice but to gear their macroeconomic policies to facilitating the economy's rapid adjustment to the terms of trade shock.

93. **Adjustment in these countries will entail a mix of real exchange rate depreciation and allowing the negative effects on demand of higher oil prices to work, given their limited capacity to cushion through monetary or fiscal accommodation.** The optimal policy mix will again depend on individual country circumstances. These include the nature of the exchange rate regime; the flexibility of fiscal instruments to adjust in the short run; and the composition of the public debt which may constrain the use of the monetary and exchange rate instruments, if a large proportion of the debt is foreign-exchange indexed or at variable rates. In general, countries with fixed exchange rate regimes will have to rely more on a reduction of domestic absorption in the short term and on downward adjustment of domestic wages and prices to achieve real depreciation over the longer term. Countries with flexible exchange rates will generally be advised to allow nominal depreciation.

94. **Depending on the availability of external concessional financing, low-income net petroleum importers may be among those that need to adjust more rapidly.** Their limited or nonexistent access to foreign capital markets, and frequently low levels of reserves, would in many instances prevent a significant smoothing of their adjustment to the shock. In these cases, increased financing from official sources would help cushion the impact in the short run. However, especially for countries facing already high debt and debt-service burdens, such financing would need to be in the form of grants or highly concessional loans, if it is not to result ultimately in unsustainable debt positions.

### **Short-run domestic petroleum pricing**

95. **As a general principle, higher international petroleum prices should be passed through to users (consumers and intermediate producers) in both petroleum-exporting and -importing countries, on efficiency and fiscal grounds.** In countries that regulate domestic petroleum prices, automatic price adjustment mechanisms that provide some limited smoothing can be justified when the fiscal risk is manageable and the fiscal and debt situations are sound. However, if the pass-through can only be partial or gradual (for socio-political reasons), the adverse fiscal (and debt) impact may need to be mitigated through compensating revenue/expenditure measures. Hedging oil price risk could also provide greater budgetary certainty and require lower levels of foreign exchange reserves. As in the case of exporters, the largest importers may be constrained by market size, especially beyond six months, though this could be offset to the extent that both importers and exporters hedge more.

96. **Where excise taxes on petroleum products are on an ad valorem basis, consideration could be given to converting them to a specific rate.** Ad valorem taxation can increase tax revenues procyclically in oil-importing countries, placing the burden of an additional adjustment on the private sector. Where the level of ad valorem excises prior to the latest oil price increases was already appropriate from the point of view of conservation and fiscal needs, it might be reasonable to go back to the earlier excise level when switching to specific rates.

97. **The impact of higher petroleum prices on the most vulnerable groups, particularly in low-income countries, should be cushioned.** This should preferably be done through direct income transfers intermediated through appropriate social safety nets. In the case of oil-exporting countries, many of which provide implicit or explicit subsidies to domestic petroleum consumption, part of the windfall revenues from the increase in oil prices could be channeled into cash transfers.

### **C. External Financing and Use of Fund Resources**

98. **Many oil-importing countries are in a position to seek external financing from private financial markets to smooth the adjustment to higher oil prices.** Experience suggests that private markets will be able to recycle effectively surplus funds to most deficit countries. Others, particularly lower-income countries, may need to seek recourse to official financing from bilateral and multilateral sources. Consistent with the above, Fund advice should emphasize that borrowing supports (and does not replace) adjustment and needs to be consistent with medium-term sustainability and sound debt management.

99. **The Fund can provide balance of payments financing where this may be a useful complement to members' own policy adjustment and reserve cushion.** Several categories of financing could be considered within existing facilities.

- Augmenting access under existing Fund arrangements. Augmentations can be done at the time of a periodic review, or separately if necessary, when an additional financing need is identified.
- Adjusting existing Fund-supported programs. It may sometimes be necessary to consider modifying a program by prudent easing of reserve or fiscal targets to smooth the costs of adjustment, provided it does not endanger the overall program objectives, including debt sustainability. There may also be cases where a rephrasing of access within existing arrangements could be helpful to the member in smoothing the adjustment to the shock.
- Negotiating new arrangements. For members with adequate policy frameworks in place, new arrangements can help provide financing while they adjust to the higher oil prices. Reaching understandings on a new arrangement could take longer for countries where underlying policies are not sustainable.

#### **D. Selected Structural Issues**

##### **Domestic petroleum price and taxation regimes**

100. **The domestic prices of petroleum products (before taxes) should as a rule be set at international levels.** Governments should not take the responsibility of shielding the private sector from changes in international oil prices. Subsidization of petroleum products is generally inefficient and regressive and entails opportunity costs in terms of foregone revenue or productive expenditure. Moreover, subsidies are often not recorded as expenditure, and their cost and social impact is poorly understood. Full pass-through of international price changes to domestic retail prices allows for correct price signals, which enhances efficiency and does not expose the government budget to excessive fiscal volatility.

101. **In some countries that regulate domestic petroleum prices, the existing substantial gaps with world prices may be difficult to eliminate at once for socio-political considerations.** In such cases, it may be necessary to phase out subsidies gradually, while putting in place social safety nets to help mitigate the impact of price adjustment on the most vulnerable segments of the population (Box 4). Poverty and social impact analyses should be used, whenever possible, to identify vulnerable groups and design offsetting measures. Countries also should take advantage of any future falls in the oil price to phase out oil consumption subsidies.

102. **Like other goods and services, domestic petroleum products should be subject to VAT.** A wider VAT base helps protect fiscal revenue when consumption patterns change, including in response to higher prices of petroleum products, and helps revenue administration.

103. **Excises levied on petroleum products should be specific and should reflect fiscal needs and externalities such as environmental considerations.** As indicated above,

specific rates avoid amplifying the effect when product prices rise and thereby help contain volatility in fiscal revenue and consumer prices. Specific rates should be adjusted regularly and automatically for inflation.

104. **Countries should be encouraged to take measures to promote energy sustainability and efficiency.** Conservation is called for not only to relieve pressures on oil prices but also for environmental purposes. Energy subsidies can generate adverse environmental effects. In principle, petroleum product prices (including taxes and excises) should reflect not only the cost of buying or selling them on the world market but also the social costs of the pollution and carbon emissions their usage can create and—in the absence of better-targeted instruments, such as toll charges—the congestion associated with motor vehicle use. Such taxes have the further benefit of yielding revenues that enable other taxes to be reduced or worthwhile expenditures increased. Realistically, however, a number of countries that have relatively low taxes are less likely to increase them significantly at a time when prices are rising, given that their domestic petroleum prices have already increased considerably or should be increased to reflect the rise in international prices.

#### **Oil revenue issues and investments in the oil sector**

105. **The fiscal regime for the petroleum sector should ensure that the state, as resource owner, receives an appropriate share of the oil rent without discouraging investment in the sector.** A balance needs to be struck between the government and oil companies over sharing risk and reward from oil investments, including the government's desire to maximize short-term revenue versus any deterrent effects this may have on investment in the oil sector. Good fiscal regimes should guarantee some up-front revenue with sufficient progressivity to provide the government with an adequate share of economic rent under variable conditions of profitability. At the same time, sufficient resources should be left with the companies to encourage investment.

106. **The regulatory regime is also important for appropriate development of the petroleum sector.** The current tight oil capacity situation can be expected to be gradually corrected by market forces in the event that real oil prices remain attractive for a sufficiently long time. Moreover, investment decisions not firmly grounded on long-term fundamentals may even exacerbate oil price volatility, rather than dampening it. However, investment, particularly by foreign private petroleum companies, may be hampered by impediments in some countries' regulatory frameworks for the exploration and extraction of mineral resources. The Fund's role in this area will likely be limited, given the macroeconomic focus of its mandate and the greater expertise of other agencies such as the IEA and the World Bank.

### Box 4. Domestic Petroleum Price Reform

**Studies have shown that developing countries tend to regulate domestic petroleum prices and the resulting subsidies may need to be phased out gradually.** In addition to monthly adjustments to reflect increases in petroleum product prices and exchange rates, the original gap between domestic and international fuel prices should be phased out over time, for example over a twelve-month period with quarterly adjustments each eliminating one-quarter of the gap.<sup>1/</sup> When international oil prices go down, however, there would be no downward adjustment in petroleum product prices until the gap is eliminated.

Domestic Petroleum Pricing Mechanisms In Selected Developing and Transition Economies

| Region  | Countries Surveyed | Oil Importers | Regulate Retail Petroleum Prices | Have an Automatic Pass-Through Mechanism | Have Full Pass-Through | Have a Stabilization Fund |
|---|--------------------|---------------|----------------------------------|--|------------------------|---------------------------|
| Africa  | 11                 | 10            | 8                                | 3  | 2                      | 1                         |
| Asia-Pacific                                  | 7                  | 5             | 4                                | 1  | 1                      | 1                         |
| Europe  | 7                  | 5             | 3                                | 0  | 0                      | 2                         |
| Middle East                                   | 11                 | 6             | 11                               | 4  | 3                      | 1                         |
| Western Hemisphere                            | 9                  | 5             | 7                                | 3  | 2                      | 3                         |
| Percentage of total                           | 100                | 69            | 73                               | 24                                       | 18                     | 18                        |
| Percentage of countries with regulated prices |                    |               | 100                              | 33                                       | 24                     | 24                        |

Source: G. Federico, J. Daniel, and B. Bingham, "Domestic Petroleum Price Smoothing in Developing Countries and Transition Economies," in J. Davis, R. Ossowski, and A. Fedelino (eds.), *Fiscal Policy Formulation and Implementation in Oil-Producing Countries* (IMF, 2003). The sample comprised 45 countries.

**Social impact studies and social safety nets should help mitigate the impact of price adjustments on the most vulnerable.** The pace of price reform should depend on fiscal needs, the availability of social protection schemes, and the political strength and administrative capacity of the government. Governments should foster support for needed price reform, through effective publicity campaigns to educate the public on the costs of poorly-targeted subsidies and discuss the tradeoffs involved. Countervailing measures that can be implemented to minimize the social impact of price reform include targeted cash transfers or, as a second-best solution if targeting cash transfers effectively is not feasible, limiting subsidies to a subgroup of the population.

- Cash transfers allow for consumer choice, their cost to the budget is explicit and known with greater certainty than generalized subsidies, and they can be better targeted to the poor.
- Subsidies to a subgroup may be limited by taxing relatively inelastic products (e.g., gasoline) and subsidizing so-called "social products" (e.g., kerosene and diesel). To reduce the scope for the nonpoor to shift their consumption to the subsidized products, a generalized subsidy could be limited at or below the amount consumed by the poor (including direct quantity rationing).

<sup>1/</sup> In countries where product prices are extremely low, longer adjustment periods may be necessary.

107. **In many countries national oil companies should be reformed to increase their efficiency and enhance their transparency and accountability.** The performance of national oil companies has been generally poor. These enterprises are often plagued by lack of competition, the assignment of noncommercial objectives, weak governance, limited transparency and accountability, lack of oversight, and conflicts of interest. These problems may be addressed by setting performance standards, increasing competition in the oil sector, divesting noncore assets, transferring noncommercial activities to the government, and conducting (and publishing) independent audits on a regular basis. The reform of national oil companies needs support from the highest political levels and a wide range of public opinion.

108. **In some oil-exporting countries, the federal nature of the state poses complications to the conduct of fiscal policies.** While the assignment of oil revenues will depend on the fiscal federalism arrangements in the country, there is a case for fiscal oil revenues to accrue to the central government, with predictable and relatively stable transfers distributed to subnational governments. The central government is likely to be in a better position to absorb the uncertainty and volatility of oil prices than subnational governments. Moreover, the central government can contribute to horizontal equity by redistributing revenue between resource-rich and resource-poor regions. In contrast, sharing oil revenue with subnational governments complicates fiscal management, can exacerbate the procyclicality of fiscal policy, and does not provide stable financing to subnational governments. A second-best solution is to share relatively stable oil tax revenues (for example, excises on oil production) supplemented, if needed, by stable transfers from the central government.

### **Oil funds**

109. **Some oil-producing countries have implemented oil funds to help address the short-run stabilization and long-run saving challenges posed by oil revenues.** *Stabilization funds* aim at reducing the impact of volatile revenue on the budget, by transferring uncertainty and volatility from the budget to the fund. *Savings funds* seek to address the exhaustibility of oil and create a store of value for future generations; they may also have stabilization objectives.

110. **The experience of countries that have implemented oil funds is mixed.** Governments should not think of oil funds as a panacea, and should focus on tackling the challenges of oil revenues as an integral part of their fiscal policy (Box 5).

### **Box 5. Oil Funds—Selected Examples**

**Norway's State Petroleum Fund (SPF)** (activated in 1995) is designed to manage accumulated budget surpluses and does not have specific rules for the accumulation or withdrawal of resources, making its operation flexible. Specifically, the budget transfers to the SPF net oil revenues. In turn, the SPF finances the budget's non-oil deficit through a reverse transfer. The accumulation of assets in the SPF thus represents government net financial savings, reflecting the principle that it may not make sense to accumulate government capital in a fund while debt is being built up in other parts of the government. The amount actually saved depends on oil revenues and the fiscal stance as embodied in the non-oil fiscal deficit.

SPF assets are under the control of the Ministry of Finance and are managed by the central bank, with a high degree of transparency and accountability. Detailed reports are regularly published on the management of the fund and its operations.

The SPF is a government account at the central bank. Its features ensure integration into a unitary fiscal system and address fungibility issues. The fund does not attempt to deal directly with the problems posed to the budget by the volatility of oil prices—the latter are addressed in the context of the standard budget process. The flexibility and lack of restrictions on fiscal policy and asset management posed by the SPF have worked well, as Norway has typically followed sound fiscal and macroeconomic policies.

**Venezuela's Macroeconomic Stabilization Fund (FIEM).** The FIEM was established in 1998 with the objectives of insulating the budget and the economy from fluctuations in oil prices. Under the initial set of rules, contributions to the fund were specified as the oil revenues above a reference value corresponding to a five-year moving average. Resources could only be drawn from the fund if oil revenues in a given year were below the reference values or resources in the fund exceeded 80 percent of the five-year moving average of oil export revenues. Since then, the rules of the FIEM have been modified on several occasions (and during some periods the application of the rules was suspended), but these changes did not lead to more consistent fiscal management and transparency in the operations of the fund. The experience of the FIEM did not result in improved fiscal performance, as the non-oil fiscal deficit expanded by 10 percentage points of GDP between 1999 and 2003. The integration of the fund's operations with central government operations proved especially problematic, as the government often borrowed at high interest rates to place deposits in the fund.

**Nigerian oil funds before 1995.** Nigeria had various types of extrabudgetary funds financed by oil revenues and used for off-budget expenditure before 1995. Spending was undertaken in various investments in the oil sector and "priority" development projects for which project evaluation and selection criteria and procedures were lax. Moreover, capacity to manage investment expenditure was inadequate. As a result, a number of large investment projects ended up requiring large and costly financing and had low ex post rates of return.



111. **The design and institutional setup of oil funds show great variety around the world.** And design matters for the success of an oil fund. In particular, oil funds with rigid accumulation and withdrawal rules have been difficult to operate and to integrate with the overall fiscal policy, because of changing exogenous circumstances and policy objectives. In some of these funds the rules have often been changed. Moreover, while generally the effect of such funds in constraining spending (except in the case of strong liquidity constraints) is unclear, on occasion they have hampered efficient cash management.

112. **A well-designed oil fund can help.** Such an oil fund can help “sell” to the public and policymakers the need to save oil revenue, but it should be tailored to individual country circumstances. Some important principles of good oil fund design are the following:

- The Fund should be coherently integrated into the budget process. This is best achieved by ensuring that the fund operates only as a government account rather than a separate institution, that rigid accumulation and withdrawal rules are avoided, and that it has no authority to spend.
- Fund assets should be prudently managed, coordinated with other government financing operations (to ensure, for instance, that assets built up in the fund are not offset by liabilities incurred elsewhere), and invested offshore.
- There should be stringent mechanisms to ensure transparency and accountability and prevent the misuse of resources.

### **E. Transparency**

113. **The windfall from higher oil prices adds further urgency to promoting transparency in fiscal revenue flows and the management of petroleum assets for future generations.** For a number of oil-exporting developing countries, the windfall gains could add pressure on the already prevalent governance problems. The pressures for both corruption and poor macroeconomic policy choices will increase. Emphasis should be given to improving transparency and establishing a clear, widely understood policy on management of the oil assets and revenue flows.

114. **The Fund already encourages transparency in policy making and implementation, but further focus is required on oil revenue-specific issues.** Standards and codes are in place to guide Fund members in their efforts to improve transparency, and Reports on the Observance of Standards and Codes (ROSCs) are prepared to monitor implementation.<sup>20</sup> Data and fiscal ROSCs are of particular relevance for energy exporting

---

<sup>20</sup> See IMF transparency standards at <http://www.imf.org/external/standards/index.htm>.

countries.<sup>21</sup> The *Fiscal Transparency Code* includes 37 specific transparency benchmarks under four major principles—clarity of the roles and responsibilities of government, public disclosure of fiscal information, open processes of budget preparation and execution, external assurances of integrity—and best and good practices for each of these are described in the *Manual on Fiscal Transparency*. To address the issues arising in resource-rich countries, FAD is in the final stages of preparing a *Guide on Resource Revenue Transparency*.

**115. Further emphasis on data standards would help improve the overall quality of data produced by countries.** The SDDS establishes, among other things, the reserve template as a standard for reporting data on international reserves for surveillance. Encouraging countries to participate in the Fund’s data standards initiatives (GDDS, SDDS, ROSC and Coordinated Portfolio Investment Survey) should improve data compilation and dissemination, in particular among oil-producing countries given their low participation rates.

**116. Fiscal transparency principles apply to both oil-exporting and -importing countries, and some have direct application to transparency of energy prices and subsidies.** In energy-importing countries, subsidization of retail petroleum products and tax concessions for energy companies is likely to become especially costly when energy prices are rising. Transparency about the hidden costs of such implicit subsidies or tax concessions would permit a public debate which in turn is likely to enhance the quality and public acceptability of policy responses. At any rate, the nature and costs of implicit subsidies and concessions should be clearly described in budget documents, including preferably an analysis of the sensitivity to fluctuations in prices.

**117. Particular emphasis should be placed on strengthening transparency in developing countries that export energy.** In line with the four general principles of the fiscal transparency code and the recommendations of the fiscal transparency manual (and to be covered in detail in the forthcoming Guide), the following practices should be particularly emphasized:

- Clarity of the roles and responsibilities of government. Governments should establish a clear legal and regulatory framework for the oil sector, covering all production stages and including licensing procedures, production sharing contracts, fiscal regime, state-owned oil companies, oil funds, and revenue sharing arrangements.
- Public disclosure of fiscal information should cover all oil-related transactions, in particular oil revenue (see discussion of the Extractive Industries Transparency Initiative (EITI) below); oil-related debt, guarantees and other contingent liabilities; oil reserves; financial assets held in oil funds; and quasi-fiscal activities of state-

---

<sup>21</sup> Oil-exporting countries that have completed both data and fiscal transparency ROSCs include Azerbaijan, Kazakhstan, Mexico, and Russia. A fiscal ROSC has also been completed for Iran, and a data ROSC has been completed for Norway.

- owned oil companies (e.g., selling oil products below cost, and providing social services).
- Open processes of budget preparation and execution. Budget documents should contain clear policy statements on the use of oil revenues, including for financial and other investments, information on non-oil fiscal balances, and explanations of the risks attached to oil price fluctuations and the measures taken to mitigate them. Systems and policies on accounting and internal control and audit should be transparent, and oil tax administration procedures should be seen to be clear and effective.
  - External assurances of integrity. Governments should be advised to require that the international and national oil companies comply fully with internationally accepted standards for accounting and auditing. State-oil companies' accounts should be published and externally audited. A national audit office should verify oil revenue collection and report to the Parliament. Governments should be strongly encouraged to use their contractual rights to have expert audits of the exploration and exploitation costs filed by the oil companies.

118. **The Fund has welcomed the EITI and encourages members where resource revenue transparency is problematic to join this initiative.** The EITI aims to lend credibility to government revenue reporting by reconciling it with reports on payments from national and international oil companies. For that purpose, governments and companies would fill out similar templates. This objective of the EITI is fully consistent with the fiscal transparency code. Countries that express an interest in joining the EITI should be encouraged to rapidly take steps in that direction. For instance, they should urge all oil companies operating in their country to participate and exempt them from any confidentiality restrictions (see Section VII below for more information on the EITI).

119. **There is a need to go beyond revenue transparency to transparency of data on petroleum reserves, production, consumption, exports, and inventories.** Medium-term fiscal policymaking and proper oil revenue collection presupposes that these data are of good quality. Oil policy transparency requires that such information be made public. As mentioned, staff should encourage oil-producing countries to publish data on petroleum regularly. Staff should, to the extent possible or practical, use external sources to corroborate oil data provided by the authorities. Staff should also encourage participation in the Fund's data dissemination standards initiative (SDDS) that could provide a vehicle for improved public dissemination of data.

## VII. THE SCOPE FOR PRODUCER AND CONSUMER ACTION AND COOPERATION

120. **In its communiqué of October 2, 2004, the International Monetary and Financial Committee (IMFC) of the Board of Governors of the IMF noted the desirability of stability in oil markets for global prosperity and stressed the importance of dialogue between consumers and producers.**

**121. Both oil-exporting and oil-importing countries can contribute to stability in oil markets and prices:**

- Demand can be contained by strengthening policies to promote energy sustainability and efficiency.<sup>22</sup> While energy demand tends to be inelastic in the short run, high prices should dampen demand increasingly over time. Beyond this, the domestic prices of hydrocarbon products (before taxes) should as a rule be set at international levels. Full pass-through of international price changes to domestic retail prices allows for correct price signals, which enhances efficiency and does not expose the government to undue fiscal volatility. Conservation should also be promoted for environmental reasons. In principle, petroleum product prices (including taxes and excises) should reflect not only the cost of buying or selling them on the world market but also the social costs their use can create.
- Raising supply on a sustained basis requires increased investment in oil capacity. The current tight capacity situation can be expected to be gradually corrected by market forces in the event that real oil prices remain attractive for a sufficiently long time. In the meantime, countries could review the extent to which investment is hampered by impediments in their regulatory frameworks for the exploration and extraction of mineral resources, and take action to remove any undue impediments. Also, a balance needs to be struck between the government and oil companies over sharing risk and reward from oil investments, including the government's desire to maximize short-term revenue versus any deterrent effects this may have on investment in the oil sector.

**122. Increased dialogue between consumers and producers could also be conducive to stability in the oil market.** The dialogue could take on various forms. For example, increased exchange of information on current and future supply and demand could help markets distinguish between temporary and permanent factors underlying price changes and therefore improve the signaling efficiency of price changes for investment. The scope for increased hedging by importers and exporters could also be explored.

### **VIII. PROGRESS ON DATA TRANSPARENCY ISSUES IN OIL MARKETS**

**123. Recent developments in the oil market have highlighted the need for more timely and accurate oil market data.** In particular, last year's surge in China's crude oil demand

---

<sup>22</sup> The benefits of more efficient and environment-friendly policies are depicted in the alternative energy outlook of the International Energy Agency *World Energy Outlook*. According to this scenario, by 2030 oil demand would be some 13 million barrels per day lower than in the reference scenario, an amount equal to the current combined oil production of Saudi Arabia, the United Arab Emirates, and Nigeria. Stronger measures to improve fuel economy in OECD countries and faster deployment of more efficient vehicles in non-OECD countries account for two thirds of these savings.

(for which actual data are not readily available) was largely unexpected, and an overly optimistic assessment of the level of inventory building may have been responsible for OPEC's decision to cut official quotas in early 2004. Limited or incorrect information about demand, supply, stocks, and trade can increase perceptions of risk, reduce willingness to invest in new capacity, and increase price volatility.

124. **Against this background, the international community has called for additional efforts to improve oil market data.** In October 2004, the IMFC stressed the importance of further progress to improve oil market information and transparency. In November 2004, the G-20 urged cooperation between oil producers and consumers to enhance oil market transparency. In February 2005, the G-7 encouraged further work, including on oil reserves data by relevant international organizations.

125. **This section reviews the main weaknesses in oil market data, recent progress in improving the data, and the scope for further improvements.** Within the limits of the data provided by countries, the IEA does a laudable job in compiling and disseminating oil statistics. The root of the data quality problems lies in the uneven and inadequate data reporting by individual countries.

### **Data production**

126. **The IEA is the primary source of global oil market data, although several other agencies are also involved.** The IEA produces world energy statistics under the legislative authority of the Agreement on an International Energy Program. This agreement—which covers 26 OECD countries and therefore excludes the largest oil-exporting countries—calls for members to share energy information, coordinate energy policies, and cooperate in the development of rational energy programs.

127. **The IEA publishes a wide range of oil market indicators for over 130 countries.** The IEA compiles its statistics through questionnaires and market information. Annual questionnaires are sent to both OECD and selected non-OECD countries, whereas monthly questionnaires are sent only to OECD countries. Key indicators on demand, supply, trade, stocks, prices, and refining of oil (largely in physical units) are published by area and product. The main publications are the *Annual Statistical Supplement* and the monthly *Oil Market Report*.

### **Main weaknesses in the data**

128. **The accuracy and timeliness of data on supply, stocks, and exports are particularly weak.** This largely reflects data collection arrangements currently in place. Current data are compiled from a mixture of monthly direct reporting from OECD countries, and market information combined with past trends for non-OECD countries. The latter countries, which account for almost three quarters of oil supply, have no obligation to provide data to the IEA. By contrast, demand data are dominated by the OECD countries that account for some 60 percent of the world oil demand.

129. **There are also significant weaknesses in data on demand and inventories, including demand from emerging market countries, which are increasingly significant in the oil market.** Direct reporting by countries would help in capturing shifts in both oil demand and supply, thereby improving the accuracy of the statistics. The average price data are adequate for OECD countries, but are neither defined nor reported consistently for non-OECD countries. Data on oil stocks are limited to primary industry and strategic holdings for OECD countries, and are not reported by many non-OECD countries. The limited availability of timely data on the breakdown by different types of crude oil is also a concern.

130. **Improvements in the accuracy and reliability of all aspects of oil market statistics are needed.** Production and reserve data from non-OECD countries are particularly lacking. In addition to inadequate statistical resources in many countries, data on oil production are considered strategically important information in several non-OECD oil producing countries and reliable data cannot be obtained even with a considerable lag. More generally, data on production levels and reserves are limited owing to the proprietary nature of the data, the existence of production agreements, and sensitivities related to data on the size of oil funds. Hence, these data have to be estimated for a number of countries. Since a dominant share of oil is produced by non-OECD countries, global oil production and reserve data are thus not as reliable. Major revisions in reserve estimates by IOCs indicate another area of data shortcomings.

131. **Even for OECD countries, there are substantial time lags.** Final annual estimates are only available 16–20 months after the reference year, and the initial estimates are lacking, with data subject to periodic major revisions. The initial monthly estimates (which are published with a nine-week lag) are based on surveys of OECD countries, market information, and past trends.

### **Progress so far**

132. **In an effort to improve the quality and transparency of international oil data, six international organizations launched the Joint Oil Data Initiative (JODI) in 2001.**<sup>23</sup> The IEA is heavily involved in the JODI exercise, which collects a series of monthly oil market indicators but with less detail than the IEA monthly oil survey. More recently, the International Energy Forum (IEF), the most global body in the energy area, decided to take over the direction of the JODI.<sup>24</sup>

---

<sup>23</sup> The participating organizations are the Asia Pacific Energy Research Center (APEC), the statistics office of the European Union (EUROSTAT), the International Energy Agency (IEA), the Latin-American Energy Organization (OLADE), the Organization of the Petroleum Exporting Countries (OPEC), and the United Nations Statistical Division (UNSD).

<sup>24</sup> The IEF started in 1991 as a Producer-Consumer Dialogue, and was renamed the International Energy Forum in 1999. The IEF's mission is broad, and includes improving oil data and analysis in

(continued)

133. **The JODI has led to some improvement in the coverage of the data.** The coverage of global oil demand and supply has increased from about 70 percent at its initiation to about 95 percent now, representing data from 93 countries.

134. **Despite this progress, the JODI data have yet to be published as their quality needs to be evaluated.** Out of the 93 participating countries, only 56 submit data regularly. In several cases, the data are of questionable accuracy owing to lack of experience of the respondents with oil market data. Improvements in JODI reporting may shed light on how far transparency is spreading across countries. A comprehensive review of the data is expected to be undertaken during the first half of 2005.

135. **The U.K. launched the Extractive Industries Transparency Initiative (EITI) in 2003 as part of a broader international effort to improve governance in natural resource rich countries.** The EITI is a multi-stakeholder initiative involving governments, companies, and NGOs that aims at voluntary disclosure of natural resource related revenue by governments and payments by companies. The reconciliation and verification of government receipts and company payments is expected to substantially improve the quality of these data for participating countries. The initiative has generally led to an increased awareness of the importance of transparency in this area. While there are few observable results as yet, efforts toward meeting the EITI objectives are reasonably advanced in half a dozen countries.

### **Looking ahead**

136. **The international community can best contribute to improved oil market data by supporting existing initiatives.** In particular, the increased role of the IEF in JODI is important, as this may lead to better data coverage of the non-OECD countries. Promoting fiscal transparency, including through the EITI, is another vehicle for improved oil market data. To the extent major oil-producing countries become convinced that increased fiscal transparency is useful in their own resource management, this would also have significant positive implications for the quality of global oil data.

137. **As the responsibility for oil data production is well entrenched at the international level, the case for direct Fund involvement in this area is weak. However, the Fund could be helpful to these international bodies by using its infrastructure to help enhance data quality.** The Fund staff has initiated contacts with the IEA, and more recently the IEF Secretariat, to explore ways that it could support the JODI through technical assistance to member countries. This technical assistance would focus on ways to improve the members' institutional framework, such as statistical legislation and organization, to facilitate the adoption of best practices in data production. The IMF could also assist by

---

both producing and consuming countries. Its meetings are held biannually at ministerial level. The IEF Secretariat is based in Riyadh, Saudi Arabia.

encouraging its members to accelerate their participation in the Fund's data-related initiatives, which could pave the way for better reporting of data, including oil data.

138. **Besides the international initiatives, individual countries can take steps to contribute to improved oil data.** Many national statistical agencies do not have adequate resources to comply with the increasing requirements on oil data, and new staff needs to be trained in energy statistics production. Standard definitions and terminology are critical in obtaining data that are consistent internally and conceptually comparable across countries. Statistical laws need to be reviewed and strengthened to support data reporting, and links between industry and government need to be established to identify data reporting requirements.

## IX. ISSUES FOR DISCUSSION

139. Directors may wish to comment on the general conclusions of the paper that (i) despite much uncertainty about the durability of the recent oil price increases, some of the increase could well be permanent; and (ii) due to historically low spare capacity and growing demand, the oil market remains sensitive to shocks.

140. In light of this, Directors may wish to discuss the prospects for, and impediments to, new investments in the oil sector in the coming years.

141. The paper discusses the usefulness of international efforts to improve oil market data. What role do Directors see for the Fund in this area? In particular, how can the Fund support the work of other international bodies to help enhance data quality? Do Directors see additional areas for cooperation between oil-exporting and -importing countries?

142. What are Directors' views on the appropriate policy response to higher oil prices? Do they see the general principles identified in the paper as a valuable basis for taking forward the policy dialogue with members, while taking into account each country's specific circumstances?