

Impact of China and India on Sub-Sahara Africa

Evaluating Asian Drivers Impacts on Sub-Saharan Africa Oil and Gas industries: A Methodological Framework

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I. Introduction

The rising profiles of the Asian Drivers (ADs) – China and India – in global economic relations is generating considerable interests, concerns and attention at both the academic and policy levels. Their rapid growth and increased openness over the past quarter of a century has led to their emergence as a key player in the global economy in the early twenty-first century. China's GDP has grown at over 9% per annum over the past two decades and the OECD predicts that China will become the fourth largest economy in the world during the next five years. Its share of world trade has risen from less than 1% in 1980 to almost 6% in 2003, making it the fourth largest trading economy (OECD, 2005). The increased competitiveness of ADs and their expanded presence in world markets is having a major impact on both developed and developing countries. This is especially the case with Africa in general and Sub-Saharan Africa (SSA) in particular, where the presence of the ADs has become quite pronounced. The activities of the ADs cut across various sectors of the economies of African countries, including the oil and gas sector.

The rapidly growing ADs have crafted their foreign policy goals around getting the resources needed to sustain their economic development and are taking quest to lock down sources of oil, gas, and other necessary raw materials around the globe¹. With the high risk of instability in the Middle East, the ADs, as well as other oil-dependent, developed and developing countries, desirous of energy supply security, are increasingly turning in the direction of Africa. This has brought some opportunities as well as poses some challenges to the countries of the region, especially SSA countries.

Clearly, the activities of the ADs impact on many sectors of the African economies. However, our focus in this framework paper is with respect to the oil and gas sector. Several countries in the sub-continent are heavily dependent on oil and gas exports for both government revenues and as the dominant source of foreign exchange. Hence, the impact of the ADs on all spheres of these economies – political, social, environment and economic is quite significant, and worthy of investigation.

However, what makes oil and gas quite unique are some characteristics associated with the presence of the resource in most countries. Oil and gas has been the harbinger of macroeconomic distortion, corruption, rent-seeking, political and economic crises, environmental degradation, capital flight, and much more. Most of the countries in SSA with huge oil and gas deposits have not been able to translate the resources into direct economic development of their countries. Rather these countries are marred in poverty, sharp social and economic inequalities, governance crisis among others. It is precisely for these reasons that it is important to actually carry out a study on the growing impact of the ADs on the oil and gas sectors in SSA. To be quite clear, this impact will vary based on whether the specific SSA country is an oil exporter or an oil importer.

The channels through which the ADs impact on the oil and gas sector in these countries are several. They include trade, financial and capital flows, migrations, aid and governance. We shall investigate these various channels as well as their impact on the economic growth process, equity, governance and the environment in SSA. The effects of the ADs are both direct and indirect. For instance, a direct impact comes from bilateral economic relationships

¹ Overall growth rate of global demand for oil increased from less than 1% in 2002 to 3.5% in 2004. China accounted for one-third of this growth in 2004, while other Asian economies account for 17%. Together, China and India accounted for 74% of the increase in total demand for oil in 2004 (IMF, 2006a).

between the ADs and SSA. However, an indirect effect arises from the impacts of ADs on the world prices of primary commodities, including oil and gas. The booming demand for agricultural and mineral products (including oil and gas) in ADs has contributed to rising prices of these primary commodities [Jenkins et al. (2006), Kaplinsky (2005), and UNCTAD (2005)]. Considered that oil prices still matter to the health of the world economy (Birol, 2006) and that oil price shocks affect an economy through different channels: the supply side, the demand side and the terms of trade (Schneider, 2004), a number of pertinent issues to be addressed in the country studies thus arise:

- ✓ What are the implications of the rising demand for African oil and gas for countries in the continent?
- ✓ What are the direct and indirect consequences on the economies of African countries? What are distributional and environmental impacts of the activities of ADs in the oil and gas sectors in the SSA countries?
- ✓ What should be the appropriate policy response of Africa countries?

We focus in this paper on the framework of analyzing those issues. Before proposing some methodologies for the impact assessment in section 6, we first briefly present recent developments in ADs and SSA countries in section 2 with a view to identifying their challenges. Section 3 gives an overview of oil and gas demand and supply in ADs and SSA. Section 4 identifies the channels through which the ADs impact on the oil and gas sectors of the economy. The potential effects of ADs involvement in SSA countries (SSAs) oil and gas sector are discussed in section 5. Section 6 concludes the paper by summarizing the issues that country case studies must consider and offer suggestion on the list of countries and potential participants at various related workshops and seminars.

II. Recent economic developments in ADs and SSA

As shown in Figure 1, less progress has been made in reducing poverty in SSA compared to Asian countries. Nevertheless, extreme poverty in SSA is estimated to have increased and nearly one-half of the population is living below the poverty line (IMF, 2006a). Growth performance appears to be closely related to this situation. Table 1 show that ADs economies have grown at an extraordinary pace over the past four years, with an average annual growth rate of 8.4% and 6.2% for China and India respectively. However, the SSA growth is relatively more modest at about 5%. This is below the level required to achieve the Millennium Development Goals (MDGs) of halving extreme poverty by 2015.

Nevertheless it is important to point out that economic growth in SSA has picked up compared to the experience in the 1990s. This trend has been attributed mainly to the favorable performance of primary products, including oil and gas on the world market in recent years. As we shall point out later, the influence of the ADs in bringing about a reversal in the secular decline in primary product prices on the world market has had a significant impact on the recent good growth performance of the SSAs.

In SSA, although there have been large cross-country differentials, growth is projected to evolve around its actual level in the coming years, while growth forecast is very optimistic in ADs. Chinese leaders set in 2005 a target of quadrupling its growth rate by 2020. India's economy is also projected to grow at about 8% a year for the next 10 years (Lim, 2006).

Table 1: Select indicators for ADs and SSA

		2002	2003	2004	2005
Real GDP (annual growth, in %)	Sub-Saharan Africa	3.5	4.1	5.6	5.3
	Oil exporters	4.2	7.8	8.3	6.8
	Oil importers	3.3	3.0	4.9	4.9
	China	8.0	9.1	8.5	8.0
	India	4.7	7.4	6.8	6.0
Consumer prices (average -annual growth- in %)	Sub-Saharan Africa	12.5	13.8	9.8	10.8
	Oil exporters	18.7	16.9	12.5	13.3
	Oil importers	8.9	9.6	7.9	6.6
	China	-0.8	1.2	3.5	3.0
	India	4.3	3.8	4.3	4.1
Current account balance (% of GDP)	Sub-Saharan Africa	-3.3	-2.6	-1.8	-0.5
	Oil exporters	-8.2	-3.6	2.4	9.3
	Oil importers	-1.9	-2.2	-2.8	-3.2
	China	2.8	2.1	1.6	1.9
	India	1.0	0.5	0.2	0.3

Sources: IMF (2006b and c)

Other macroeconomic indicators also show that SSA underperforms relative to the ADs. Inflation rate in SSA is higher relative to the ADs. Moreover, while the latter countries are recording positive current account balances over the period, SSA is increasing its deficit; with the exception of oil exporting countries whose current account balances are positive since 2003 due largely to recent oil price increases.

Asia's trade performance has been important with respect to both total merchandise exports and manufactures. Its share of global merchandise exports increased from 18% in 1980 to 22% in 2000, while its share of total developing-country merchandise exports increased from almost 60 to 72% over the same period (see Table 2). Similarly, its share in global manufactures trade increased threefold, reaching 21.5% in 2000 (see Table 3). The value of Asia's total exports recorded 7% average annual growth over the period under review compared to a mere 1.1% for Africa and 1.3 for SSA. While the value of Asia's non-fuel commodity exports increased by 5% per year, those of Africa and SSA rose by only 0.6 and 0.4% respectively. SSA recorded the worst performance in terms of the annual growth rate of merchandise exports, as well as in the other categories of exports – primary and non-fuel primary commodities, and manufactures.

From this short overview of recent performances of SSA and ADs, it is clear that the two regions faced different challenges. To achieve the MDGs, SSA need to accelerate its growth, knowing that, only acceleration in economic growth for a long and sustained period of time will unlock the continent from the poverty trap (Sachs et al., 2004). For this, progress made toward establishing a policy environment that is more conducive to fostering strong economic growth needs to be enhanced. ADs need to search for raw materials and commodities, including oil and gas, to fuel their surging growth. As far as oil and gas is concerned, with the Middle East mired in long-term instability, ADs are increasingly turning toward another major producer (SSA countries), whose risks and challenges have caused it to be overlooked by much of the rest of the world. Emerging ADs' growth remains heavily reliant on exports. To sustain the expansion of their growth, they need to further nurture domestic demand growth. To balance their economic growth and make it more resilient, structural reforms are required to improve public and private sector governance, strengthening and deepening

financial markets, increase competition, and raise labor productivity of their large rural populations (IMF, 2006a).

Table 2: Shares of developing regions in world merchandise trade, 1980–2002 (in %)

<i>Region</i>	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2001</i>	<i>2002^a</i>
Exports							
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Developing Africa	5.9	4.2	3.0	2.2	2.2	2.1	2.0
North Africa	2.1	1.7	1.0	0.7	0.7	0.6	0.5
Sub-Saharan Africa	3.7	2.5	1.9	1.5	1.5	1.5	1.5
Developing Asia	17.9	15.6	16.9	21.6	24.3	23.7	23.3
Developing America	5.5	5.6	4.2	4.4	5.5	5.5	5.9
Imports							
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Developing Africa	4.6	3.6	2.9	2.5	2.1	2.2	2.1
North Africa	1.4	1.6	1.2	0.9	0.7	0.8	0.7
Sub-Saharan Africa	3.1	2.1	1.6	1.6	1.3	1.4	1.4
Developing Asia	13.1	15.2	15.9	21.9	21.1	21.0	20.8
Developing America	6.1	4.2	3.7	4.7	5.7	5.8	5.7

Source: UNCTAD (2006:3)

Table 3: Export structure of Africa and other developing regions by product category, 1980 and 2000 (in %)

	<i>1980</i>		<i>2000</i>	
	<i>All merchandise^a</i>	<i>Manufactures^b</i>	<i>All merchandise^a</i>	<i>Manufactures^b</i>
Africa				
<i>Share in:</i>				
Global exports	6.3	0.8	2.5	0.8
Developing countries' exports	20.3	7.8	7.9	3.0
Developing America				
<i>Share in:</i>				
Global exports	5.9	1.9	5.9	4.6
Developing countries' exports	19.1	18.1	18.9	16.8
Developing Asia				
<i>Share in:</i>				
Global exports	18.1	7.1	22.4	21.5
Developing countries' exports	58.5	66.9	72.0	79.0
Memo item:				
Developing countries				
<i>Share in:</i>				
Global exports	31.0	10.6	31.1	27.2

Source: UNCTAD (2006:5)

Oil and gas industries generate significant revenues for the national economy. Sound macroeconomic management and governance are required to ensure that these revenues are successfully converted into social capital and lead to broader-based overall economic development and poverty reduction for the country as a whole. While the oil and gas industries provide significant opportunities for developing economies, at the same time, they bring substantial risks that need to be managed and mitigated by governments, investors, and communities.

The depleting nature of oil and gas resources make it particularly important that governments and economic policies ensure that the benefits of their exploitation contribute to the development of the human, social, and physical capital needed for sustainable development. Unfortunately, in certain cases, neither investment nor oil revenues have been able to guarantee economic growth or poverty reduction. Thus, the presence of major oil and gas industries has been associated with a variety of negative social and environmental outcomes. The so-called ‘Paradox of Plenty’, where resource development fails to generate the sustainable benefits expected, is one of the most urgent challenges for SSA countries (Mayorga Alba, 2001).

There is no doubt that ADs voracious demand for oil and gas to feed their booming economies will have significant impact on the economy of SSA in general and its oil and gas sector in particular. However, policy responses to what is ostensibly a boon must also be tailored in a careful and comprehensive manner to facilitate sustainable development in a region which is socio-economically fragile. Yet, deepening the pattern of specialization in oil and gas can impede the development of the other sectors by consuming all available financial resources and contributing to real exchange appreciation (the so-called Dutch disease).

Furthermore, economic development strategies based solely on raw commodities (oil and gas) risk having a very limited effect, if any, on poverty levels – although national incomes may increase, oil and gas resources exploitation generate preciously few job opportunities for the low-skilled. In order to avoid the Dutch disease, resource-rich SSA needs to find ways to capitalise on windfall gains arising from resource extraction and promote job-rich sectors.

Improving the macroeconomic policy mix is crucial. To avoid remaining stuck in the unpromising corner of vulnerable, capital-intensive and high-risk dependence on raw materials with little local-labour content, SSA will have to carefully manage the windfall gain generated by higher oil and gas prices. This is needed to avoid compromising the future development of labour-rich manufacturing and services activities. Monetary authorities will have to lean against real currency appreciation in order to avoid penalising import-competing industries and exporters outside the resource sector. A proper policy mix must be put in place and fiscal authorities are required to limit public consumption to keep non-tradable prices in check. Investing abroad part of the export proceeds may be a solution to insulate local economies from ‘Dutch Disease’ effects.

Diversification of economic activities is key as well. ADs are encroaching in the low-technology, labour-intensive sectors such as apparel where they have become globally competitive. Still, there is room for capitalising on opportunities created by the economic ascent of the ADs. Beside diversification, creating vertical and horizontal linkages with other productive sectors and removing development bottlenecks are also important (Goldstein et al. 2006).

III. Overview of oil and gas demand and supply in ADs and SSA

The growing global demand for oil has not just been led by China but also by India. Energy Information Administration says China accounted for 40% of total growth in global demand for oil in the last four years. In 2003, it surpassed Japan as the world's second-largest oil consumer, after the United States. China consumed about 5.46 million barrels per day (mbd) in 2003 compared to Japan's 5.43 mbd according to the IEA. China relies on overseas producers for one-third of supplies and accounts for about 7% of world oil demand. India on her own imports nearly 70% of its oil needs and in 2003 consumed a little more than 2 mbd. India's oil demand is projected to increase to 74 mbd by 2025 (IMF, 2006c).

China's energy mix is dominated by Coal, with Oil accounting for only about 20-25% of its overall primary energy consumption. China was a moderate oil exporter in the 1980s but currently its 3 main oil producing zones – Degan, Shengli and Liaohe, situated in the northern and north-eastern parts of the country are nearing depletion and will need additional massive investments to sustain current levels of production. The growth of the domestic supply of oil is primarily associated with the development of oil fields in Xinjiang province in Western China and the exploitation of offshore basins in the Eastern China sea. However, the increase in these sources will still not be able to meet demand growth. Beginning in 1993, China's imports of crude-oil grew at an average rate of 9.1% annually.

Table 4 shows the rising energy use in the ADs, and Table 5 shows their rising dependence on imported fuels.

Table 4: China and India's Rising Energy Use (year-on-year growth rate)

	China		India	
	1996-1999	2000-2003	1996-1999	2000-2003
<i>Annual average:</i>				
Industrial production	9.90	10.07	4.97	5.84
Energy consumption	1.16	6.16	3.35	2.41
Energy production	0.15	6.16	1.49	2.51

Source: Chen et al. (2005)

Table 5: China and India's Global Demand and Supply for Oil

(a) China

	2000	2001	2002	2003
<i>Oil (000 tons):</i>				
Production	163000	163959	167000	169600
Export	-10306	-7550	-7665	-8133
Import	70265	60260	69406	91020
Net import	80571	67810	77071	99153
Consumption (demand ^{1b})	222959	216669	228741	252487
Import dependence (imports as % of demand)	31.5	27.8	30.3	36.0

(b) India

	2000	2001	2002	2003
<i>Oil (000 tons):</i>				
Production	32426	32032	33042	33373
Export	0	0	0	0
Import	74097	78706	81989	90434
<i>Net import</i>	<i>74097</i>	<i>78706</i>	<i>81989</i>	<i>90434</i>
Consumption (demand)	106523	110738	115031	123807
<i>Import dependence (imports as % of demand)</i>	<i>69.6</i>	<i>71.1</i>	<i>71.3</i>	<i>73.0</i>

Source: Chen et al. (2005)

Several factors drive China's importation of oil, First, oil is the only primary fuel for now that is able to meet the soaring demand of Chinese transportation and industry – the most rapidly growing sectors of energy demand. Second, due to financial, ecological and technological limitations, more advanced processes of energy production (such as hydro and nuclear power) will continue to play a subordinate role in China's energy mix. Third, has to do with the relative higher cost of exploration and production of oil in Chinese oil basins. The average production cost of Middle East oil is under \$2 per barrel compare to between \$9 and \$23 per barrel for onshore oil in China depending on the oil fields (Trough, 1999)

Natural gas consumption presently accounts for only 3% of total China's energy needs, but the government plan to increase that to 8% by 2010. However, it is estimated that about 40% of China's total gas will be imported by 2025. By 2030, coal is expected to provide 62%, oil 18%, Natural Gas 8%, Hydropower 9% and Nuclear power 3% of China's energy consumption (The Stanley Foundation, 2006).

ADs battle for oil and gas reserves will likely continue into the future. The actual world spare production capacity is now about 3 mbd, compared with almost 7 mbd in 2002, and capacity will remain tight over the near term (see Figure 2). This reflects long lags in bringing significant new quantities of oil into production and shorter lags before demand substitution can have an effect. Moreover, approximately half of the expected new capacity is being produced by OPEC, suggesting that, on the one hand, the organization will continue to exercise significant market power over the near term and, on the other hand, that emergent producers will be much wooed. Among these emergent producers are SSA countries. Ron Mobed (2006), Energy President and Chief Operating Officer (COO) of the Energy segment of IHS Inc., said: 'the number and size of hydrocarbon discoveries continued to decline during 2004-2005 and many areas of the world became less accessible due to political constraints. Oil and gas companies are increasingly seeking access to larger oil reserves in Africa to meet growing global demand'.

Currently, Africa's liquids production constitutes 12% of world production. However, it will supply 30% of the world's liquid production capacity increase and as much as 25% of global Liquefied Natural Gas (LNG) capacity growth by 2010 (Moded, 2006). According to IHS Inc. statistics, African discoveries in the period 2000 to 2004, contributed nearly 25% in the international liquids discovery volumes (exclusive of onshore U.S. and Canada) and 12% of the discovered gas. Approximately 300 billion barrels of oil equivalent, two-thirds of them liquids, have been discovered in Africa through 2004, 85% of which has been found in just 10 basins, with Libya's Sirte Basin yielding the largest resources (22% of Africa's total). At the end of 2004, the estimated remaining proven plus probable liquids resources in Africa are

nearly 105,000 million barrels of oil (mmb). Africa's remaining sub-Saharan and Saharan countries account for an additional 11,173 mmb.

Additional forecasts by Cambridge Energy Research Associates (CERA), an IHS company, show that Africa will add 29% in oil productive capacity, contributing an additional 3.44 mbd from 2006 to 2010. A substantial portion of this growth will be from new giant fields in Nigeria, Angola and Algeria. This growth represents 27% of the projected 12.55 million barrels per day global productive capacity growth. Giant deepwater discoveries in sub-Saharan Africa are expected to add around 2.5 mbd, with Angola and Nigeria being the major contributors. The major SSAs oil producers are (Pan, 2006):

- ✓ Nigeria, member of OPEC, is the largest oil producer in Africa and the eleventh-largest producer in the world. The country is a major oil supplier to both Western Europe and the United States. The country produces roughly 2.5 mbd. Nigeria's proven oil reserves are some 35.2 mmb, with plans by the Nigerian government to expand to 40 billion barrels by 2010. Nigeria's economy is heavily dependent on oil revenues, which account for nearly 80% of government revenues. Despite its resource wealth, more than 70% of the population lives in poverty;
- ✓ Angola is the second-largest oil producer in SSA after Nigeria. Its oil production is expected to reach 2 mbd by 2008. Angola also has major offshore sources of gas. The oil and gas industries, both considered highly promising, have attracted over \$20 billion in Foreign Direct Investment (FDI) since 2003. The Angolan economy is highly dependent on its oil sector, which accounts for over 40% of gross domestic product (GDP) and almost 90% of the government's revenues;
- ✓ Sudan, its production and export of light (sweet crude) oil, the most easily refined, and therefore most desirable, have risen rapidly in the last few years. Sudan's Energy Ministry reporting production of some 500,000 barrels per day in 2005 despite internal upheaval, including the unrest in the northern region of Darfur. Sudan has proven reserves of some 563 million barrels of oil, with the potential for far more in regions of the country made inaccessible by conflict. Sudan is one of the world's poorest countries;
- ✓ Equatorial Guinea. This tiny Central African country's total proven oil reserves are estimated at 1.28 billion barrels. Oil production averaged 371,700 barrels per day in 2004, with oil accounting for nearly 90% of the country's total exports in 2003. In October 2004, Equatorial Guinea told oil companies operating in the country to cap production at 350,000 barrels per day, for fear that ever-increasing oil revenues could destabilize the economy;
- ✓ Gabon, it has proven oil reserves of roughly 2.5 billion barrels and produces about 230,000 barrels per day. This represents a decline of 37% since its peak production levels in 1997. Exports of crude oil account for approximately 60% of the government's budget and more than 40% of GDP.

Africa's contribution to the world energy supply however is not limited strictly to oil. The continent's new LNG capacity will be a growing source for natural gas. At the end of 2005, Africa had 50 million metric tons per year of the world's online LNG capacity of 173 million metric tons per year, with Algeria and Nigeria leading the way. Supply is more diverse with

12 countries exporting LNG in 2001. Unfortunately, no SSA country is among the main producers (Indonesia, Algeria, Malaysia, Qatar and Australia). The principal producers are the major oil and gas companies. Demand is dominated by Japan, which took 52% of the 143 billion cubic meters (bcm) produced in 2001. Other markets are Western Europe, USA, South Korea and Taiwan. As shown in Table 6, ADs and SSA countries are notable major players in the world LNG market.

Table 6: 2001 trade movement of LNG

To	From													Total Import
	USA	Trinidad Tobago	Oman	Qatar	UAE	Algeria	Libya	Nigeria	Australia	Brunei	Indonesia	Malaysia	Taiwan	
North America														
USA	-	2.62	0.34	0.84	-	1.84	-	1.08	0.07	-	-	-	-	6.59
S&C America														
P Rico	-	0.58	0.05	-	-	-	-	-	-	-	-	-	-	0.63
Europe														
Belgium	-	-	-	-	-	2.32	-	0.08	-	-	-	-	-	2.40
France	-	-	-	0.15	-	9.80	-	0.60	-	-	-	-	-	10.45
Greece	-	-	-	-	-	0.50	-	-	-	-	-	-	-	0.50
Italy	-	-	-	-	-	2.25	-	3.00	-	-	-	-	-	5.25
Portugal	-	-	-	-	-	-	-	0.28	-	-	-	-	-	0.28
Spain	-	0.45	0.91	0.78	0.02	5.20	0.77	1.71	-	-	-	-	-	9.84
Turkey	-	-	-	-	-	3.83	-	1.20	-	-	-	-	-	4.83
Asia Pacific														
Japan	1.79	-	0.83	8.30	6.89	-	-	-	10.05	8.20	22.74	15.27	-	74.07
S Korea	-	-	5.30	6.67	0.17	-	-	-	0.08	0.80	5.38	3.04	0.41	21.83
Taiwan	-	-	-	-	-	-	-	-	-	-	3.70	2.80	-	6.30
Total Exports	1.79	3.65	7.43	16.54	7.08	25.54	0.77	7.83	10.20	9.00	31.80	20.91	0.41	142.95

Note: Flows are on a contractual basis and may not correspond to physical gas flows in all cases.

Source: Cedigaz, cited by Scottish Enterprise (2002)

The huge oil and gas reserves in Africa and the rising demand in the ADs indicate that there are substantial opportunities for growth in trade economic relations between ADs and Africa in general and particularly, SSA. The African continent is a net exporter of oil and gas. Africa accounts for 10% of world proven oil reserve in 2004, while Asia and Pacific region accounts for only 3%. The implication of this is very clear, when countries in Asia and Pacific region would have exhausted their oil reserves, Africa will continue to produce oil.

Crude oil reserves in Nigeria outstrip the reserves in China and India. Asia is the biggest oil consumption area in the world accounting for 30% of world crude oil consumption (see Figure 3). Chinese demand for oil and gas will continue to grow in the next 20 years (see Figure 4). There are two immediate implications of this. First, Chinese oil and gas demand relative to oil producing SSA countries will be higher, and perhaps more significantly, oil reserves in China are likely to run out faster.

IV. Channels of ADs Influence on Oil and Gas Sector in SSA

There are several channels through which ADs activities affect the oil and gas sector in SSA. These channels include: trade, Foreign Direct Investment (FDI), AID, migration, governance, and environment. In this section, we examine each of these influences seriatim.

IV.1. Trade

Traditionally, African economies have strong trade and economic relations with European countries (see Figure 5). In contrast, exports to Asia are a small but increasing market for Africa in recent years. Africa's exports to Asia grew significantly in both relative and absolute terms during the past 12 years. Of Africa's total export earnings, which are estimated at about US\$134 billion per year (2001–2003 average), 15% derive from sales to Asia. Africa exports to Asia grew by 10.3% in the period 1991-2003, surpassing intra-Africa trade which grew by 7.0% over the same period. It was also higher than the mean growth for the period which stood at 5.3% (see Figure 6). On the Asia side, Figure 7 shows that apart from intra-Asia imports, which grew by 7.9% between 1991-03, imports from Africa came a close second averaging 7.5% compared to 4.7 and 2.9% from EU and USA respectively.

The major factor accounting for the rising share of Asia in trade relations with Africa is the influence of China and India. Sino-African trade in particular, has grown tremendously. It grew by 700% during the 1990s. Between 2002 and 2003, trade between China and Africa doubled to US\$18.5 billion and then nearly doubled again in the first ten months of 2005 to US\$32.17 billion. Most of the growth was due to increased Chinese imports of oil from Sudan and other African nations. China's FDI in Africa represented US\$900m of the continent's US\$15billion total in 2004. China is now the continent's third most important trading partner, behind the US and France and ahead of Britain. Figure 8, which shows higher (and increasing for China) share of oil in the total imports of goods of China and India, highlight the significant role of oil in the rising of ADs trade with Africa (see Table 7).

Table 7: ADs Oil Import from World and Africa

Chinese Oil Imports (\$ billions)						
	2000	2001	2002	2003	2004	2005
Crude Petroleum						
Africa	3.6	2.5	3.0	4.9	9.3	13.2
ROW	14.9	11.7	12.8	19.8	33.9	47.7
Petroleum products						
Africa	0.0	0.0	0.0	0.1	0.0	0.1
ROW	5.7	5.8	6.3	9.1	13.4	15.0

Indian Oil Imports (\$ billions)						
	2000	2001	2002	2003	2004	2005
Crude Petroleum						
Africa	3.9	2.1	2.2	2.4	-	-
ROW	1.8	1.9	2.2	2.2	2.4	-
Petroleum products						
Africa	0.01	0.01	0.06	0.03	0.02	0.01
ROW	1.0	0.7	0.7	1.0	1.4	1.4

Source: Broadman (2006)

The trade relationship between the two parties is based on a number of mutually beneficial factors. On the African side, China is more acceptable because of its policy of non-interference in other states internal affairs which means that loans or aids are not subjected to political conditions, as is often the case with the West. Second, China involvement in the oil sector often comes with a development package that incorporates the development of other aspects of the economy.

Trade-relationship between Africa oil exporters and ADs in oil and gas sector is largely complementary rather than competitive. However, with oil importers, the activities of ADs in oil & gas may well be judged to be competitive as ADs activities in the various channels may bid up prices. There are also indirect global macroeconomic effects that arise from ADs growth performance on raw materials markets through which Africa economies are most prominently linked to the world economy. A critical factor behind the promising growth in Africa real GDP has actually been commodity prices (AfDB, 2006). Commodity prices have largely been driven by the ADs demand for commodities.

Table 8 shows the contribution of the ADs to growth of world import of oil. China accounts for about 30% and India slightly over half of this (18%) of the growth in the world import of oil.

Table 8: China and India’s Contribution to growth of world import of oil (%)

	China			India		
	Average annual growth for the world excluding China	Average annual growth for China	Overall contribution to global growth by China	Average annual growth for the world excluding India	Average annual growth for India	Overall contribution to global growth by India
Oil	1.1	31.6	29.9	1.3	18.8	17.9

Source: Chen et al. (2005)

IV.2. Foreign Direct Investment

This is also an important channel of transmission of ADs influence on the oil and gas sector in SSA. It is possible to identify four main channels through which ADs impact on FDI in the oil and gas sector in SSA (Chen et al., 2005):

- ✓ direct competition for projects;
- ✓ indirect consequences of the rise in the price of commodities on the financial viability of FDI projects;
- ✓ Interests of ADs through direct investment in Africa;
- ✓ Opportunities for Africa multinationals to invest in ADs.

The first relate to how direct competition for global FDI might affect SSA’s ability to attract FDI on the global scene. However, due to limited oil and gas reserves in these ADs, there might not be direct threat here. Global FDI in the energy sector are deplored globally to countries for the exploration and development of oil fields wherever they can be found. However, the flow of FDI into oil-rich African countries may however displace FDI flows to

resource poor countries. 50-80% of FDI in Africa is in natural resource exploitation and natural resources rich countries (Angola, Chad, Equatorial Guinea, Nigeria and South Africa).

The second channel is also gaining importance. This is largely an indirect effect. The high price of oil and gas on the world market has made deep water oil exploration now financially viable. The Gulf of Guinea is now being exploited, so also are Angola deepwater basins. In Nigeria, due to the crisis in the Niger Delta, the favorable price of crude oil on the world market is pushing exploration and production (E&P) companies to increasingly move to offshore.

The third channel – overseas ADs investment. This is where we expect one of the greatest direct impacts of the ADs in SSA. The bulk of ADs investment goes to oil and non-oil mining sectors. China and India are currently involved in a number of oil producing countries in SSA. For instance, China has been heavily involved in Sudan's efforts to become a key oil producer/ exporter. A major pipeline constructed with Chinese assistance opened in 1999 and provides access to the Red Sea. A Chinese built refinery also opened in 2000. China has 40% stake – the biggest shareholder in the Greater Nile Petroleum Operating Company (GNPOC) which carries out production in Sudan. In Niger, CNPC (China National Petroleum Company) acquired prospecting rights in Tenere and Bilma oil fields. China has also showed interests in Gabon oil, even though Gabon's oil production is falling.

In May 2004, Wei Jianguo, the Chinese vice-Minister of Commerce visited Nigeria with a 10-member trade delegation and announced that China would commit more than half a billion dollars to 2 off-shore oil blocks OML 64 & 66 in the Delta area offshore. China's SINOPEC is to operate the field as a joint venture with NNPC (Akinjide, 2005). The agreement provides for 50,000 bpd supply to china with prospect of future increase. In the first ten months of 2005, Chinese official sources say, Chinese companies invested a total of \$175 million in African countries, primarily on oil exploration projects and infrastructure. In January 2006, the state owned China National offshore oil corporation (CNOOC) agreed to invest US\$2.3 billion in Nigeria's oil industry and India Oil and National Gas Corporations (ONGC) made a bid to partner in the development of Nigeria's Akpo field. China is a big investor in Nigeria where it received access to exploration sites as part of a package which included the construction of a 1,000MW hydroelectric plant in Mambila. It also has a controlling share of a refinery in Kaduna

The African oil and gas markets hold a number of attractions for the Chinese. First, China prefers sweet crude oil which is low in sulphur contents to blend with more sour variables that they import from the Middle East. There is therefore fierce competition over the existing supplies of sweet crude from Africa. Second, for energy security, China is trying to diversify supply sources from Middle East countries to more stable African countries. Third, among all SSA oil producing countries, Nigeria is the only member of OPEC. Hence, fears about production quota and other controls by the cartel will have little impact on ADs quest for oil and gas from the continent.

Beginning in 1994, the Chinese government embarked on serious realignment in the oil industry and the reform of domestic oil prices. One of the aims of these realignments was to create financially robust, strong and flexible oil companies capable of aggressive imports policies and overseas investments. As a result of such measures, three leading Chinese State oil companies – the Chinese National Offshore Oil Corporation (CNOOC); the China

National Petroleum Corporation (CNPC) and the China National Petroleum Corporation (Sinopec) were promoted to the Ministerial level and placed under the State Economic and Trade Commission.

Along with this promotion, the companies were delegated the power to purchase operating rights and rental rights overseas, and to establish subsidiaries and to undertake overseas oil exploration. The government also gradually increased the state controlled price of crude and thus bolstered the oil producing companies with substantial financial resources for overseas exploration and development.

To promote their investment relationship with the SSA countries, China and India have signed a number of bilateral investments (BITs) and double taxation Treaties (DDTs) with several African countries as evident in Table 9.

Table 9: Bilateral Investments and Double Taxation Treaties between the ADs and SSAs

	China				India			
	BIT*	DTT**	FDI Value a	Nrs. b	BIT*	DTT**	FDI Value c	Nrs. b
Angola				4				
Botswana	√							
DR Congo								
Ethiopia	√					√		
Ghana	√				√			
Kenya						√		3
Mauritius		√				√	414.8	9
Mozambique								
Nigeria		√ ^d	44.3	4				2
Senegal								
South Africa		√	119.3	1		√		13
Tanzania			41.3	1		√		2
Zambia			134.4	2				

Notes:

*BIT = bilateral investment treaties

**DTT = double taxation treaties

(a) Cumulative investment value of approved projects (1999-2002);

(b) Number of projects (2002-June 2005);

(c) Equity (1991-March 2001);

(d) Treaty signed (15 April 2002) but not yet in force.

The last channel which relates to outflow of direct investments from SSA firms in the ADs countries is less relevant. Perhaps, only South African firms have had the capacity to be involved in the FDI flows into both China and India.

It is also pertinent to point out one feature of Chinese investments in the oil and gas upstream sector of the SSA countries. Chinese oil companies always work in tandem with their service companies. Table 10 shows some involvement of Chinese oil services and downstream interests in SSA. The activities of the service companies are well integrated into the overall Chinese goal of energy security. These companies are able to compete on labor, cost, manufacturing, and increasingly, know-how. This may have implications on host government local content policies (Battat and Aykut, 2005). Evidently the involvement of ADs in the downstream sector of SSAs is largely low-key.

Table 10: Chinese Oil Services/Downstream Interests in Africa

Country	Notes
Algeria	CNPC: 100 kbd refinery project in Sbaa Basin BGD: CNPC's seismic affiliate, Algerian seismic work
Libya	Unnamed: Pipeline construction project BGD: CNPC's seismic affiliate, Libyan seismic work
Niger	BGD: CNPC's seismic affiliate, Nigerian seismic work
Nigeria	CNPC: downstream agreement to refurbish Kaduna refinery BGD: CNPC's seismic affiliate, Nigerian seismic work
Sudan	China Petroleum Engineering & Construction: construction branch of CNPC; oil pipeline construction to Port Sudan and oil terminal on the coast; deals worth \$405 million CNPC: pipeline from Al-Fulah field in Block 6 to main pipeline CNPC/Sinopec: equity in refineries BGD: CNPC's seismic affiliate, several projects in Sudan

Source: Mohammed (2006)

IV.3. AID

The ADs have sweetened their FDI and other involvements in SSA oil and gas sector through their development AID. China has carefully aligned its foreign policy to its domestic development strategy. State controlled companies are encouraged to seek out exploration and supply contracts with countries that produce oil and gas. China also aggressively courts the governments of those countries with diplomacy, trade deals, debt forgiveness, and aid packages.

In fact, for oil producing countries that are desirous of linking the upstream and downstream sectors, the Chinese offers to build power plants, railways, refineries, etc seem a very much attractive offer. For instance, in Angola, which currently exports 25% of its own production to China, Beijing has secured a major stake in future oil production with US\$2 billion package of loans and aid that include funds for Chinese companies to build rail roads, schools, hospitals, roads, bridges and offices, lay a fibre-optic network and train Angola telecommunication workers.

During Hu Jintos's visit to Nigeria in April 2006, Hu signed a MOU for billions of dollars to invest in infrastructure. The MOU included an arrangement for CNPC to take a stake in the Kaduna refinery in return for the right of first refusal on 4 oil blocks. CNPC won the blocks in May with a commitment to invest \$2 billion in the refinery. The Chinese also committed to building railways, pipelines and to help the government develop the Mambila Hydropower. Preferences in oil countries are given to bidders offering attractive economic packages.

Moreover, the roads, bridges, and dams built by Chinese firms are low cost, good quality and completed in a fraction of time such projects usually take in Africa. China has cancelled US\$10 billion in bilateral debt from African countries, sends doctors to treat African hosts thousands of African workers and students in Chinese Universities and training centers.

Some of the infrastructure financed by China Exim bank in Africa – such as the Dam at Imboulou in Congo and projects in Sudan are repaid in oil. This has indeed help ease the financial burden of infrastructure development in the beneficiary SSA countries.

Selling arms to African countries also helps ADs (especially China) cement their relationships with African leaders and helps offset the costs of buying oil from them. Indeed, Beijing sees Africa as a growth market for its military hardware. China's active exploration of oil sources in Africa also leads to a need to ensure security around them, which has led Beijing to send Chinese military trainers to help their African counterparts.

It is important to mention that the interests of China and India do not always coincide. India and China are locked in battle to secure stakes in oil fields and blocks in the new energy haven of West Africa. In Angola and Nigeria, nearly completed deals with India have been cancelled in favor of Chinese companies. This is because China accompanies its bids by offering aid for a variety of projects which are usually higher than what India is willing to offer. Chinese US\$2 billion compare to India's offer of US\$200million for developing railways.

IV.4. Migrations

Migration does not seem to be an important channel through which the ADs affect the oil and gas sectors in Africa. The sector remains an enclave, highly capital intensive and high technology oriented. Some of the oil producing countries like Nigeria already have local content policies that are targeted to enhance indigenous participation in the oil and gas sector. In spite of this, we expect that more Chinese and Indian migrant may use their involvements in the exploration, production and processing of oil and gas in SSA to stay in these countries. For instance, in the Nile River Merowe Dam – biggest international project secured by China so far, 'all managers, 90% of engineers, and 75% of technicians will be Chinese. Local staff will account for 20% of skilled workers and all general labor'.

IV.5. Governance

Governance is one the channels through which the ADs are likely to impact on the economies of SSA. ADs interest in SSA has both positive and negative effects. It is good for the continent because it brings in a new actor who is willing to invest, but it could be bad for Africa if it turns countries away from the hard work of political, social and economic reforms.

Oil has brought corruption and turmoil in its wake virtually wherever it has been found in the developing world. Second only perhaps to the arms industry, its lack of transparency and concentration of wealth invites kickbacks and bribery as well as economic distortions.

Transparency International (TI) report on 30 leading exporters found that Indian, Chinese and Russian exporters bribe more often than companies from other companies. Bribing companies undermine the efforts of government in developing countries to improve governance. Corruption is one of the symptoms of poor governance. Revenue from extractive industry should be a blessing and not a curse in poor countries, but all ties often poverty, conflict and corruption go hand in hand with the vector of oil & gas and minerals.

While more competition in the demand side is welcomed by oil and gas producing countries and in theory may contribute to make the bidding processes for exploration and production rights more open, the risk exists that companies that are based in emerging countries may follow lower bidding practices. While the Western oil majors may be somehow curtailed in their practices by the various standards and conventions on transparency and good government and corporate behaviors, the same may not apply to these other countries.

Most raw materials rich African countries receive low score in the perception of corruption and bribery as reported by TI. This suggests that increased presence of the ADs in the resources rich countries may increase the rent earned by an elite that commands access to these resources rather than the population at large. The exploitation of exhaustible resources might therefore not only burden current, but also future, generations if the proceeds are not invested at a social return high enough to exceed the inter-temporal shadow cost (see Table 11).

Table 11: SSA Performance on Some Indicators of Governance and Trade with ADs

<u>Country</u>	<u>CPI TI Score*/ Rank/ CPI Change</u> 2004 of 145 since 2000	<u>Main Export Items</u> per cent of total Exports, 2002	<u>China's Share 2003</u> per cent of export receipts	<u>India's Share 2003</u> per cent of export receipts
Angola	2.0 133 +0.3	Crude Petroleum (91.4)	23.2	0
Cameroon	2.1 129 -0.1	Crude Petroleum (43.9)	4.4	0.3
Congo	2.3 114 n.a.	Crude Petroleum (30.3), Wood (7.7)	30.3	0.2
Gabon	3.3 74 n.a.	Crude Petroleum (75.2), Wood(13.9)	5.5	2.0
Nigeria	1.6 144 +0.3	Crude Petroleum (88.9)	0.5	9.9
Senegal	3.0 85 +0.5	Inorganic acid, oxide, etc.(21.5)	1.4	13.0
Sierra Leone	2.3 114 n.a.	Diamonds (100)	n.a.	4.0
Somalia	n.a.	Wood & Pulp (49.2)	5.6	11.7
South Africa	4.6 44 -0.4	Precious Metals	4.6	4.2
Sudan	2.2 106 n.a.	Crude Petroleum (76.2)	40.9	3.0
Tanzania	2.8 90 +0.3	Fish (12.1)	2.6	9.9
Zambia	2.6 102 -0.8	Copper (39.2)	1.7	3.6

Note: * Transparency International (TI) CPI (Corruption perception Index) Score relates to perceptions of the degree of corruption as seen by business people and country analysts and ranges between 10 (highly clean) and 0 (highly corrupt).

Source: Chen et al (2005)

IV.6. Environment

This is also a channel of ADs impact on the SSA oil and gas sector. The exploration and production of oil and gas has significant impact on the environment. One problem associated with this dependence on oil is the extremely damaging effects that production, distribution, and use have on the environment. Furthermore, accidents and conflict can disrupt production or the actual oil resource, which can also result in environmental devastation Oil waste dumping, production pollution, and spills wreak havoc on the surrounding wildlife and

habitat. It threatens the extinction of several plants, and has already harmed many land, air, and sea animal and plant species.

The effects of oil on marine life are caused by either the physical nature of the oil (physical contamination and smothering) or by its chemical components (toxic effects and accumulation leading to tainting). Marine life may also be affected by clean-up operations or indirectly through physical damage to the habitats in which plants and animals live. For instance, Nigeria has the highest gas flaring rate in the world. This has had major environmental impact on the indigenous people living in the oil producing region. Lack of appropriate environmental regulations and standards or/and ineffective implementation of the existing environmental laws have made the MNCs to continue to degrade the environment with impunity. This has impoverished the indigenes.

With very poor record of the Southern MNCs, including the ADs, it is doubtful if environment consideration will feature significantly in their operations. Are they going to raise the quality of environmental standard in the exploration and production of oil and gas in the host countries or will care little about what the impact of their activities will be on the environment. This is will be very important in particular in those SSA countries where their operations are very significant like Sudan, Angola and Democratic Republic of Congo.

V. Potential effects of ADs involvement in SSA oil and gas

The ADs involvement in SSA oil and gas sector has several impacts – direct and indirect – on the following performance indicators: macroeconomic performance, poverty and income distribution, governance, and environment

V.1. Macroeconomic Performance

The impact of ADs on macroeconomic performance of SSA comes through both direct and indirect channels. These include, oil and gas prices, trade and financial flows. Each of these impacted on the macroeconomic performance of the subcontinent. According to Kaplinsky et al., (2006) and DFID/UK (2005), the direct impact includes:

- ✓ Oil and gas price and growth (production) impacts due to increased demand of ADs;
- ✓ Trade impacts due to growth of SSA exports to ADs and increased import from the region;
- ✓ Financial impacts working through channels of Foreign Direct Investment (FDI) and Aid.

There are also many indirect impacts. We can cite among others, the multiplier effects due to price impacts, the impact on inflation, production cost, consumption, balance of payment, public finances (government revenue), aid, Dutch disease, management, and poverty and income distribution. The direction (positive or negative) and the magnitude of these direct and indirect impacts may vary from one country to another depending to supply responses, status of the country (net exporter or net importer), the horizon of the analysis (short, medium and long term), the deepness of the previous relation of the country with ADs, and etc.

V.1.1. Oil and gas price and growth impacts

As far as prices are concerned, Crude oil prices behave much as any other commodity with wide price swings in times of shortage or oversupply. The crude oil price cycle may extend over several years responding to changes in demand as well as OPEC and non-OPEC supply. Figure 9 gives a short history of oil price trend in relation with world events. It can be clearly seen that Asian demand is the main reason of the growing of oil prices in 2005. During the first months of 2005, the Asian demand for crude oil was growing at a rapid pace. The loss of production capacity in Iraq and Venezuela combined with increased production to meet growing international demand led to the erosion of excess oil production capacity.

In mid 2002, there were over 6 mbd of excess production capacity, but by mid 2003 the excess was below 2 mbd. During much of 2004 and 2005 the spare capacity to produce oil has been less than 1 mbd, not enough to cover an interruption of supply from almost any OPEC producer. In a world that consumes over 80 mbd of petroleum products, that adds a significant risk premium to crude oil price and is largely responsible for prices in excess of \$40 per barrel. Crude oil rose from less than \$40 a barrel (bbl) in 2004 to a record high of \$70.85 a bbl in August 2005. While the price of oil fell slightly in December 2005, it resumed its upward trend in early 2006 and even exceeded \$70 a bbl in April (AfDB, 2006).

There are a number of underlying factors that have prevailed for most of 2005 that have affected LNG prices. These factors include (EIA, 2006): Weak production (decreased by 0.6% in 2004), rising net imports (imports increased by almost 3% in 2004), high demand (demand has remained strong in 2005, owing to the continued strong performance of the global economy and high temperatures prevailing across the country), high oil prices (substitute energy), and Hurricane activity (Katrina and Rita caused major service disruptions and production shut-ins). Other factors contributing to continued high natural gas prices in 2005 include the expectation that Pacific Northwest hydroelectric resources will be below normal through the rest of the year, and recent difficulties in maintaining rail shipments of coal to electric power generators.

Many indirect impacts, listed above, are derived from the effects of price shocks. Oil price shocks affect the economy through different channels: the supply side, the demand side and the terms of trade. Supply suffers as production costs rise in the wake of an oil price shock. Given substitution between production factors, relative price changes result in a reallocation of the means of production. This, in turn, cushions the negative effects. The long-term effects on production capacity are thus less pronounced than the short-term effects, which are dominated by frictions arising as a result of resource reallocations and by uncertainties about the subsequent development of oil prices. However, these inter-sectoral reallocations also generate costs (training expenses, irreversible investments, etc.). The actual impact on investment essentially depends on the expectations about the stability of oil price changes, which tend to vary over time. On the demand side, oil price shocks drive up the general level of prices, which translates into lower real disposable incomes and thus reduces demand.

Apart from their direct effects on the general price level, oil prices also have second-round effects, as rigid nominal wages and price and wage indexation add to inflation. Higher wage pressures and weaker demand dampen employment. In addition to that, a deterioration of confidence and stock market reactions can amplify the impact of a shock. Furthermore, economies are hit by changes in the international environment brought about by oil price shocks. Climbing import prices trigger a deterioration of the terms of trade and thus

precipitate welfare losses. Apart from the channels described so far, the monetary policy response plays an important role. The above mostly findings apply to oil importing countries. Oil exporting countries benefit from higher export revenues, which are, however, diminished by a decline in global demand (Schneider, 2004).

When considering long term, empirical findings show that an increase in the price of oil feeds through to GDP growth to a much larger extent than a decline. The phenomenon can be attributed to adjustment costs associated with sectoral reallocations and the implications of uncertainties for spending on consumer durables and investment. According to the so-called dispersion hypothesis, oil price hikes lead to a reallocation of resources from energy-intensive to energy-efficient sectors. As this reallocation progresses only gradually due to adjustment costs involved, a short-term decline in output results, which intensifies the economic slowdown.

On the other hand, when oil prices shrink, the consequent expansion of aggregate output is dampened by adjustment costs. In this connection, adjustment costs on the labor market play an important role according to the dispersion hypothesis. Nominal wage rigidities also help explain asymmetric effects. When oil prices rise, employees will try to compensate the loss of their purchasing power by negotiating wage hikes. However, increases in real purchasing power caused by lower oil prices do not lead to sinking nominal wages. Another explanation for these asymmetric effects is that decisions on whether or not to buy consumer durables and capital goods (cars, real estate, heating, insulation, production facilities, etc.) are often based on energy prices. Oil supply problems fuel uncertainty and lead to an abrupt contraction of such expenditures. Therefore, rising oil prices entail a decline in demand, while falling oil prices do not trigger a spike in demand. Definitely, the intensity of the effects of oil price shocks depends on wage and price responses (and in particular on inflation expectations), but also on the respective monetary policy reaction [Barsky and Kilian (2001), Hamilton and Herrera (2001), and Brown and Yücel (1998)].

V.1.2. Trade and balance of payment impacts

As it has been shown earlier and confirmed by trade trends in Figure 10, direct impact on trade on both ADs and African (SSA) countries is obvious. It is the assessment of the indirect impacts which seem to be more controversial. A number of attempts have been made to assess them [Kaplinsky et al. (2006), Kaplinsky and Santos Paulino (2006), and Edwards and Jenkins (2005)]. As the impact on poverty is concerned, it is state in the literature that growth of exports will not necessarily translate into an increase in per capita income (UNCTAD, 2004a).

Other things being equal, increased exports will increase import capacity and given the import dependence of most SSA economies, this should translate into higher investment, higher capacity utilization and expanded output. However other things may not be equal, for example reduced aid inflows or increased debt service obligation can offset the positive import-supply effect of increased exports. Where the expanding export sector is an enclave relying heavily on imported inputs and having few linkages with the local economy, the impacts of export growth will be attenuated. Thus the relationship between export growth and per capita income in an economy needs to be taken into account in discussing the likely impacts of SSA exports to ADs.

In like manner, the impact of growth on poverty, one of the main challenges of SSA, depends not just on the rate of growth but also on the inclusiveness of the growth process. The latter partly depends on domestic structures and institutions and partly on the nature of the growth stimulus itself. In terms of local structures, a number of studies have shown that the degree of income inequality is an important determinant of the extent to which the poor are likely to benefit from economic growth (White and Anderson, 2001). One factor that should be taken into account therefore in identifying the likely impact of increased exports to ADs on poverty in SSA is the existing degree of inequality within countries. The type of product exported can also have an important impact on the extent to which the poor benefit from the growth of exports. Oil and gas, and other mineral sectors, whose products mainly explain growth in SSA export to ADs, tend to be capital and skill-labor intensive, although there may be some jobs created in the initial construction stages of opening new mines. A more substantial contribution can potentially come from government revenues which increase as a result of higher prices or increased levels of production.

In importing countries, high price of oil impacts directly on firms, consumers and the government. First, it increases the domestic price of petroleum products, raises the cost of many intermediate inputs, and as a result leads to higher production costs. Consequently firms may reduce their labor demand, investment and output. Second, as the short-run demand for oil is highly inelastic, consumers are forced to reduce their consumption of other goods and services to pay for higher energy bills. Third, net oil-importing countries face Balance of Payment (BP) constraints as they must secure additional resources to pay for the higher oil import bill. Governments also face tighter budget constraints which can affect their capacity to finance social programs. However, the extent to which the high price of oil affects oil-importing countries BP will depend on the share of oil in their imports and economic activity. In the absence of sufficient external reserves, or external borrowing, reductions in domestic consumption and investment will undermine even more their economic performance. Countries which resort to continued external borrowing to finance their budget shortfall will face higher debt servicing, and possibly debt sustainability problems, in the future.

Given the limited availability of foreign exchange, oil-importing countries face a number of options. Consumers and firms could decide to reduce their oil consumption but since the demand for oil is highly inelastic in the short-term, they may be compelled to reduce their consumption of other imported goods. Doing so could undermine economic growth especially if capital goods imports are affected. Alternatively, countries could try to access foreign currencies to fill the gap and finance the energy bill. However, obtaining funds from private markets, bilateral and multilateral sources must be consistent with medium-term sustainability and sound debt management. In highly indebted poor countries, the only solution to fill the financing gap, and not to weaken growth, is to obtain grants or highly concession loans. More importantly, a sustainable financing plan needs to be considered. However, it is pertinent to point out that SSA face escalating tariffs for oil and gas sector in the ADs as evident in Table 12.

Table 12: Africa’s leading exports face escalating tariffs in China and India

	China	India	Japan	Asia average
Petroleum oil. Crude	0.0	na	na	0.2
Petroleum prod refined	7.4	15	2.1	0.3

Source: Broadman (2006)

V.1.3. Financial flows (Government revenue, FDI, and Aid) impacts

Governments of exporting countries stand to earn significant benefits from the high price of oil. Those with small population, which in addition are currently quite poor (Equatorial Guinea, Chad, etc.), stand to benefit substantially on a per capita basis. That oil wealth, if properly managed, could help exporter countries to grow quickly. However, governments should be aware of the distortions that an oil boom can create through inflows of sizable foreign exchange earnings.

The real exchange rate can appreciate through growing inflation and nominal currency revaluation. The non-traded sector could expand and non-oil traded goods lose competitiveness and decline. This is the classical Dutch disease pattern. Consequently, it is advisable that the monetary authorities adopt a non-inflationary policy to avoid hyperinflation and to maintain monetary credibility.

High oil prices will exert a heavy toll on the importing countries budget both on the revenue and expenditure sides. On the revenue side, the tax base will be eroded if the profitability of oil-consuming companies is adversely affected and if unemployment increases. Expenditure could increase wherever governments subsidize oil products, or programs, which make intensive use of petroleum products. In that regard, an important question is if there should be complete pass-through of the oil price increase. Governments are under heavy pressure to intervene to cushion the effect of the oil price increase. If the price of oil is not mean-reverting, price controls will lead to ever increasing losses which will ultimately be borne by current or future tax payers.

Subsidies to public utilities can also worsen the consolidated government budget deficit. In many countries electricity is produced using oil and is sold by law below its cost of production. In this case, the government will have to bear the additional expenditure from a higher oil bill. If the government does not have the resources to do so (for instance, if foreign reserves are too low), it may have to resort to rolling blackouts which have very adverse effects. Moreover, the government will itself face a higher energy bill through its own activities and that of state-owned companies.

The impact of ADs on FDI flows must be analyzed in terms of ‘FDI diversion’ (competition effect) and FDI creation (complementary effect) to account, on the one hand, for the fact that that the ADs and SSA are in competition for attracting third party FDI, and on the other hand, flow of them is not one way.

As far as diversion is concerned, the massive growth of FDI flows to China and the much smaller, but also rapidly growing FDI in India could have diverted investment from other Developing Countries (DCs) including SSA and this could have a negative effect on growth and poverty reduction in those countries. Looking at the complementary effect, ADs have begun to invest overseas and this aspect of their growth might have a positive effect on growth and poverty reduction in host countries.

If crowding out is not significant then any diversion of FDI to ADs will have negative effects on production in other countries. Increased competition for FDI might also reduce government revenues as countries compete to attract investors through lower tax rates and increased incentives. On the other hand inflows of FDI from ADs would tend to increase employment and might reduce prices as a result of increased competition. Particularly, if ADs

FDI went into labour-intensive industries there could be positive effects on poverty (DFID/UK, 2005). In the past, FDI outflows from ADs into SSA have been small compared to their investments in other regions, and inflows to ADs from SSA have also been smaller compared to what the region received from ADs.

In terms of the likely impact of the positive net FDI on poverty, it is important to consider the sectors in which ADs FDI have been concentrated. By far the most important is oil. India's major investment in the African countries is the state-owned Oil and Natural Gas Commission Ltd's stake in a Sudan oil field (UNCTAD, 2004b). China's involvement in Africa is also heavily geared towards oil and it too has recently made a significant investment in Sudan (Economist, 2004). The dominance of extractive activities means that the poor are unlikely to benefit directly from the ADs investments.

The pattern of FDI into China is likely to change as China opens its service industries to FDI under its WTO accession agreement. However this changing pattern is unlikely to represent a diversion of FDI from other developing countries since any such FDI inflow into China will be (to a large extent) in non-traded goods such as banking and finance, telecommunications, distribution, retail and wholesale trade (UNCTAD, 2005). Similarly, FDI into India is unlikely to be at the expense of FDI SSA (DFID/UK, 2005).

As far as outward FDI is concerned, the 2004 World Investment Report expects investment from China to increase as the government has relaxed restrictions on outward investment, partly to ease the pressure of rising international reserves on the exchange rate. The Government of China has expressed recently a strong political commitment towards Africa and has stated its intention to give preferential treatment on trade from the least-developed SSA countries and, together with the UNDP, has established a China-Africa Business Council (CABC) to promote trade with, and FDI in, Africa.

Chinese FDI has grown rapidly over the four years up to 2002 with Africa representing 10% of the total (CABC, 2004) and some commentators predict that Africa could be one of the top three investors on the continent within five years (Economist, 2004). These investments are likely to continue to be predominantly in natural resources.

Similarly outward FDI from India is expected to grow rapidly as restrictions on FDI abroad are relaxed by the Indian Government. In the recent past, India's outward FDI has been in the manufacturing and service sectors (UNCTAD, 2005). Such investment is unlikely to go to SSA but the pattern of India's outward FDI is widely believed to be changing. With India importing 70% of its oil needs, securing natural resources is becoming an important driver for Indian outward FDI [Gottschalk (2005) and UNCTAD (2004b)]. Thus, FDI into SSA from ADs is likely to increase. But, most such investments are likely to be in oil and mining and will not necessarily have positive effects in terms of directly benefiting the poor.

In spite of the well known recurrent debate of the relation between aid and development [Easterly (2006a and b), Erixon (2005), Easterly et al. (2003), Kosack (2003), and Collier and Dollar (2002 and 2001)], aid flows between ADs and SSA can be analyzed in the same manner that flows of FDI, in terms of competition and complementary effects. ADs aid to SSA, of which little is known, appears to be very closely linked to strategic and political objectives. Until the mid-1990s, much of this aid was directed to Liberation Movements and to further the desire to politically isolate Taiwan. But since the mid 1990s, aid appears to be

increasingly directed towards broader strategic objectives, and in particular to the development of links with resource-rich SSA economies (Kaplinsky et al., 2006).

As regarding competition effect, support for aid to Africa is higher than for countries in other regions. Africa received substantial sums of aid over a sustained period (However, oil importing countries are receiving more than oil exporting ones (IMF, 2006b). From 1970-2000, despite the decrease of end of 1990s, aid (as percentage of Gross national income -GNI-), received Africa is over ten times that receiving by ADs (see Figures 11 and 12).

V.2. Poverty and income distribution impacts

Winters et al. (2005) pointed the limited impact on terms of poverty reduction of oil and minerals industries and exports (the positive impact of which mainly consists of windfall government revenue). Oil is an enclave and labor intensity is very low; hence limited impact on poverty reduction.

Oil-rich SSA countries do not have lower poverty rates than the rest of Africa. Their challenge is to translate higher growth numbers, and value of oil stocks, into lower poverty rates. This requires that oil-producing countries adopt sound institutions and appropriate macroeconomic policies. They need to invest in projects which yield the highest social rates of returns, such as education and infrastructure, and not in prestige enhancing projects. Moreover, care must be taken that the extra oil revenue does not accrue only to some segments of the population while the living standard of the others remains unchanged or worsens.

In importer countries, lower employment prospects and the higher inflation rate will lower the purchasing power of the poor who have fewer (if any) instruments to hedge against the oil price increase. The biggest impact will be through higher price of kerosene which is used for cooking and lighting. The poor will also be affected by higher transportation costs. Clearly, higher petroleum costs will increase commuting costs and, especially in the case of agricultural economies, the cost of getting the crops to the markets.

However, governments should resist the temptation to provide subsidies to offset the high price of energy. Subsidies constitute a serious drain on public finances, especially if the high price of oil persists. They will have to be financed through higher taxes, or external borrowing which will generate a higher debt burden. Moreover, although kerosene is considered an inferior good, it is not clear that subsidizing it is the best means to protect the poor because it is difficult to prevent non-poor from consuming kerosene. Discretionary fiscal response should be limited since it may be difficult to remove in the future.

V.3. Governance impacts

The prudent use of oil windfalls requires appropriate governance structures, which are based on transparency and accountability. To manage the problem of governance and revenue management Mayorga Alba (2001) proposes the following key critical policies:

- ✓ The establishment of transparency and accountability with respect to revenues earned and their disposition;

- ✓ Consultation with principal stakeholders in developing plans for the use of resource revenues;
- ✓ Credible oversight and audit of the implementation of these plans;
- ✓ Serious attention in building local institutional capacity.

The World Bank group works with several governments to improve their governance of oil revenues and, where appropriate, to design the operating conditions for any oil fund which the country establishes for the use of such revenues. To support these efforts, the international donors have endorsed the Extractive Industries Transparency Initiative, which was launched in by Tony Blair, UK Prime Minister, and piloted by the UK's Development for International Development (DFID) department, and encouraged producing countries, and provide them incentives to join the initiative and others (Publish What You Pay –PWYP- and Publish What You Earn Initiative –PWYE-). Works have also been done to develop instruments to facilitate securitization of oil proceeds and help countries design instruments to use their oil reserves to tap into financial markets. Currently 13 out of the 20 countries that have endorsed the principle of EITI are in Africa (Congo, Ghana, Nigeria, Sao Tome and Principe, Angola, Cameroon, Chad, Democratic Republic of Congo, Equatorial Guinea, Gabon, Guinea, Niger and Sierra Leone). However, only four of them - Congo, Ghana, Nigeria, Sao Tome and Principe, are actually reporting on their implementation.

It is important that the extra oil revenue be used to increase the set of production possibilities through investment in physical (e.g. infrastructure) and human capital. Moreover, given that oil reserves are exhaustible, appropriate provision should be made for future generations to benefit from the current high price of oil. Specifically, there must be built-in mechanisms for control, reporting, and evaluation of oil revenues and operations. Some oil producing countries are adopting policies to that effect. For example, the Nigerian government has created a special holding account for temporary increases in oil revenues so as to smooth government spending and to reserve some of the windfall revenues for infrastructure development.

However, some countries may choose to renege on their promises to manage their resources for the benefit of both the current and future generations. A time-consistent mechanism needs to be found, such that it is in the best interest of an oil-producing country not to renege on its commitments. Such a mechanism may mean better involvement of the civil society through all the decision-making process and a stronger coalition of all lenders. There are fears that the way China operates compromises transparency and accountability in SSA oil and gas sectors. Some think that, the willingness of Chinese firms to pay bribes and Chinese government to attach no conditions to aid money may undermine local efforts to increase transparency and good governance and international efforts to enhance internal macroeconomic reforms. The ongoing crisis in the Darfur region and the inability of the United Nations to take a decisive action has been attributed to the involvement of Chinese, a permanent member of the UN Security Council, in the oil and gas sector of Sudan.

V.4. Environment impacts

The environment is intertwined with sustainable development. The whole process of exploration, production, refining and distribution of oil and gas has significant impact on the environment. Energy is also the major source of pollution and greenhouse gas emissions. Pollution is caused by gas flaring, above ground pipeline leakage, oil waste dumping, and oil

spills. Approximately 75% of gas produced is flared annually causing considerable ecological and physical damage to other resources such as land/soil, water and vegetation. Gas flares, which are often times situated close to villages, produce soot which is deposited on building roofs of neighbouring villages. Whenever it rains, the soot is washed off and the black ink-like water running from the roofs is believed to contain chemicals which adversely affect the fertility of the soil.

Gas pipelines have also caused irreparable damage to lands once used for agricultural purposes. These pipes should be buried to reduce risk of fracture and spillage. However, they are often laid above ground and run directly through villages, where oil leaks have rendered the land economically useless. The social and environmental costs of oil production have been extensive. They include destruction of wildlife and biodiversity, loss of fertile soil, pollution of air and drinking water, degradation of farmland and damage to aquatic ecosystems, all of which have caused serious health problems for the inhabitants of areas surrounding oil production.

Multinational companies are powerful agents on the international stage, with huge impact on the lives of people, particularly in the workplace and in the communities in which they operate. With such powers, come moral responsibilities. Amnesty International and other organizations have challenged companies like Shell, BP and ExxonMobil to operate under the highest standards. However, it will be useful to find out the extent to which the same influence can be exercised on companies from China and India.

The Chinese has appalling records when it comes to concerns for the environment. If we take the experiences within China as a case study, in terms of miner death per ton of coal produced, the Chinese fatality figures are 100 times more than in the U.S and 10 times more than the figures in India. The Chinese government recorded over 4000 deaths in the first nine months of 2004 (Khan, 2005). With its rapid development and low energy efficiency, China became the second largest emitter of Sulphur Oxide (SO₂).

It is in the context of the impact of oil and gas on sustainable development that SSA countries have to be very careful in ensuring that the ADs involvement in the oil and gas sector in these countries are environmental friendly and promote sustainable development. Table 13 shows the extent of environmental assessment in African countries. It is obvious that the extent of enactment and implementation of environmental enactment is quite limited across the continent. In fact, only one African oil producing country – Nigeria is classified as having environmental enactment and also monitoring implementation.

Table 13: Environmental assessment (legislation status) for African countries

Group 1 (no enactment)	Group 2 (enactment/little implementation)	Group 3 (Enactment/ implementation)
Cameroon	Botswana	Djibouti
Cape Verde	Burkina Faso	Egypt. Arab Rep.
Comoros	Burundi	Eritrea
Equatorial Guinea	Central African Republic	Ethiopia
Lesotho	Congo	Gabon
Liberia	Congo. Democratic Republic	Gambia The
Mauritania	Djibouti	Guinea
Niger	Ivory Coast	Guinea-Bissau
	Mali	Kenya
	Morocco	Libya
	Mozambique	Madagascar
	Rwanda	Malawi
	Sao Tome and Principe	Swaziland
	Senegal	Tanzania
	Seychelles	Togo
	Sierra Leone	Tunisia
	Somalia	Uganda
	Sudan	Zambia

Source: World Bank (2006)

VI. Framework for assessing impacts of ADs involvement in oil and gas on SSA

It can be seen from the above discussions that the ADs involvement in SSA oil and gas sectors may impact countries of the region in many ways. Thus, a common methodology to assess those impacts requires a set of indicators that can be measured across countries, a time-frame within which the assessment is based, and the appropriate methodology for the assessment of each indicator.

According to what have been discussed above, we can cite among other indicators that data can be obtained relatively easily:

- ✓ Crude oil and gas prices;
- ✓ Local oil and gas derivatives prices (gasoline, gas-oil, kerosene, domestic gas, etc.);
- ✓ Inflation;
- ✓ Oil and gas supply and demand;
- ✓ Importance of oil and gas in total real output;
- ✓ Employment in oil and gas sectors and change in total employment/unemployment;
- ✓ Trend and composition, and direction of trade;
- ✓ Current account balance and balance of payment (global, regional and bilateral);

- ✓ Government revenue, including oil and gas, and fiscal revenues;
- ✓ Trend and composition of investments, including FDI;
- ✓ Aid flows;
- ✓ Fiscal policy profile;
- ✓ Governance profile, including fight against corruption, transparency in revenue and expenditure management, participation of stakeholders, etc.;
- ✓ Distribution of income;
- ✓ Poverty profile.

Time-frame for the assessment of those indicators will depend to the duration of the relation of the country with the ADs (age-old or recent), the transmission lags, and the data constraints which vary across countries. The most important point is to cover enough periods that can give the opportunity to highlight the role of ADs for countries with long-term relationship, or to make a ‘before and after’ analysis for countries with recent relations with ADs.

As stated by Collier et al. (1997:348), ‘devising a methodology for a multi-country study that is both credible and robust poses real challenges’. First, because it is difficult to be entirely certain that what happen is attributable to ADs or what would have happened in the absence of ADs. Second, even when ADs have probably driven the observable situation, it is difficult to identify (quantify) to disentangle their contribution from other influences, including internal. Third, lack of consensus on theoretical models linking the indicators cited above with external and internal shocks. Finally, lag or insufficient capacity in all countries to implement all methodologies.

However, like in the case of trade liberalization presented by Collier et al. (1997) and according to what is already done in the literature, there are three ways of dealing with the assessment impacts of ADs on SSA oil and gas industries in particular and economy in general: cross-section analysis (with/without approach), time-series analysis (before and after approach) or Computable General Equilibrium (CGE) modeling, which allows systematic evaluation of alternative ADs scenarios².

VII. Conclusion and Some Policy Issues

In this paper, we have identified key issues, policy research questions and concerns of SSA arising from the emergence of ADs in the oil and gas industries. In order to provide a basis for articulating appropriate responses by African policy makers and other stakeholders, a framework for the assessment and analysis of those points have been provided. Quite a number of issues, policy research questions and concerns are country- specific. The general framework provided should be just considered as a guideline for necessary and indispensable country case studies. The following questions, among the number of pertinent ones to be addressed in the country studies, have to be answered:

- ✓ What are the implications of the rising demand for oil and gas for the country?
- ✓ What are the direct and indirect consequences on the country’s oil and gas industries in particular, and the entire economy in general?

² See Collier et al. (1997) for more developments of those approaches. An interesting summary of the state of CGE models is given by Robinson Sherman (2006).

- ✓ What are distributional and environmental impacts of the activities of ADs in the oil and gas sectors in the country?
- ✓ What should be the appropriate policy response of country's government and oil and gas industries' stakeholders?

In view of answering those questions, opportunities and challenges related to the potential country affected indicators must be identified and analyzed. Hence, quite a number of policy issues must be considered:

- ✓ Recent developments (supply and/or demand) of the country's oil and gas industries;
- ✓ Economic, trade, social and policy drivers of the country's relationship with the ADs;
- ✓ Transmission mechanisms (growth, fiscal policy, government expenditures, distribution policy, etc.) of oil and gas prices tendencies to domestic market;
- ✓ Economic, trade, social and policy changes of the country's relationship with the rest of the world due to ADs presence in the country's oil and gas industries;
- ✓ Country's response capacity constrains to benefit from the opportunities offered by ADs and overcome their induce challenges;
- ✓ Identification of stakeholders and articulation of their interests in relation to the evolution of the country's relation with ADs;
- ✓ Identification and evaluation of institutions and mechanisms established and/or strengthened as a means of articulating, reconciling and aggregating stakeholder interests in the process of adopting national oil and gas revenue managing policy;
- ✓ Designing of an appropriate country capacity building policy in

The examination of the curse literature and its relevance to the African Oil and gas industries is indispensable to properly address these issues. The multi-country study will be more useful to Africa if it covers both oil and gas producing countries as well as a number of oil and gas importing countries in SSA, and includes important emerging oil and gas producer countries.

However, there are also a number of issues that policymakers in SSA countries should be interested in. These include future developments in the oil and gas sectors of the ADs. For instance, further increase in oil prices may cause China to develop her oil deposits. Moreover, the scope for implementing alternative energy and energy efficiency technologies is large. It is also feared that the pace of investment and industrialization may abate somehow over the next 20 years (UNCTAD, 2005).

Moreover, the oil and gas producers in the subcontinent must improve the management of commodity related revenues and upgrading domestic infrastructure to reduce extant transaction costs. In general countries rich in natural resources should regard the latter as assets that are certainly exhaustible but which may be used to develop new areas of competitive advantage, diversify the economy create linkages with other production sectors and remove bottlenecks.

Appropriate ways must be developed for managing the unwanted macro effects of unstable commodity prices and avoiding boom and burst pro-cyclical fiscal management. They must also enhance transparency in the use of commodity revenues. It is important that the subcontinent take advantage of the presence of the ADs and utilize them for technological transfer, skill formation and world market access.

List of Selected Countries

We then suggest that it include the following producer and emerging producer countries: Nigeria, Sudan, Angola, Congo Republic, Equatorial Guinea and Cameroon, and the following importing countries: Ghana, Cote d'Ivoire, Kenya, South Africa, Zimbabwe and Zambia. The importing countries are chosen on the basis of the energy intensity and energy import dependency (see Table 14) and in view to cover all representative SSA regions.

Table 14: Ranking of countries on the Basis of Energy Intensity and Energy Import Dependency

Country	Energy Import Dependency	Energy Intensity	Decision
Seychelles	11.1	NA	Not Recommended
Ghana	10.2	0.08	Recommended
Kenya	8.5	0.05	Recommended
Guinea-Bissau	7.4	NA	Not Recommended
Sao Tome and Principe	6.9	NA	Not Recommended
Zambia	4.7	0.20	Recommended
Ivory Coast	4.4	0.04	Recommended
Senegal	4.2	0.07	Not Recommended
Gambia The	3.9	NA	Not Recommended
Burundi	3.6	NA	Not Recommended
South Africa	3.5	0.02	Recommended
Guinea	3.4	NA	Not Recommended
Swaziland	3.2	NA	Not Recommended
Lesotho	3.0	NA	Not Recommended
Zimbabwe	2.9	0.12	Recommended
Madagascar	2.9	NA	Not Recommended
Rwanda	2.5	NA	Not Recommended
Cape Verde	1.9	NA	Not Recommended
Botswana	1.5	NA	Not Recommended
Central African Republic	1.2	NA	Not Recommended
Namibia	0.8	0.16	Not Recommended
Malawi	0.8	NA	Not Recommended
Cameroon	0.7	0.05	Not Recommended
Congo	0.3	0.11	Not Recommended
Equatorial Guinea	0.1	NA	Not Recommended
Tanzania	0.0	0.04	Not Recommended

Note: energy import dependency measured as ratio of energy imports to GNP at market prices. Energy intensity is energy use divided by GDP in kg/million of US\$

Source: Computed from World Bank (2006).

Permanent Secretaries (Petroleum Resources or Energy, Commerce, Mining and Industries), Heads of National Petroleum and downstream oil processing/refined products Companies, and Labor Union Leaders of the up-cited countries are potential invitees for the related workshops.

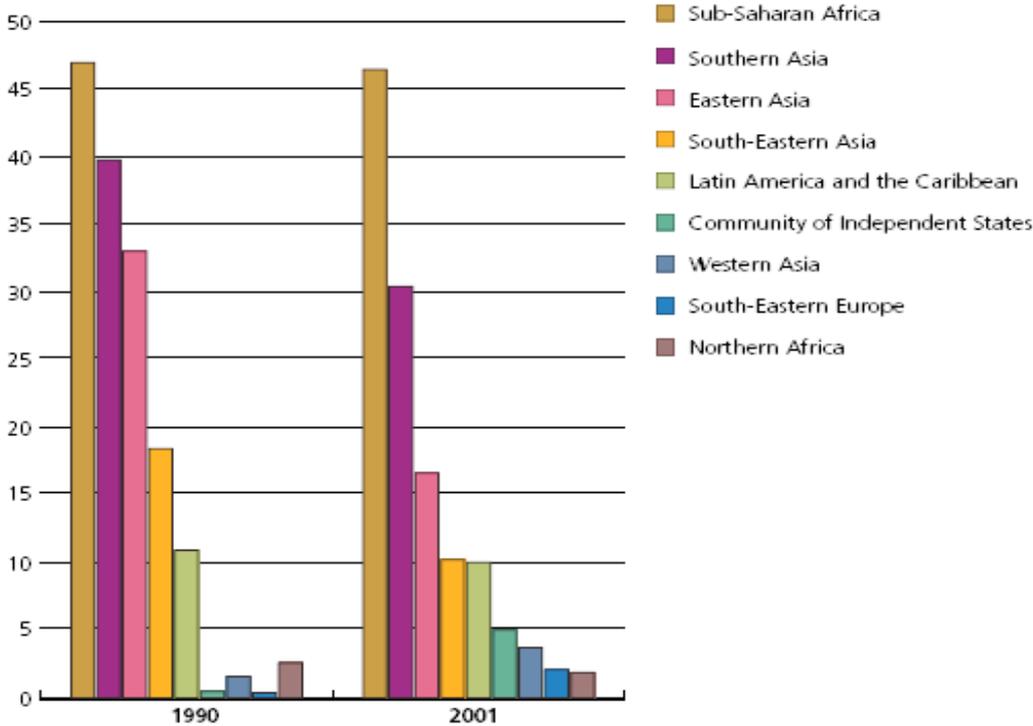
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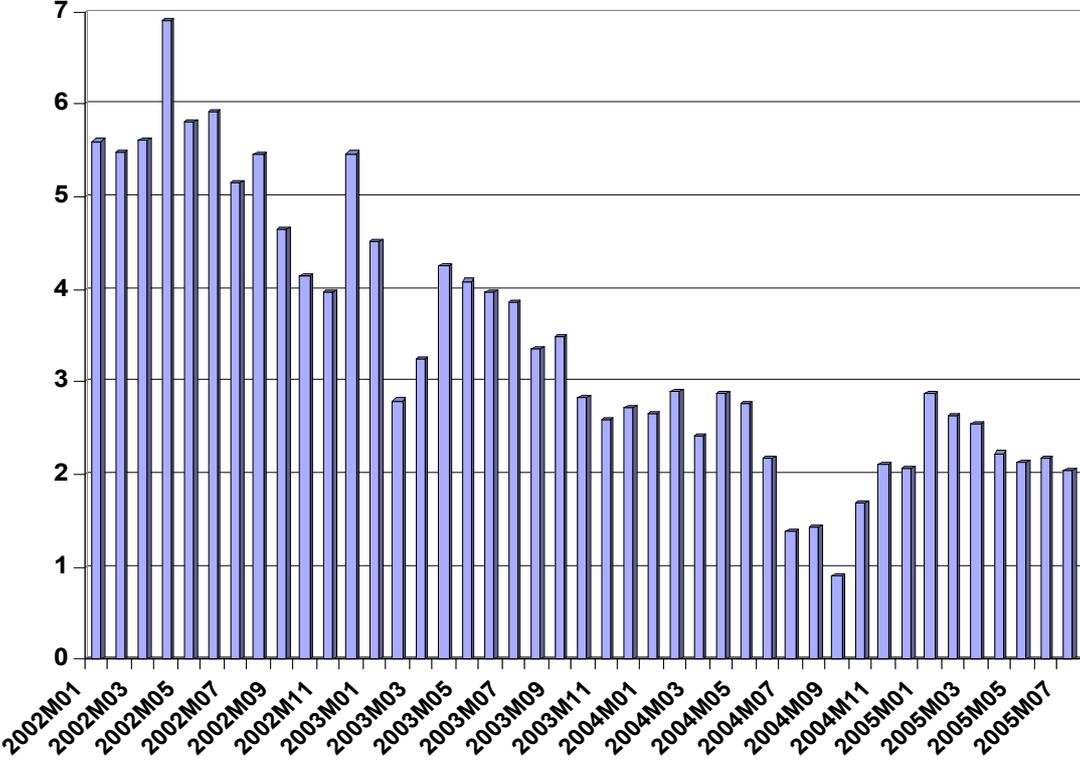
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Figure 1: Percentage of population below USD 1 per day: 1990-2001 (in %)



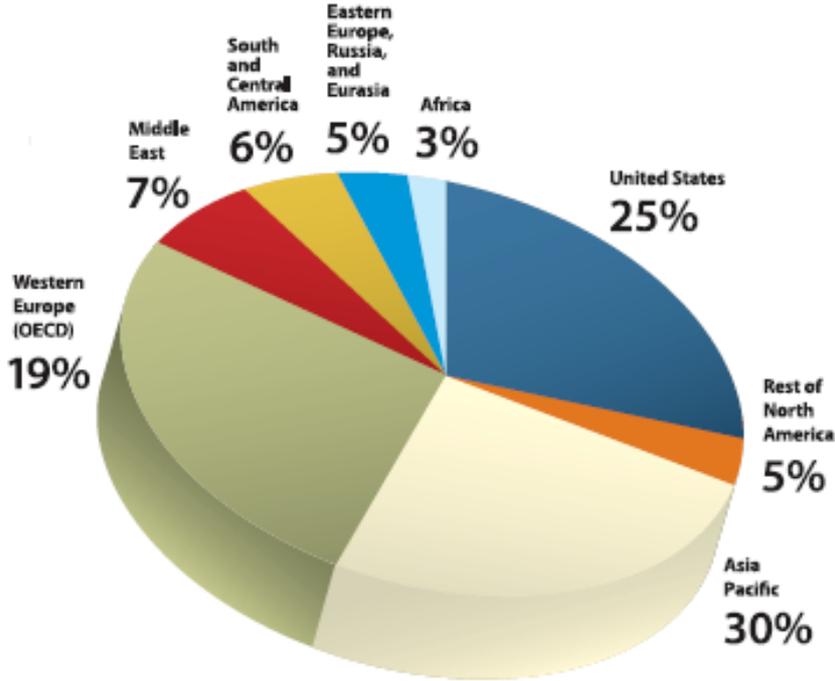
Source: Audinet and Haralambous (2005:13)

Figure 2: World spare capacity (in million barrels per day)



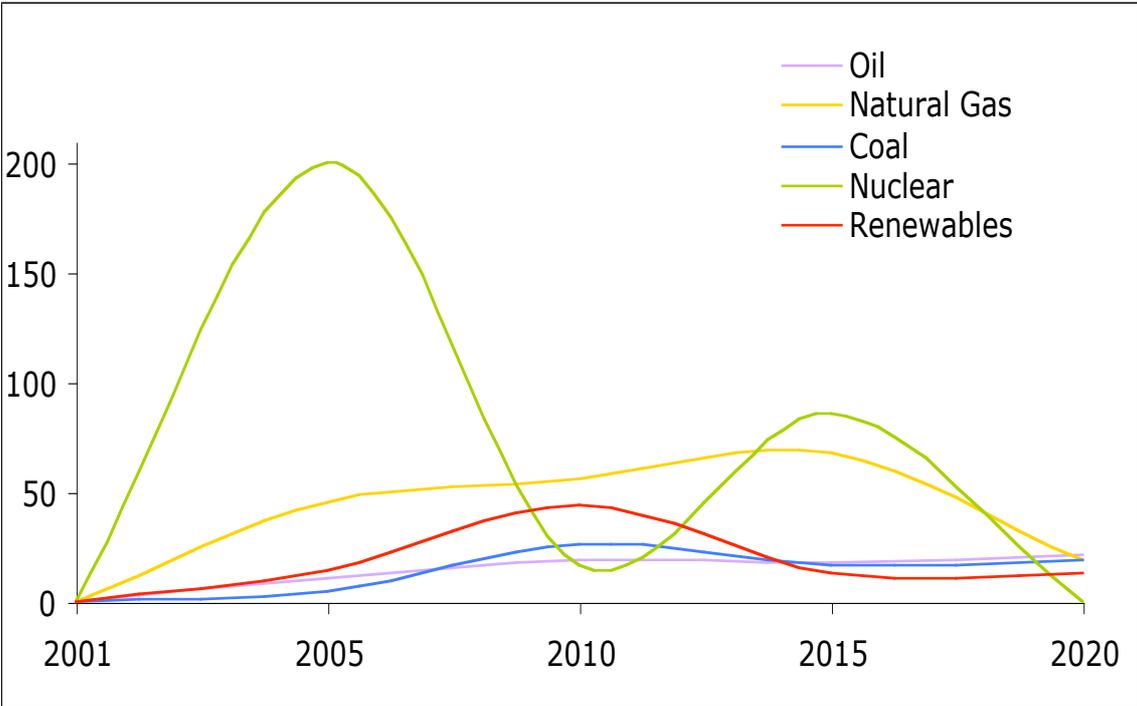
Source: <http://web.worldbank.org/external/default/main?theSitePK=612501&pagePK=64218950&contentMDK=20666033&menuPK=612515&piPK=64218883>

Figure 3: 2004 crude oil consumption by region.



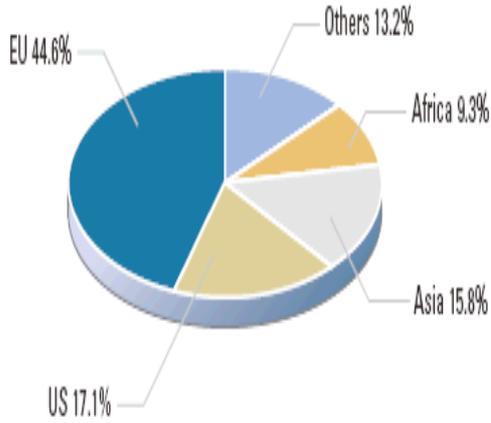
Source: Grant et al. (2006:9)

Figure 4: China’s Energy Consumption Growth (in %)



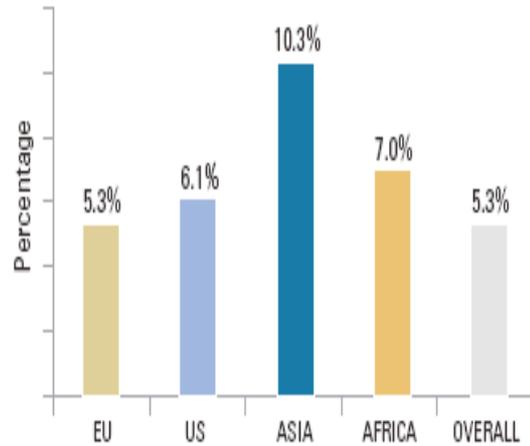
Source: US-China Economic and Security Review Commission, cited by China Energy Market Trends Report 2006, February.

Figure 5: Destinations of African exports (2001–2003)



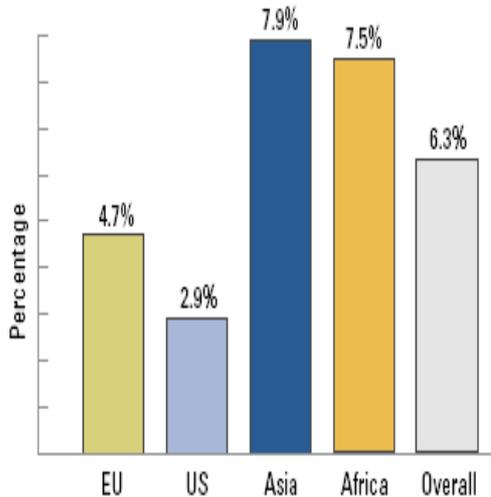
Source: IMF Direction of Trade compiled by World Bank (2005)

Figure 6: Growth rates of African exports by destination (1991-2003 annual average)



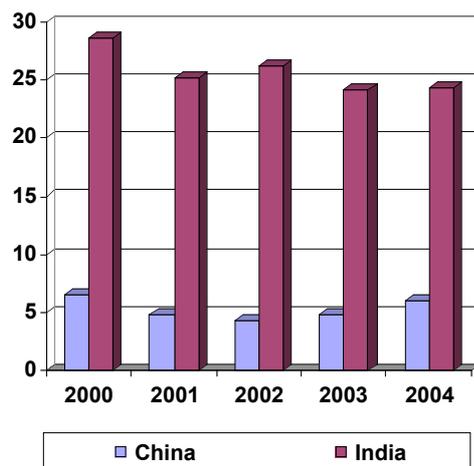
Source: IMF Direction of Trade compiled by World Bank (2005)

Figure 7: Growth Rates of Asian imports by origin (1991–2003 annual average)



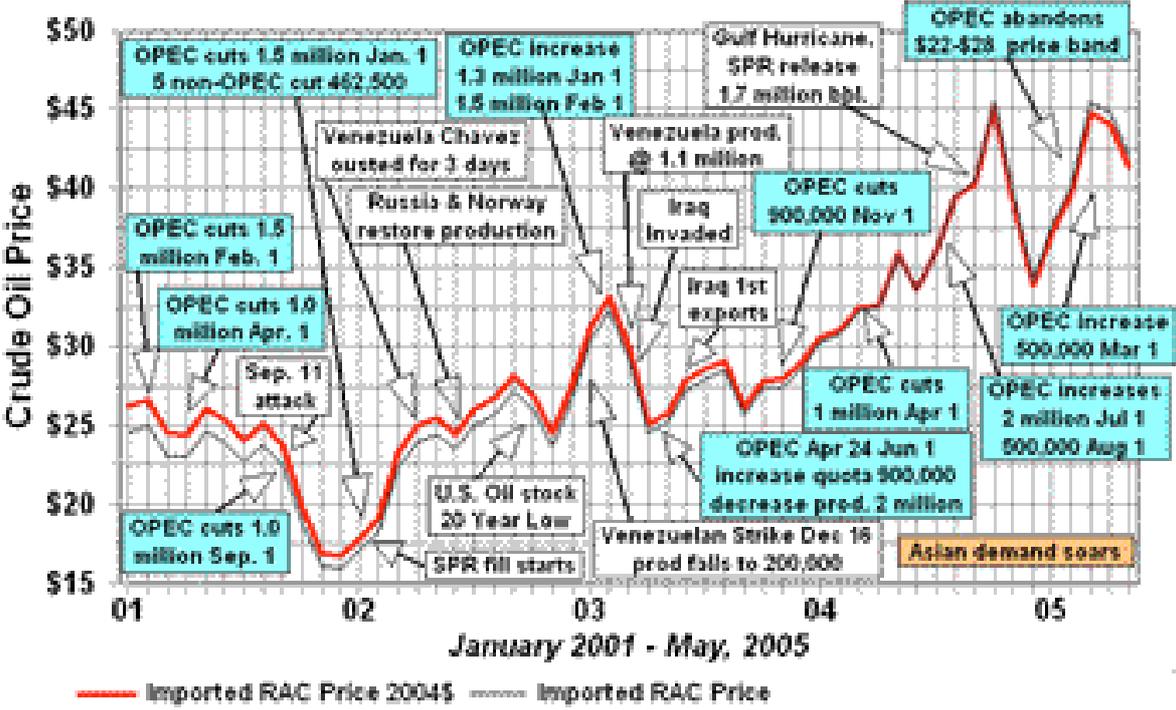
Source: IMF Direction of Trade compiled by World Bank (2005)

Figure 8: Share of crude oil in goods imports form ADs (in %)



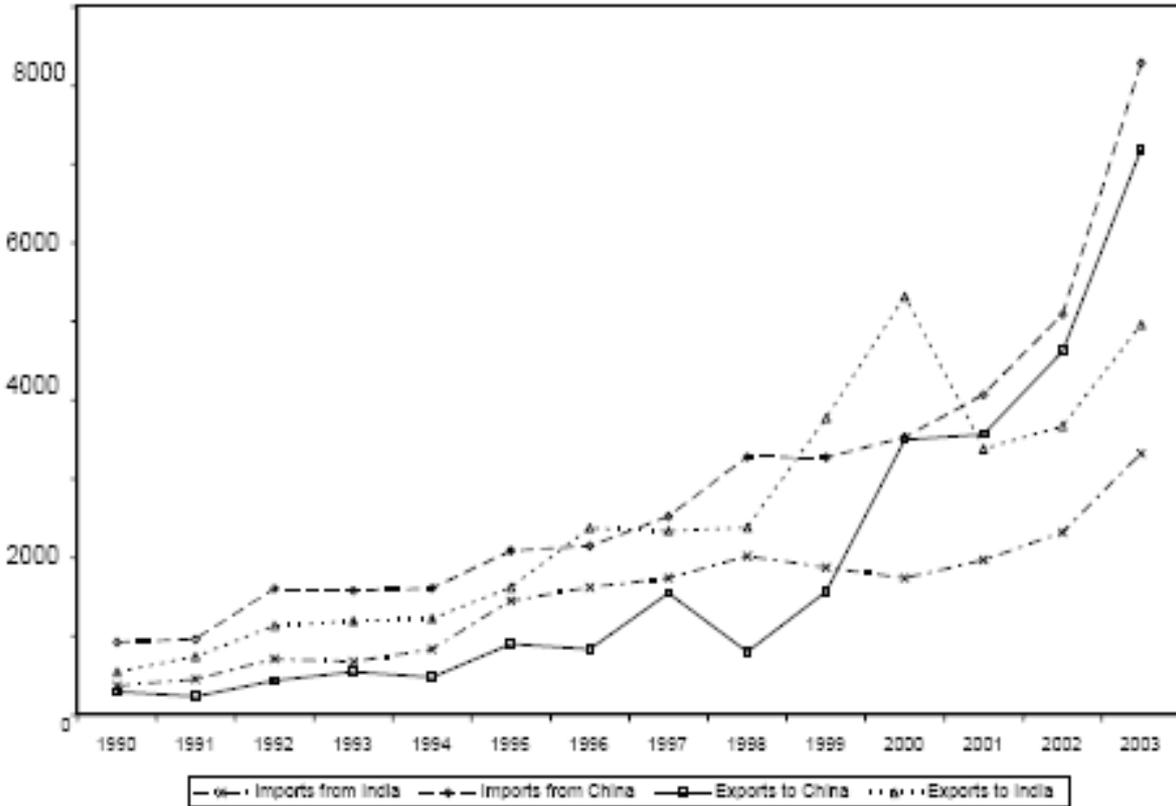
Source: Qureshi and Wan (2006)

Figure 9: World events and crude oil prices: 2001-2005



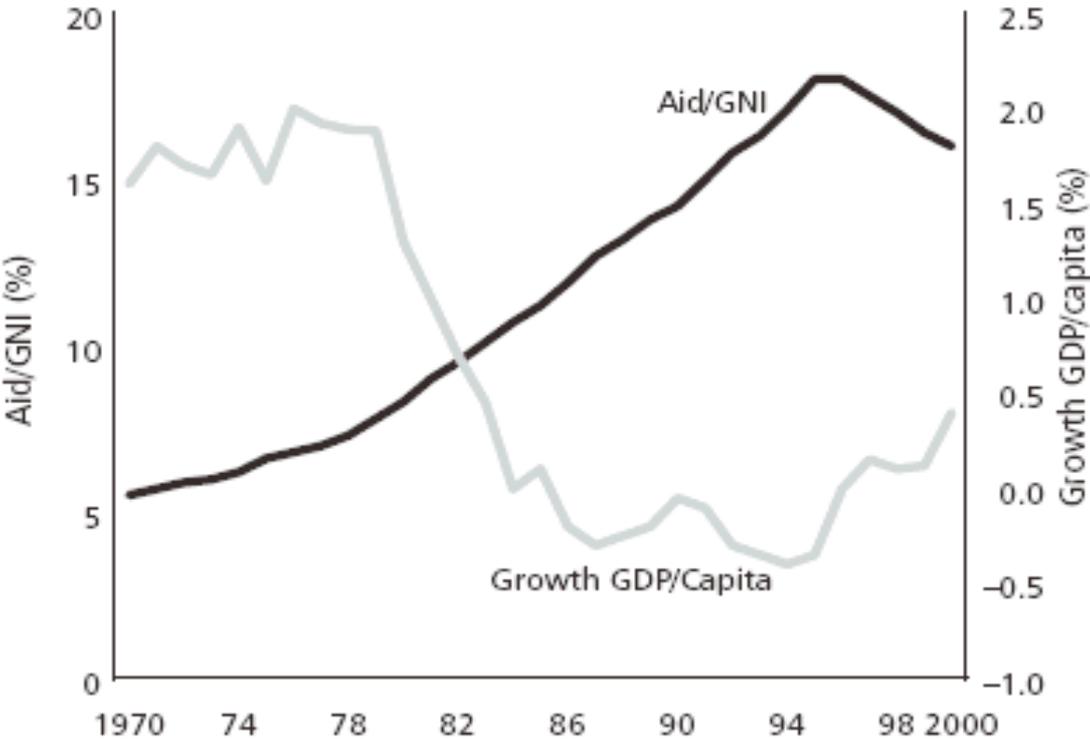
Source: EIA (Energy Information Administration), WTRG Economics (www.wtrg.com)

Figure 10: Africa’s trade with ADs: 1999-2003 (in million US\$)



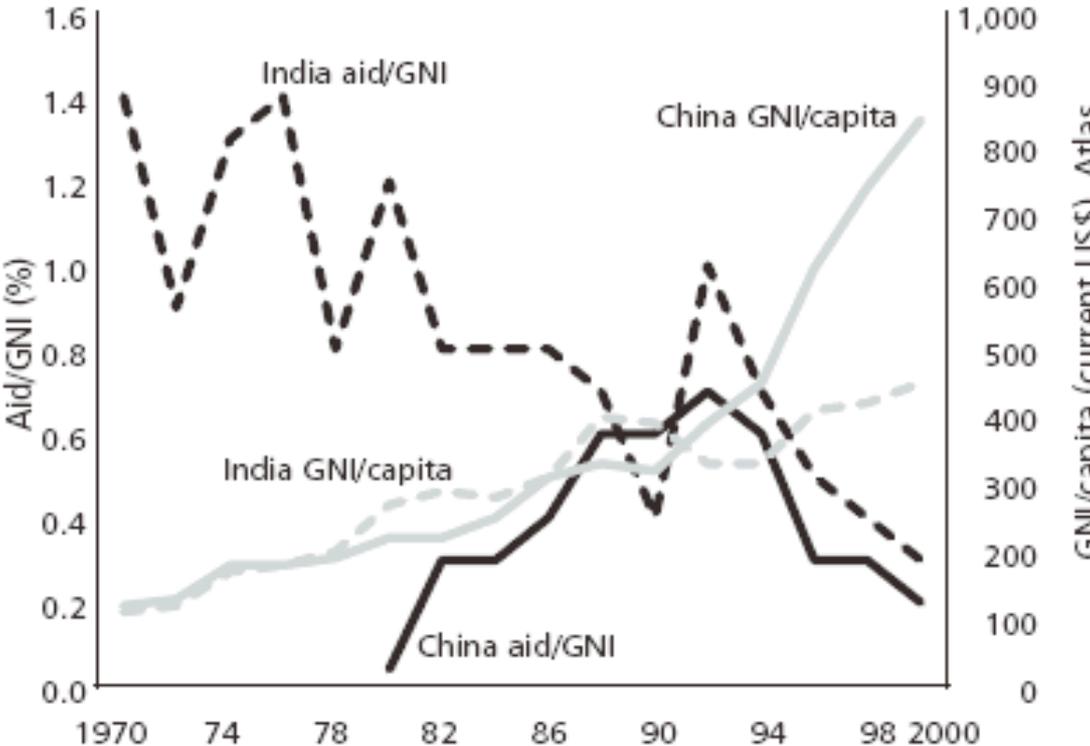
Source: DFID/UK (2005:3)

Figure 11: Aid and growth in Africa (10-year moving average)



Source: World Development Indicators Online compiled by Erixon (2005:8)

Figure 12: Aid and GNI/capita in ADs



Source: World Development Indicators Online compiled by Erixon (2005:10)