

Oil Price Changes and the Libyan Economy: Perceptions of Libyan Experts

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Introduction

The impact of oil price changes on the demand for (and the supply of) the output of the oil and gas industry suggests that increased knowledge about the nature and effect of crude oil price movements is likely to be of interest to most institutions and organisations in the global economy. The importance of the energy sector is evident even in country as Libya where the nation's massive dependence on oil export revenues renders the economy especially prone to significant swings in oil prices.

This paper therefore, provides an analysis of the interviews conducted with Libyan experts to investigate the impact of oil price changes on the Libyan economy. In particular, the interviews were used to investigate: (i) the impact of movements in crude oil prices and exchange rates; (ii) how the Libyan state attempts to manage exposure to these risks in order

to reduce their impact; and (iii) the role of UN and US oil sanctions on the Libyan economy. The more general aim of the paper is to examine the extent to which perceptions regarding oil price change exposure in a developing country without a liquid stock market but with a great dependence on the success of the oil industry.

The Interview Method

A pilot interview conducted in April 2003 to ascertain the scope for using a full series of interviews to establish views on the effects of price movements. The interviews took place at the Faculty of Economics at Garyounis University; during this pilot interview a number of academic staff with a good knowledge of the oil industry provided helpful advice regarding both the content of the interviews and the identities of suitable interviewees. The

main research interviews took place between 15th June 2003 and 6th September 2003, during which time 11 interviews were conducted, each lasting an average of 40 minutes.

The 11 Libyan experts selected for interview were chosen because their qualifications, experience and positions indicated that they were likely to have relevant and timely knowledge about the oil and gas sector in Libya. To allow a breadth of different perceptions to emerge, the interviewees were also chosen to represent a wide variety of backgrounds and included academics, Government officials, an Insurance company and a senior Libyan representative at OPEC. The English language was used in developing the questions to be asked, but the Arabic language was used for the interviews themselves. Ten of the interviewees have a PhD, five of these are in economics and five in accounting; and the only interviewee without PhD has an academic background in chemical engineering. Two of the interviewees have ministerial experience, one as the Minister of General Planning (currently with a position as the Minister of the

Economy); prior to that this interviewee was the chairman of the Central Bank of Libya (CBL). One of the interviewees has experience as Minister of Monitoring and Control (while also serving as the Minister of Finance). One interviewee recently served as Libya's representative in OPEC; he is also a consultant in the Libyan National Oil Company (NOC) and was the chairman for ten years. The chairman of the Libyan Insurance Company, previously the deputy of Ministry of Finance, was also interviewed, while another interviewee is the current chairman of the Economic Research Centre in Benghazi, a board director of CBL, a member of the General Planning Committee and had previously served as the Dean of the Economics Faculty at the University of Garyounis. The other six interviewees, all academics, were selected because the Libyan government regularly employs such staff members as consultants and managers of state corporations, and as senior Government officials.

Each interview was conducted face to face, except for interview number 11 which was conducted by telephone⁽¹⁾. During each inte-

review, the answers were written down and immediately following the end of each interview the notes were reviewed to ensure that none of the interviewee's comments were lost. The decision to write down the answers rather than tape them was made because the former recording method can encourage a higher degree of frankness (Hussey and Hussey, 1997); in addition, the method was recommended by the Libyan experts on the first trip, for the same reason. The interviews were structured in nature and were based around the seven questions.

For many years the exchange rate in Libya was fixed, but since 1999 CBL has gradually engineered a large depreciation of the Libyan Dinar (LYD). As a result, in 1999 1 LYD equalled 2.165 US \$ whereas in 2006, 1 LYD equalled only 0.68 US \$. Furthermore, as Libyan oil revenue is directly related to the value of the US dollar, it is possible that fluctuations in the strength of the US Dollar could impact the Libyan economy severely. The role of the exchange rate on the Libyan economy was therefore included in the discussions.

The interview questions were divided up into sections covering the following five themes: (i) the impact of oil price fluctuations at both micro and macro level; (ii) the policies that the Libyan State adopts to reduce the impact of oil price fluctuations; (iii) the effect of UN and US oil sanctions on the Libyan economy; and (iv) the effect of exchange rate fluctuations.

The Impact of Oil Price Changes

The first part of each interview examined views about the impact of oil price movements on the Libyan macro and micro economy. All of the interviewees concurred with the view that the state of the Libyan macro-and micro-economy is highly dependent on the oil price, typically pointing out that when oil prices rise there will be a positive effect on the Libyan economy and vice-versa. Reasons given by the interviewees for this belief included: (i) the fact that Libya's economy is based largely on oil revenues, with oil representing about 95 per cent of total hard currency; (ii) the tendency in Libya for the level of oil production to be virtually

fixed; and (iii) the lack of progress in diversifying economic activity, with Libya failing to organise a significant non-oil industrial sector. For example, Interviewee 7 pointed out that:

The Libyan economy is heavily dependent on oil revenues, and oil revenues are calculated by multiplying the quantity of exported oil by the oil price. In fact, the quantity of exported oil is a fixed proportion determined by OPEC. Oil price fluctuations therefore have a direct influence in the same direction up and down on: Libyan GDP; per capita income; the general budget; hard currency; exports and imports; the balance of payments; development budgets; and actual expenditure on the development budget.

Interviewee 5 stated that oil price fluctuations only partially influence imports because some Libyan imports such as essential alimentary goods⁽²⁾ are not influenced by changes in oil prices. This interviewee added that oil prices do not directly affect the administrative budget as much as in the past because the budget is increasingly financed from other sources such as customs

and tax revenues. However, Interviewees 8 and 10 both stated that customs and tax revenues are strongly affected by oil prices, explaining that the higher the oil price, the higher the oil revenue and the more the country can afford to make development plans that raise the value of imports.

Interviewee 9 highlighted that the oil price impacts the micro economy through the value of actual expenditure on development plans; in particular, a large scale development plan leads to a big increase in demand. Such a rise influences the level of investment and creates a wide range of new jobs, which in turn maximise customs and tax revenues.

Table 1 presents the correlation matrix for the key variables mentioned by the interviewees as being relevant in the context of oil pricing risk in Libya. Specifically, data for oil prices, administrative expenditure, development expenditure, imports, tax revenues, customs revenues and non-oil revenues are shown.

Inspection of the table reveals that, for oil prices, the only significant relationships are positive ones with development expenditure and imports. For imports, additional significant positive relationships exist with: development expenditure, administrative expenditure and tax revenues.

This data is presented here as it reflects the variables mentioned regularly by the interviewees; in addition, the data appear to be consistent with the opinion of Interviewee 5 that oil prices do not affect the current administrative budget to the same extent as in the past, mainly because the administrative budget is financed from non-oil revenue. However, inspection of Table 1 also reveals that the correlation coefficient between the administrative budget and non-oil revenue is positive and statistically significant.

The correlation results are consistent with the beliefs of Interviewees 8, 9 and 10 that oil price fluctuations positively influence development expenditure, imports and tax revenue, but appear to run counter to the idea that imports have a positive

impact on customs revenue. In fact, most imports are undertaken by the state for its development projects and no customs duties are paid; this could in turn explain why no relationship was found between the level of imports and customs revenue. The main reason for the rapid increase in Libyan customs and tax revenues since 1993 is the resurgence of the private sector.

Table 1: Correlation Between the Key Factors Mentioned by the Interviewees over 1981-2001

	Oil Price	Imports	Tax Revenue	Customs Revenue	Non Oil Revenue
Imports	0.606*				
<i>p-value</i>	0.004				
Tax Revenue	0.032	0.484*			
<i>p-value</i>	0.891	0.026			
Customs Revenue	-0.179	0.151	0.630*		
<i>p-value</i>	0.438	0.513	0.002		
Non Oil Revenue	-0.046	0.326	0.823*	0.571*	
<i>p-value</i>	0.843	0.149	0	0.007	
Administrative Expenditure	0.349	0.579*	0.608*	0.703*	0.612*
<i>p-value</i>	0.121	0.006	0.003	0	0.003
Development Expenditure	0.880*	0.717*	0.27	0.068	0.137
<i>p-value</i>	0	0	0.237	0.768	0.554

Note: This table presents the correlation between Libyan oil prices, administrative expenditure, development expenditure, imports, tax revenue, customs revenue and non-oil revenue over the period 1981-2001. A * indicates that the coefficient is significant at 5% level on the basis of a two-tailed test.

Oil Production Policies

The second part of each interview dealt with the oil production policies adopted by the Libyan State and the effect of these on oil price variability. Six of the interviewees indicated that, as Libya is a member of OPEC, its production level is largely determined externally and there is no alternative long-term oil extr-

action strategy. However, Interviewee 2 believed that a separate long-term plan exists at the Planning Ministry, as did Interviewee 6. The latter pointed out that:

The US sanctions had a strong negative impact on the Libyan petroleum sector. They make the development of the petroleum sector very difficult because the

big petroleum companies are prevented from working in Libya ... The oil price does not affect oil production because oil revenue is the main source for the Libyan economy.

Interviewees 10 and 11 also explained that there is probably an intention to extract oil on the basis of Libyan national interest. Interviewee 11 indicated that:

The NOC has a long-term plan to extract oil and this plan includes two aspects: to maintain the oil production levels and to undertake new exploration activities.

According to Interviewee 7, Libya intends to rely on the use of advanced technological equipment that allows for the extraction of the maximum quantity of oil in the long-term. As a result of the early stages of implementing this strategy, Libya has reduced its oil production from approximately 3.31 million barrels per day (b/d) in the early 1970s to between 1 to 1.5 million b/d in recent years. The interviewee also indicated that in order to maximise its oil revenues, Libya has increased its share of many oil production agreements as well

as playing a significant and direct role in increasing oil prices, particularly during the 1970s. Overall, this evidence suggests that in Libya, production activities are more likely to influence oil prices than vice-versa, reflecting the nation's share of global oil production.

Methods of Reducing the Impact of Oil Price Changes

A further section of the interviews investigated the policies and procedures that the Libyan State adopts to reduce the impact of oil price fluctuations. The interviewees again expressed a range of views about the issues that are most relevant in the context of an examination of pricing volatility. For example, eight of the interviewees believed that the Libyan government invests heavily in the industrial and agriculture sectors in an attempt to create new sources of national wealth and thereby reduce its dependence on oil revenues. However, most of the participants suggested that these efforts had not achieved their objectives, with the result that Libya is still highly dependent on oil revenues; all eight added that, to this day, it is proving difficult

to create new sources of GDP. As an alternative to broadening the nation's industrial base, Libyan attempts to compress expenditure were seen as proving to be more successful. Two interviewees outlined specific examples of areas where central expenditure had been reduced, including the cancellation of some premiums (reducing salaries), the transfer of some Governmental employees to private institutions, the imposition of new quotas on imports and the foreign transfer of hard currencies. Interviewee 11 added that the lowest expected oil price (based on historical trends) is used in the planning stage.

Three interviewees believed that oil price variability has a stronger impact on development expenditure than on administrative expenditure. This view is evidenced by the simultaneous decline in development spending that has taken place in Libya since the mid-1980s; development plans have, as a result, become annual occurrences since 1985, rather than operating on the basis of the previous system of three- or five-yearly reviews.

Interviewees 5 and 6 indicated that the Libyan government has taken action to reduce production costs⁽³⁾, in response to low oil prices, while Interviewee 7 noted that Libya has managed to lessen the impact of low oil prices by starting refining activities both within and outside the country⁽⁴⁾, adding that Libya refines approximately 300,000 barrels per day in refining industries located abroad, but domestically-owned. In addition, two interviewees stated that Libya works with OPEC to help bring about stability in oil prices⁽⁵⁾. However, Interviewee 8 believed that the determination of oil prices is largely a political rather than an economic decision.

The Impact of UN and US Sanctions on Libya

The interviewees' opinions about the impact of UN and US sanctions on Libya generally fell into one of four groups. Seven individuals thought that the UN and US sanctions led to equally negative consequences for the Libyan economy, including the oil and gas sector, while two of them believed that the impact of the US sanctions was greater than the effect of those imposed by the

UN. One interviewee indicated that the consequences of the UN sanctions were the most severe, but another thought that neither UN nor US sanctions had significantly affected the Libyan economy in general or the oil and gas sector in particular.

Five of the eleven interviewees indicated that the consequences of the sanctions have been greater in the oil and gas sector than in other parts of the Libyan economy. For example, Interviewee 6 highlighted the large increase in the cost of production-related spare parts and equipment caused by both sets of sanctions, which in some cases rose by around 300 per cent because of the need to source these items externally. This interviewee added that although the Libyan oil sector had managed to open new markets such as the UK and Canada, the period of sanctions was characterised by serious problems regarding employees' training and the obtaining of technical equipment; both of these difficulties had adversely affected the maintenance of oil fields and growth levels in the oil sector. For example, the third stage of development at the Ras Lanuf Corporation⁽⁶⁾ was halted

Because of these sanctions.

Interviewee 10 indicated that while many believed the sanctions not to have affected the Libyan economy, he thought that they had inflicted serious damage, especially in the oil sector where production costs had increased significantly, while production rates and exploration activities decreased. Interviewee 9 indicated that for the oil and gas sector the consequences of the US sanctions were greater than the consequences of the UN sanctions, stating that:

The impacts of these sanctions on the Libyan macro economy are many; some physical and others moral.

Interviewee 8 stated that the consequences of the US sanctions on the Libyan economy were not great, whereas, the UN sanctions had had a devastating impact on all sectors, including oil and gas. In contrast, Interviewee 7 believed that neither the UN nor US sanctions had damaged the Libyan economy in general or the oil and gas sector individually; he pointed to the results of Mahmud and Russell (2002) as supporting this opinion. This individual

stated, however, that the sanctions had led to some increases in production costs as a result of the necessity to import oil equipment through third parties.

Many of the views put forward by the interviewees regarding the (non) impact of UN and US sanctions on the Libyan economy and the oil and gas sector appear to conflict with the finding of the aggregate study by Mahmud and Russell (2002). Three possible reasons might explain the apparent inconsistency. First, Mahmud and Russell used four indicators in their study, namely: the number of seismic crews at work; the number of active drilling rigs; the number of exploratory and development wells completed; and additions to proven crude oil reserves. However, these measures might not fully reflect the entire impact of the sanctions; for example, the effect on production costs and employee training might not be incorporated fully. Second, Mahmud and Russell split their data into sub-periods to coincide with the application of new Government policies and the change from concessionary terms to participation terms; the sub-periods used do not therefore

coincide with the dates of the sanctions. Third, Mahmud and Russell employed a data set beginning in 1960, the starting point of major oil exploration in Libya. Arguably, it might be worth re-performing the tests, but excluding the early period and beginning later to avoid the results being overly influenced by the dramatic changes in oil exploration and production that took place during the 1960s and 1970s, to obtain more generalisable evidence.

To undertake the replication of the Mahmud and Russell (2002) study, the same four indicators were used. In contrast to the earlier study, three five-year periods - chosen to coincide with major changes in the sanctions regime - were employed. The first period, 1980-1985 (P1), represents a regular production stage⁽⁷⁾; the second period, 1986-1991 (P2), reflects the time-span over which US sanctions were in place, while the third period, 1992-1997 (P3), covers the first five years of UN sanctions.

The results of a Kruskal-Wallis⁽⁸⁾ test comparing the values of the four indicators across the three periods are presented in

Table 2. Examination of the p-values indicates that there were statistically significant intertemporal differences in the distribution of both the number of seismic crews and the number of drilling rigs. However, the number of completed wells and added proven reserves did not appear to be time-dependent.

crews operating in Libya, with the UN sanctions leading to a further reduction. In other words, both sets of sanctions had substantial adverse impacts on the Libyan oil and gas sector; however, in terms of changes in mean rank, the impact of the UN sanctions appears to have been greater.

The results regarding the number of seismic crews at work indicate that the mean rank of P2 is lower than P1, with the lowest mean rank occurring in P3. These findings suggest that the US sanctions led to a significant decrease in the number of seismic

Table 2: Results of the Kruskal-Wallis Test

Indicators	P-value	Periods (mean rank)		
		P1	P2	P3
Number of seismic crews at work	0.009	14.330	10.000	4.170
Number of active drilling rigs	0.002	15.250	4.330	8.920
Exploratory and development wells completed	0.513	9.000	7.670	11.830
Added proven crude oil reserves	0.725	5.170	11.580	11.750

Note: This table presents the results of Kruskal-Wallis analysis comparing the four measures across the three periods. P1 = 1980-1985; P2 = 1986-1991; P3 = 1992-1997. The figures in bold are the mean ranks.

The Kruskal-Wallis results regarding the number of active drilling rigs indicated that P1 had the highest total with the lowest being recorded in P2. This result suggests that the US sanctions had the most severe negative impact on the oil and gas sector in Libya, although drilling activity recovered somewhat when the UN sanctions began in 1992. The results regarding: (i) the number of exploratory and development wells completed; as well as (ii) additions to proven crude oil reserves, indicate a higher mean rank for both measures by the time of the UN sanctions, but the differences were insignificant. This finding is consistent with the sanctions having a negligible impact on this aspect of oil and gas activity in Libya.

The results across the four indicators suggest substantial differences in the impact of the sanctions on the Libyan oil and gas sector; this appears to contradict the suggestion by Mahmud and Russell that:

The four indicators are related, since increased seismic crews permit identification of more potential structures, which, in turn, involve more drilling activity to

discover deposits. Ultimately, this would probably result in increased completion of exploratory and development wells and enhanced discovery of proven crude oil reserves (Mahmud and Russell, 2002, p. 31).

The results obtained in this paper do not support this contention. However, the current study's findings are, consistent with Jennings *et al.* (2000) who stated that, after drilling the well to final depth, the operator will either decide: (i) to develop and complete the well (if it is profitable) or; (ii) to abandon if it is not. Any additional wells may not significantly affect the quantity of crude oil reserves; however, the number of wells always has a direct effect on the rate of extraction of the reserves. Furthermore, visual inspection of the data in Appendix 1, indicates that the relationship between the four measures is clearly different from what Mahmud and Russell's results predict; for example when the number of seismic crews increased dramatically in 1981 from 108 to 183, the other three indicators decreased.

The Effect of Exchange Rate Fluctuations

It was considered important to examine perceptions regarding the effect of exchange rate fluctuations, and so a further section of the interviews investigated the relationship between oil pricing risk and the relative values of the Libyan Dinar and the US Dollar. Views amongst the interviewees were again mixed; for example, Interviewee 11 chose not to give an opinion on this issue, suggesting instead that it was a matter for investment experts on this subject, whereas four interviewees volunteered the opinion that an indirect relationship exists between the exchange rate and Libya's oil revenues. In particular, these interviewees believed that oil revenues are the main source of hard currency in Libya, therefore higher oil prices provide Libya with higher oil revenues, which in turn provide the nation with hard currency. Higher oil prices in turn allow Libya to control the value of its local currency (in either direction) whereas lower oil prices are likely to lead to a depreciation of the Dinar.

Six of the interviewees expressed the view that there is no relationship between Libya's oil revenues and the strength of the Libyan Dinar. For example, Interviewee 9 indicated that Libya's adoption of a policy of fixed rates means that there is no relationship between Libya's oil revenues and the Libyan Dinar. However, this interviewee suggested that, in the longer term, oil revenues do exert some influence on the value of the Libyan Dinar, noting that the direction of the relationship in practice is the opposite of what might be expected.

Interviewee 7 stated that while there may well be a theoretical link between Libya's oil revenues and the value of the Libyan Dinar, in practical terms no such relationship exists, as was evident when Libya depreciated the Libyan Dinar during periods when oil revenue was high. For example, the largest depreciation of the Libyan Dinar took place in 2002 when the average oil price was \$22.81 per barrel; in contrast, the currency's value has appreciated at times when revenues are low, e.g. in 1998 when the average oil price was \$11.91 per barrel. This interviewee added

that the value of the Libyan Dinar generally reflects political rather than economic thinking.

Interviewee 3 also indicated a belief that no strong relationship exists between Libya's oil revenues and the value of the Libyan Dinar; he mentioned a study by Alsoda (1973) in this context. Alsoda's study pointed out that as the Libyan Dinar is not a free currency, it tends not to be used in Libya's transactions with other nations. In fact, Libya undertakes these transactions using its hard currencies, and so the value of the Libyan Dinar has no impact on the profitability of these transactions. However, Libya can profit from managing its hard currencies efficiently; Alsoda (1973) recommends increasing the value of the Libyan Dinar for internal purposes, explaining that in so doing, the nation will reduce imported inflation and provide stability in the local prices of imported goods. Furthermore, the author recommends use of a multi-exchange rate policy, as adopted in other developing countries, including Egypt and Sudan. This change would allow Libya to gain the advantages of the new price for Libyan imports, while still

using the old price in other transactions, in particular when any income arising in Libya is transferred to the outside world.

Summary and Conclusion

The Libyan experts interviewed for this study indicated that oil price movements have major implications for the nation's financial performance because Libya's economy is heavily dependent on oil revenues. Libya has adopted a long-term plan for the oil sector, based around extraction of the maximum quantity of oil in the long-term, and has increased its share of various oil production agreements in an attempt to maximise its oil revenues. Although Libya has tried to reduce its dependence on the oil sector and establish new sources of revenues, the nation's economy is still believed to be greatly dependent on oil revenues. However Libya is perceived by the interviewees to have managed, to a degree, to reduce the impact of low oil prices by employing policies to compress expenditure and reduce production costs, as well as by starting refining activities inside and outside Libya.

The UN and the US sanctions were seen by the interviewees as having negatively impacted the Libyan economy in general and the oil and gas sector in particular to varying degrees. Although the Libyan oil sector has managed to open new markets, according to the interviewees, the sanctions caused a large increase in production costs. In the new era, with Libya now re-joining the world community in both political and economic terms, the likely premium will be on flexibility, as the financial and industrial sectors are gradually re-exposed to market forces. Relatedly, Libya has adopted a policy of fixing its exchange rate, meaning that there is no straight forward relationship between Libya's oil revenues and the value of the Libyan Dinar. Future years may see this policy come under severe pressure if Libya continues with its current policy of economic integration at the global level.

Footnotes:

1-It was not possible to meet this interviewee because he was moving around Libya at the time the research was undertaken.

2-Essential alimentary goods in Libya include: milk; sugar; plain; vegetable and olive oil; tea; coffee; and tomato sauce.

3-These cost reductions were primarily in the form of salary reductions.

4-Libya has reduced oil-related costs by using its own crude oil reserves to produce finished oil products for domestic consumption. Previously, normal practice was to export crude oil and import the completed products.

5-Libya's influence in OPEC is largely derived from its position as one of the largest producers of crude oil in the world. Libya is the major oil exporter to many parts of the world, including Europe (Country Analysis Briefs, Libya, 2002). It was the number one country for new exploration, development and production ventures in 2000 (Widdershoven, 2002).

6-Ras Lanuf Corporation is the biggest refining centre in Libya; the third stage development includes the building of several new chemical factories.

7-This period being 19 years after the first year of oil production in Libya and ends with the imposition of US sanctions.

8-The Kruskal-Wallis Test facilitates comparison of the scores on a continuous variable for three or more groups. Scores are converted to ranks and the mean rank for each group is compared. A significance level with a value lower than .05, indicates that there is a statistically significant difference in the variable across the groups. The Mean Rank for the groups will then indicate the group with the highest overall ranking, corresponding to the highest score on the variable (Pallant, 2001).

9-The Libyan Dinar was linked to the Pound Sterling from 1951 until 1971 and to the US Dollar thereafter, but since March 1986 it has been linked instead to Special Drawing Rights (SDRs).

<http://www.mideastinfo.com/archive/cw/libyaoil.htm>[Accessed on: 14.08.2002].

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Appendix 1: The Number of Seismic Crews, Drilling Rigs, Wells Completed and the Added Proven Reserves in Libya between 1960-1999

Year	The number of seismic crews at work	The number of active drilling rigs	Exploratory and development wells completed	Added proven
1960	472.5	34	197	0
1961	438.6	35	198	0
1962	359.2	43	209	1500
1963	332.8	46	390	2500
1964	246.5	45	420	2000
1965	215.9	55	302	1000
1966	143.6	21	238	10000
1967	185.6	22	134	9200
1968	149.4	37	150	800
1969	243.7	55	235	5000
1970	126.7	13	245	-5800
1971	44.7	18	81	-4200
1972	48.6	9	55	5400
1973	21	8	82	-4900
1974	33.9	14	72	1100
1975	94.5	9	84	-500
1976	120.9	18	88	-600
1977	90.9	24	136	-500
1978	109.3	28	135	-700
1979	77.6	34	220	-800
1980	108.4	38	192	-500
1981	183	33	157	-400
1982	163	28	89	-1100
1983	232	35	80	-230
1984	199	34	86	-170
1985	205	34	65	200
1986	135.5	12	40	1500
1987	95.6	15	41	0
1988	127	20	100	0
1989	114.5	17	110	0
1990	143	15	98	135

Source: Mahmud and Russell, (2002).