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DISSERTATION

CURRENT ACCOUNT IMBALANCES AND ADJUSTMENT POLICIES: A CASE STUDY OF SAUDI ARABIA

Submitted by

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In partial fulfillment of the requirements

for the degree of Doctor of Philosophy

Colorado State University

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY AHMED ABDULMOHSEN AL-NASSAR ENTITLED "CURRENT ACCOUNT IMBALANCES AND ADJUSTMENT POLICIES: A CASE STUDY OF SAUDI ARABIA" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

CURRENT ACCOUNT IMBALANCES AND ADJUSTMENT POLICIES: A CASE STUDY OF SAUDI ARABIA

Saudi Arabia has experienced wide variations in export proceeds leading, along with other factors such as government balance and money stock, to sharp fluctuations in its current account balance for the period of 1969-1997 (between 58.7% of the GDP in 1978 and –23.4% of the GDP in 1991). The sharp fluctuations in the current account balance have made it difficult for Saudi planners and policy makers to adopt appropriate economic policies that will promote economic growth.

In this study, two approaches have been used to investigate the current account imbalances in Saudi Arabia, in order to assist Saudi planners and policy makers in making appropriate decisions. To determine if the current account imbalances are excessive under the neoclassical assumptions, the intertemporal approach was carried out using the present value of the current account method. The estimation results showed that the model captures the statistically important aspects of the current account behavior for the period of 1969-1997.

According to the intertemporal theorists, there is no need for policies to deal with the deficit or the surplus in the Saudi Arabian current account since they are the result of maximization behavior. But since Saudi Arabia's economy has special factors (a single

commodity export economy and a high degree of openness of the economy) that may affect the risks associated with running large external deficits, widening external deficits may pose significant risks in the event of unfavorable shocks. For these reasons, the government needs to be on the alert to deal with deterioration in the current account position.

The conventional approach was carried out using the vector autoregression (VAR) model to determine the factors that cause the current account variability under the assumptions of the neo-Keynesian theory. The results revealed that the government balance, the money stock and the terms of trade have the greatest impact on the current account. These factors can be managed to deal with the current account imbalances in the short term, but in the long term, a diversification of exports and reforming the labor market are the most important policies that need to be implemented.

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DEDICATION

To my country, Saudi Arabia.

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CHAPTER ONE

INTRODUCTION

The end of World War II ushered in a golden period for the world economy. From 1949 to 1973 unemployment and inflation were low and external imbalances were moderate. Unfortunately, performance during the Golden Quarter Century was not the new norm for the world economy. Since then the growth rate has declined, unemployment and inflation have increased and external imbalances have become more severe (Hooke, 1994).

Since the early 1970s, policymakers have endeavored to incorporate new theoretical advances in open economy macroeconomics into their analyses to attain a deeper understanding of the determinants of current account movements and their relation to other key economic variables, such as fiscal and monetary policies, level of economic activity, real exchange rate and interest rate, and shifts in intertemporal behavior (Knight and Scacciavillani, 1998).

The current account imbalance produces a change in a country's net stock of foreign assets or liabilities; the question, therefore, is whether or not there are stabilizing forces that prevent continued increases in these net foreign claim positions and ensure a smooth adjustment to a long-run equilibrium. If no such mechanisms exist, adjustment may be forced through financial crisis (Fry, 1991).

The conventional analysis views macroeconomic policies (fiscal and monetary policies) and relative prices as having a direct impact on the current account imbalances. The government may have to take policy actions in order to eliminate the imbalances in the current account. The intertemporal optimization analysis views the current account imbalances as the result of intertemporal optimization, smoothing consumption by borrowing now against future income. Therefore, there is no need for the government to intervene to correct the imbalances since there will be an automatic adjustment mechanism in the current account.

The Saudi Arabian current account has fluctuated sharply over the last thirty years. For the period 1969-1982, with the exception of 1969 and 1978, the current account balance was in surplus. In 1978, 1979, and 1980, the current account as percentage of Gross Domestic Product (GDP) recorded 58.7, 30.6, and 27 respectively. However, the current account balance after 1982 showed a sudden reversal. For the period of 1983-1997, the current account was predominantly in the red. In 1991, the deficit reached its highest recorded level, 23.4 percent of the GDP. The sharp fluctuations in the current account balance (between 58.7 and -23.4 percent of the GDP) make it difficult for Saudi planners and policy makers to adopt economic policies that will promote economic growth.

The Saudi Arabian monetary authority pegs the Saudi currency to the U.S. dollar, as most of the developing countries do. But, unlike most of them, it guarantees full conversion of its currency to any hard currency. Therefore, when there is a current account deficit, the government must provide the hard currency to immediately finance

the deficit that is not offset by capital and financial accounts. It does that by de-accumulating international reserves or by borrowing from the international markets.

Since the government is responsible for the uncovered deficit in the current account, it has to find the best economic policies to solve the current account imbalances. If the current account imbalances are believed to be the result of individual optimization behavior, the government should finance the deficit by drawing down its foreign exchange reserves or by borrowing from the international market. But if the current account imbalances result from misguided government policies or large changes in relative prices, the government should perform macroeconomic adjustments. The macroeconomic adjustments can be: (1) fiscal policy (government expenditures, taxes) and monetary policy (reducing the money supply) which can be used to reduce the aggregate demand; (2) changing the import or export prices through devaluation of the nominal exchange rate, improving the terms of trade or imposing tariffs (or quotas) on the imports. These policies will alleviate the deficit in the short term, but in the long run the government has to make structural adjustments in the economy such as diversification and promotion of exports.

The objective of this study is to examine: (a) whether the Saudi Arabian current account data supports the intertemporal optimization approach to the current account or the conventional approach to the current account, in order to determine if the current account imbalances are excessive; and (b) what factors determine the current account positions. Based upon the empirical results, and the descriptive analysis of the economy and the current account behavior in Saudi Arabia, this study will propose a framework that may identify the best economic policies to cope with current account imbalances.

Should the government finance the deficit by borrowing from the international market or prevent the deficit using macroeconomic adjustment policies? This study will also examine what should be done in the long run and the implications to welfare for such policies.

The Saudi Arabian economy and the current account behavior during the period of study, 1969-1997 is described in chapter two. In chapter three, a survey of the literature concerning the causes of the current account imbalances and a detailed description of the theoretical analysis and empirical investigations of the intertemporal approach and the conventional approach to the current account are presented. In chapter four the framework for the intertemporal approach is developed, and the empirical results and policy implications presented. The framework and the empirical results of the conventional approach are presented in chapter five. Also, the policies that can be used to manage the current account in both the short and long term are discussed in more detail. The conclusions of the study are presented in chapter six.

CHAPTER TWO

THE STRUCTURE OF THE SAUDI ARABIAN ECONOMY

2.1. INTRODUCTION

After he completed the unification of the country, King Abdulaziz Al-Saud (may God bestow His mercy on him) proclaimed the establishment of the kingdom of Saudi Arabia on September 23, 1932. The kingdom of Saudi Arabia covers most of the Arabian Peninsula with an area of approximately 2.4 million square kilometers and in 1996 had a population of 18.84 million people.

Before the discovery of oil, Saudi Arabia could have been classified as one of the poorest countries in the world. During that time, most of the population was engaged in agriculture with limited scale production for very small markets. Production was essentially on a subsistence level. The discovery of oil in 1938 changed this situation. Saudi Arabia became an oil-based economy, which depends on oil revenues as the main source of the country's finance and foreign exchange.

Although Saudi Arabia is committed to free enterprise, the government has always played an active role in promoting economic development and persuading the private sector to move towards industry and other sustainable production activities. The country experienced a significant transformation in the last three decades. A substantial

educational system has been built, an extensive health care network established, and modern telecommunications, roads, ports, and airports constructed.

For the purposes of this study, the Saudi Arabian economy can be examined over two distinct periods. The first period, from 1969 to 1982, can be considered as the booming period. In this first period the oil markets experienced two shocks: the first one in 1973 and the second one in 1980. Both shocks had a positive impact on oil prices, leading to huge oil revenues and, therefore, to large government spending. During the second period, from 1983 to 1997, a slowdown in the economy took place due to the drop in oil prices. For most of this period, both the budget and the current account were in deficit, and the growth of real GDP was either slow or negative.

To better understand the features of the structure of the Saudi Arabian economy, which will be helpful in the interpretation of the results of the econometric analysis portion of this study, it is necessary to focus on the role of the government, oil, agricultural, and industrial sectors, and their impact on the Saudi economy. A detailed analysis of the external sector and the balance of payments and its most important component, the current account, will be presented.

2.2. GOVERNMENT SECTOR

The government of Saudi Arabia owns the oil revenues, and since these revenues are so large and independent from taxation, it is in a unique position to influence both the level and structure of economic activity. The avenues through which the government exercises its influence are varied. They include direct expenditures on consumption and on large-scale investment, as well as the provision of loans and other financial assistance

to other economic agents in the economy through government financial institutions (Johany, et al., 1986). The indirect way in which the government accelerates the development of the economy is through the implementation of five-year plans.

While the government's expenditures on consumption (defense, public administration, etc.) are large, a larger part of its expenditures is directed towards encouraging economic growth such as human resource development. Table 2.1 presents the government budget by sectors, illustrating that most of the government revenues derive from petroleum revenues. The expenditures section reveals that a high percentage of the government outlays went to defense and security followed by outlays on human resource development. The high percentage devoted to human development reflects the importance of economic development in the government objectives.

The second channel the government of Saudi Arabia uses to promote economic development is through government specialized credit institutions. They distribute loans and advances to Saudi individuals and companies. These institutions are:

- Saudi Arabian Agricultural Bank
- Public Investment Fund
- Real Estate Development Fund
- Saudi Credit Bank
- Saudi Industrial Development Fund (SIDF)

Total disbursements by these institutions from their inception through 1996 exceeded $68.5 billion. In a period of twenty years, their total capital has increased from $3.95 billion in 1976 to $50.7 billion in 1996. During 1996 the actual disbursement of loans amounted to $4.83 billion (U.S.–Saudi Arabian Business Council, 1997).

Table 2.1. Annual Government Budget Estimates (by Sectors) in Millions of Saudi Riyals 1988-1997

	1988	1989	1990-91	1992	1993	1994	1995	1996	1997
A. Total Revenues:	105300	---	---	151000	169150	120000	135000	131500	164000
Oil Revenues	73525	---	---	117693	121703	86933	101461	99606	129444
Other Revenues	31775	---	---	33307	47447	33067	33539	31894	34556
B. Total Expenditures:	141200	140460	359601	181000	196950	160000	150000	150000	181000
Human Resource Development	23388	24004	56392	31855	32121	29226	26912	27536	41595
Transport & Communications	9493	8516	17420	8452	8197	6855	6199	6310	6890
Economic Resource Development	5888	5039	9184	4615	5063	4284	3855	4544	4733
Health & Social Development	10806	10634	24492	13534	13626	11259	10161	10110	14366
Infrastructure Development	3555	2807	4912	2090	2078	1580	1395	1356	1588
Municipal Services	7017	5430	11882	5922	6121	5224	4880	4893	5445
Defense & Security	50080	47812	122666	57601	61692	53549	49501	50025	67975
Public Adm. & Other Gov.Spend.	25058	31345	100480	49176	58171	40530	39706	37952	30836
Government Lending Institutions	590	---	2123	648	714	523	476	415	439
Local Subsidies	5325	4873	10050	7107	9167	6970	6915	6859	7133

Source: SAMA, 1998 annual Report

Indirectly, the government of Saudi Arabia promotes economic development through the development plan mechanism. For the past 25 years the economic development of Saudi Arabia has been broadly governed by five-year economic plans. The first five plans emphasized the development of the Kingdom's infrastructure; later plans focused increasingly on human resource and private sector development. The Sixth Plan, which began in 1995, calls for further development of the technical skills of the Saudi population, and an even stronger emphasis on the private sector's role in the economy through increasing diversification of the industrial base and agriculture. The highlights are as follows:

- Limiting government spending on development programs and projects to actual revenues.
- Relating government loans and support facilities provided to individual private firms directly to the implementation of Saudization (replacement of foreign workers with Saudi workers) commitments.
- Deepening the dialogue with the private sector by adopting suitable institutional mechanisms, and organizing regular meetings with private sector representatives at the sectoral level.
- Expanding the utilization of private capital in financing many government projects.
- Improving the financial conditions for small-scale enterprises and expanding the Saudi Credit Bank's activities.

- Increasing the efficiency and utilization of non-conventional water resources, such as desalinated water, treated wastewater and agricultural drainage water in order to maintain natural water resources.
- Developing the necessary measures to encourage small industries and studying the possibility of establishing an agency responsible for their development.
- Achieving full privatization of electric utilities over the medium to long term.
- Establishing new industrial parks in locations with favorable growth potential.
- Establishing a national system for the adoption of environmental impact assessments, particularly in industrial, agricultural and urban projects.
- Meeting the increasing demand for modern infrastructure in addition to safeguarding existing facilities through routine maintenance.

2.3. AGRICULTURAL SECTOR

The Saudi agricultural sector has grown at an average annual rate of 8.7 percent since 1970 and accounts for more than 8.0 percent of Saudi Arabia's GDP in 1997. This is mostly because of government incentives to farmers in the form of loans and subsidies. Self-sufficiency has been achieved in the production of certain food items and the kingdom is nearing self-sufficiency in others. In 1995, self-sufficiency reached 68 percent of the local consumption of broiler chickens, 85 percent of vegetables, 68 percent of fruit, and 46 percent of red meat (U.S.-Saudi Arabian Business Council, 1997).

The total cultivated crop area in the kingdom declined 10.4 percent between 1995 and 1996 falling from 1.3 million hectares to 1.2 million hectares. The overall production

of grain during 1996 amounted to 1.9 million tons, a decline of 0.7 million tons or 27.6 percent from the preceding year. In contrast, the production of vegetables and fruits has increased. This increase in the latter kind of crops is due to the kingdom's policy of shifting from high-water consumption crops to low-water consumption crops.

Despite significant gains in local production of agricultural products, Saudi Arabia remains the leading importer of food in the Middle East. The kingdom imports roughly $5 billion worth of food products annually. With a young and rapidly expanding population, the demand for new and reputable food products is growing. With low rainfall and difficulties in expanding the area dedicated to crop production, an increase in the local production of agricultural products is limited. Therefore, Saudi Arabia has to rely on imports to feed its population.

2.4. OIL SECTOR

Oil was discovered in commercial quantities in 1938, but large-scale development did not take place until after World War II. At present, the kingdom is the largest producer of oil in the Middle East and the largest exporter in the world. Saudi Arabia accounts for more than a quarter of the world's total oil reserves. Official estimates put the kingdom's proven crude oil reserves at about 254,145 million barrels by the end of 1997.

For decades, Saudi Arabia's economic development has been driven by the success of its oil industry. Oil plays a crucial role in the Saudi Arabian economy, and is considered the most valuable resource in the country in terms of providing the government with most of its income and foreign exchange. In 1997, shares of oil were 39

percent of GDP. Oil exports accounted for approximately 75 percent of total exports of goods and services, and about 79 percent of government revenues.

As shown in Table 2.2, the average daily production of crude oil was 3.22 million barrels in 1969, after which it started to increase rapidly until it reached its peak in 1980, 9.9 million barrels per day. After that, the production declined to 3.17 million barrels per day in 1985. In the 1990's the production averaged 8 million barrels a day. The oil price followed patterns similar to those of production, climbing from its lowest level of $1.30 per barrel in 1969 to its highest level of $34.23 in 1981. It stabilized in the high 10s to low 20s for the 1986 to 1997 period.

Saudi Aramco is responsible for the operation of all oil and gas exploration, production, and distribution to the internal and external market. Saudi Arabia wants to maintain and increase its capacity for producing oil in order to boost the country's ability to meet higher future oil demand. Therefore, Saudi Aramco plans to expand and upgrade its oilfields. In March of 1999, it opened the Shaybah oilfield in the desert of The Empty Quarter, which began producing 500 thousand barrels a day of premium grade extra light crude. Also, in order to secure an international market for its crude oil exports, Saudi Aramco is currently focusing on investing in offshore refineries.

It is clear from the above analysis that the Saudi Arabian economy is oil-dependent. Uncertainty and instability can also characterize the oil market because oil demand and prices depend on many variables that are beyond the Saudi government's control. The uncertainty and instability in the quantity demanded and price of oil creates a problem for the Saudi government when attempting to select the most effective policies

Table 2.2. Saudi Oil Production, Exports (in Million Barrels), and Prices					
Year	**PRODUCTION**	**DAILY AVERAGE**	**EXPORTS**	**DAILY AVERAGE**	**PRICES**
1969	1173.89	3.22	1178.26	3.23	1.30
1970	1386.67	3.80	1382.06	3.79	1.30
1971	1740.68	4.77	1719.14	4.71	1.65
1972	2201.96	6.03	2200.63	6.03	1.90
1973	2772.61	7.60	2773.34	7.60	2.70
1974	3095.09	8.48	3102.25	8.50	9.76
1975	2582.53	7.08	2584.65	7.08	10.72
1976	3139.28	8.60	3145.42	8.62	11.51
1977	3357.96	9.20	3330.44	9.12	12.40
1978	3029.90	8.30	2987.50	8.18	12.70
1979	3479.15	9.53	3393.60	9.30	17.26
1980	3623.80	9.93	3554.14	9.74	28.67
1981	3579.89	9.81	3485.29	9.55	34.23
1982	2366.41	6.48	2253.50	6.17	31.74
1983	1656.88	4.54	1577.75	4.32	28.77
1984	1492.90	4.09	1345.74	3.69	28.06
1985	1158.80	3.17	977.64	2.68	27.54
1986	1746.20	4.78	1455.55	3.99	13.73
1987	1505.40	4.12	1221.23	3.35	17.23
1988	1890.10	5.18	1662.94	4.56	13.40
1989	1848.50	5.06	1616.42	4.43	16.21
1990	2340.50	6.41	2121.40	5.81	20.82
1991	2963.00	8.12	2832.34	7.76	17.43
1992	3049.40	8.35	2882.86	7.90	17.94
1993	2937.40	8.05	2812.97	7.71	15.68
1994	2937.90	8.05	2773.45	7.60	15.39
1995	2928.54	8.02	2778.51	7.61	16.73
1996	2965.45	8.12	2782.08	7.62	19.85
1997	2924.23	8.01	2765.75	7.58	18.76

- Oil Prices are average price of Arabian light crude in U.S. dollars per barrel.
- Source: SAMA, 1998 annual report.

to influence economic activities. The Saudi Arabian government has realized this problem and is now trying to control it through diversification of its economy.

2.5. INDUSTRIAL SECTOR

Saudi Arabia had no real industrial sector except some traditional crafts and cottage industries prior to the discovery of oil. During the 1960s, the growth of the industrial sector continued at a slow rate, increasing after the 1973 oil boom. The growth rate in the industrial sector increased at a faster rate during the 1980s and 1990s after the government adopted policies to promote the industries in order to reduce the country's dependence on oil. This sector demonstrated a strong growth trend with growth rates of 8.1% in 1995, 11.6% in 1996, and 9.6% in 1997.

Industrialization in the kingdom is carried out by both public and private sectors. The private sector has been consistently encouraged to undertake industrial and other investment as a means of diversifying the economy. The government has enacted a series of incentives designed to increase the profitability of industrial investment and/or to reduce its uncertainty. These incentives include establishing the industrial base by building the country's infrastructure and providing financial assistance through interest-free loans and tax exemptions (Albazai, 1991). When the size of the investment has been large and beyond the capacity of the private individuals, the government itself has undertaken the capital investment. The Saudi government has established a number of organizations to develop the basic industries in the kingdom.

The past two decades have witnessed enormous growth in the number of industrial units operating in the kingdom. In 1975, Saudi Arabia had about 470 industrial

units. By May of 1997, the total number of factories in the kingdom had reached 2,598 with a total investment of about 190.5 billion Saudi Riyals. A breakdown of these units by the type of activity is shown in Table 2.3.

The huge reserves of oil and natural gas have given Saudi Arabia a potential comparative advantage in the petrochemical industries, but the exploitation of this advantage could not be left to the private sector alone. The development of these industries demands an investment on such a large scale that the private sector would likely be unable and unwilling to meet the financial commitments and heavy risks involved in this kind of project. For this reason, the government established the Saudi Arabian Basic Industries Corporation (SABIC) in 1976 (Presley and Westaway, 1989).

SABIC was established to develop the basic heavy industries, such as the petrochemical and hydrocarbon industries, which use oil and natural gas as the main inputs in their production processes. The Saudi government is hoping to attract private investment in the petrochemical industries by low input prices and economies of scale. The final goal of the government is to privatize SABIC. Thirty percent of SABIC's stock has been sold to the public.

SABIC is one of the largest producers of petrochemicals in the world, accounting for approximately seven percent of the global petrochemical output. Besides its holdings in the kingdom, SABIC has several joint venture partners in Saudi Arabia and around the world. In 1997, SABIC produced 23.7 million tons of chemicals, fertilizers, plastics, resins, metals and gases, and is aiming to increase its output to over 28 million tons by the year 2000. To achieve that goal, new multi-billion dollar petrochemical plants are being planned and built, and these include joint venture projects with Chevron and Mobil.

Table 2.3. Industrial Units (Capital in Millions of Saudi Riyals)					
	5/96 - 5/97		CUMULATIVE OPERATING INDUSTRIAL UNITS		
Industrial activity	Number of units	Total capital	Number of units	Total capital	Employment
Food and beverages	96	1601.6	404	12316.5	33952
Textiles, ready-made garments and wood products	65	1504.4	115	2761.8	14071
Wood products	32	219.6	121	1688.8	10003
paper products and printing materials	29	438.0	170	4971.2	13000
Chemical and plastic products	240	4231.7	501	124190.9	56200
Construction materials, ceramic and glass products	40	390.2	476	22707.2	42326
Basic metal products	8	2016.4	13	4307.8	3559
Manufactured metal products and machines	172	2982.3	717	16363.6	60176
Other industries	15	160.7	62	963.0	4749
Transport and storage	-	-	19	402.1	1995
Total	697	13544.9	2598	190672.9	240031

Source: SAMA, 1998 annual report.

SABIC is also turning its attention to plants that manufacture higher value-added products such as gasoline oxygenates, aromatics, acids, plastics, and fibers (U.S.-Saudi Arabian Business Council, 1998).

2.6. EXTERNAL SECTOR

One of the features of the Saudi Arabian economy is its degree of interdependence with the rest of the world. This interdependence has increased dramatically as the nation's income from oil has risen, and simply reflects the increased standard of living made possible by that increase in income. In 1997, exports of goods and services represented 48 percent of Saudi Arabia's gross domestic product. Imports of goods and services amounted to 47 percent of GDP. The kingdom is the 24th largest exporter of merchandise trade in the world, accounting for approximately one percent of the world's total. It is also becoming an increasingly important importer.

Saudi Arabia has an open trade and exchange system; the country does not impose trade or exchange restrictions for balance of payments purposes. There is no import license requirement and foreign exchange is freely available for payment abroad. Exports are free of restrictions, except for the prohibition on re-exporting certain imported items, which benefited from government subsidies. The tariff system has three basic rates (0%, 12%, and 20%). The 20 percent tariff tends to be imposed on a limited number of manufactured imports that compete with locally produced items in order to protect the local industry.

Foreign direct investment is encouraged through joint ventures with local companies. Tax exemptions are granted to foreign capital invested in industrial joint

ventures in order to encourage the transfer of technology to Saudi Arabia. While foreign direct investment is encouraged, short-term foreign portfolio investment is restricted. Presently, only one closed-end mutual fund, listed in London, is available to foreigners wanting to invest in Saudi Arabian equities. More of these kinds of funds are under consideration. Gulf Cooperation Council (GCC) residents, however, can freely participate in the stock market, and nonresidents are allowed to invest in government bonds (International Monetary Fund, 1998).

The Saudi riyal is formally pegged to the SDR at the rate of SRs 4.28255 = SDR1 with margins of 7.25 percent on either side of the parity. These margins were suspended in 1981; and since June of 1986, the Saudi riyal has been effectively pegged at a rate of SRs 3.745 = US$1.00. The Saudi Arabian monetary authority has chosen to peg the riyal to the U.S. dollar because of a number of factors: 1) oil export contracts are in U.S. dollars and the oil exports occupy a large percentage of Saudi exports; 2) the U.S. is Saudi Arabia's largest trading partner; and 3) the U. S. has a low rate of inflation when compared to other industrialized countries; therefore, pegging its currency to the U.S. dollar helps Saudi Arabia keep its own inflation rates low.

By law, the riyal is fully backed by reserves of hard currency or gold. This gives the government the power to defend the currency against speculative pressure. The Saudi's peg system is similar to the currency-board system. There are some similarities as well as differences between the two. Under the currency-board, a country backs its currency one-to-one with one of the hard currencies (the U.S. dollar, for example), with the interest rate playing a big role in bringing equilibrium into the money supply. But under the Saudi's peg system, the riyal is fully backed by hard currency and gold, and the

monetary authority is the one in charge of defending it through intervention in the currency market by selling or buying the foreign currency.

The external sector activities of the Saudi Arabian economy can be seen through the balance of payments. The most important section of the balance of payments is the current account, which reflects the real activities in the external sector. Over the last thirty years the Saudi Arabian current account is reflective of the kingdom's economic performance. The economy boomed during the period in which the current account had a surplus (1969-1982), and when the current account was in deficit (1983-1997), the economy experienced a slow growth or recession. Therefore, it is important to determine what causes the surplus and the deficit in the current account. To accomplish this it is first necessary to know how the current account has behaved and how the deficit has been financed during the period encompassed by this study.

Current Account Behavior (1969-1997)

Figure 2.1 shows how the current account balance of Saudi Arabia behaved over the period of interest to this study (1969-1997). With the exception of 1969 and 1978, the current account experienced a surplus for the 1969-1982 period. It reached its peak in 1974, scoring 58.73 percent of GDP. The current account started to experience a serious deficit in 1983, which continued until 1995. It reached the lowest level in 1993, scoring -23.41 percent of GDP.

The two components of the current account, the merchandise trade account, and the services and transfers account, behaved differently. The merchandise trade account

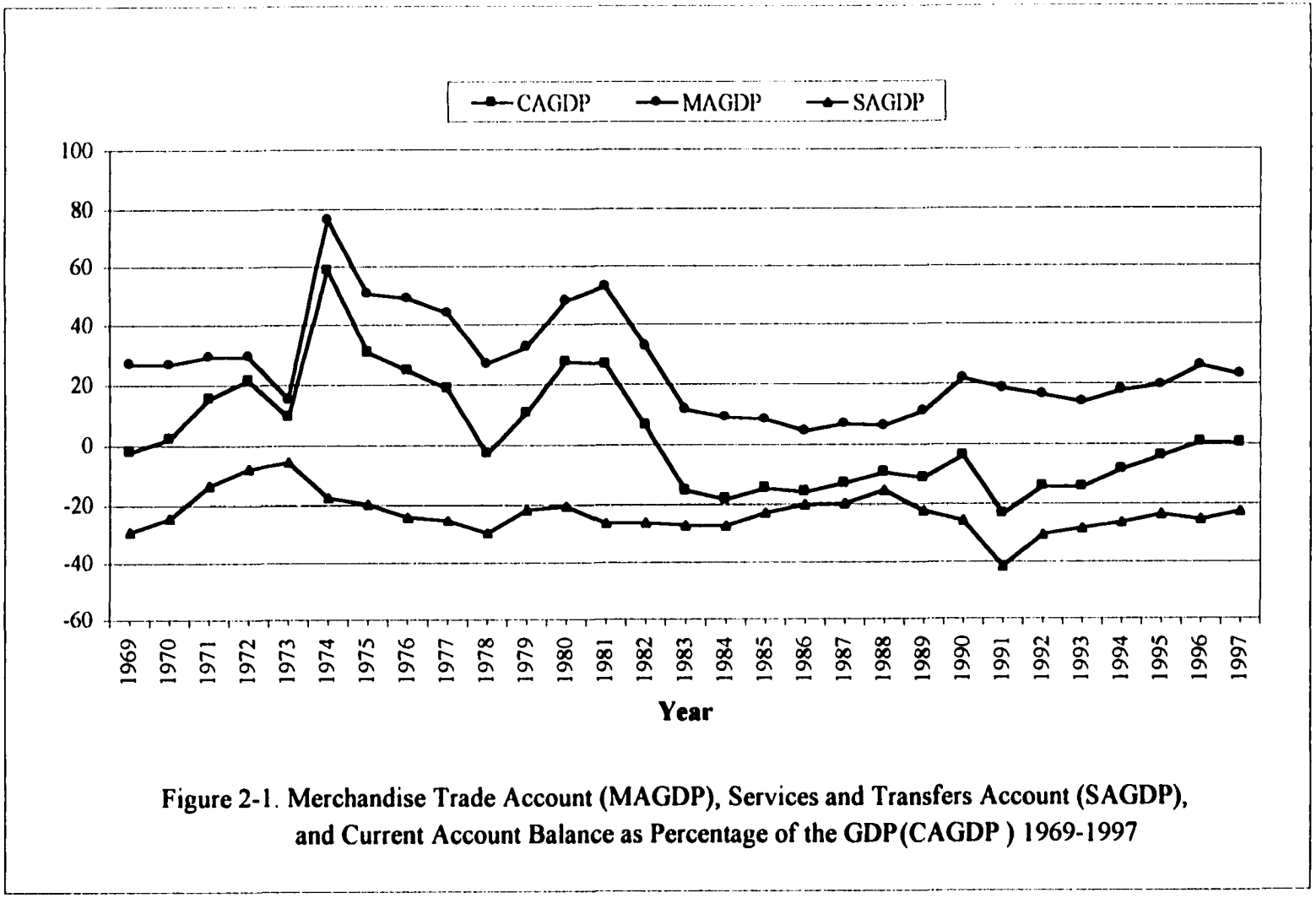

Figure 2-1. Merchandise Trade Account (MAGDP), Services and Transfers Account (SAGDP), and Current Account Balance as Percentage of the GDP(CAGDP) 1969-1997

Source: SAMA 1998 annual report.

was in surplus while the services and transfers account was in deficit throughout the period of the study. The merchandise trade account reached its highest point as a percentage of GDP in 1974 and 1981 (76.46 and 52.82 respectively) following the two positive oil shocks in 1973 and 1980. As a percentage of GDP, the services and transfers account fell to its worst position in 1991 due to the crisis in the Gulf (the Iraqi invasion of Kuwait).

In the exports section of the merchandise trade account (Table 2.4), oil accounted for a large part of the exports. In 1997, the value of oil exports was $52,137 million (or 88 percent of total exports) while all other exports accounted for only $7,340 million (or 12 percent of total exports). The value of oil exports fluctuated sharply, affecting total exports and the merchandise trade account. On the other hand, other exports had steady rising trends due to the kingdom's policy aimed at diversifying its exports to reduce reliance on oil exports and make non-oil exports more attractive to world markets. The non-oil exports consist of petrochemicals ($2,643 million), construction materials ($958 million), agricultural and food products ($318 million), and others ($3,471 million).

Saudi imports rose steadily over the 1970's until imports reached a peak of $34,421 million in 1982. In 1986 the value of imports fell to $17,063 million as a result of both adjustments in government expenditure (due to the decrease in oil revenue) and import substitution. During the late 1990's, imports stabilized at around $25 billion.

The composition of imports reveals that before the massive move toward industrialization the most important imports were consumption products: food items, medicines, automobiles, and textiles. In the last years, the relative importance of consumer goods has declined and that of investment goods has become more important.

Table 2.4. Balance of Payments Summary In Millions of US Dollars (Selected Years)							
	1975	1980	1986	1990	1995	1996	1997
CURRENT ACCOUNT	**14309**	**42758**	**-11795**	**-4153**	**-5326**	**680**	**253**
1.Merchandise Trade (fob)	**23628**	**75156**	**3060**	**22723**	**24259**	**35207**	**33373**
a) Total Exports	27293	100719	20123	44247	49910	60565	59527
i) Oil Exports	27174	100563	18000	39960	43416	54109	52137
ii) Other Exports	119	156	2123	4287	6494	6456	7390
b) Total Imports	-3665	-25563	-17063	-21524	-25651	-25358	-26154
2.Services & Transfers	**-9319**	**-32398**	**-14855**	**-26876**	**-29585**	**-34527**	**-33120**
a) Receipts	3201	11267	13943	12399	8598	8062	10377
i) Investment Income	1859	7443	11278	9199	4987	5127	5736
ii) Oil Sector	499	858	60	169	131	163	157
iii) Other	843	2966	2605	3031	3480	2772	4484
b) Payments	-12520	-43665	-28798	-39275	-38183	-42589	-43497
i) Freight & Insurance	-550	-4602	-2048	-2583	-2437	-2406	-2354
ii) Oil sector	-1614	-6917	-659	-1220	-2184	-2681	-2580
iii) Private services	-1716	-6693	-7928	-10114	-6244	-10186	-11573
iv) Govt. Services	-8087	-21360	-13360	-14121	-10702	-11803	-11651
v) Private Transfers	-553	-4093	-4803	-11237	-16616	-15513	-15339
CAPITAL AND FINANCIAL ACCOUNT	**-5325**	**-37565**	**4176**	**-1225**	**6542**	**-2458**	**398**
1. Direct Investment	**1865**	**-3192**	**967**	**1864**	**-1877**	**-1129**	**2575**
a) Direct Invest. In SA	1865	-3192	967	1864	-1877	-1129	2575
b) Direct Invest. Abroad	---	---	---	---	---	---	---
2. Portfolio Investment	**-9923**	**-22007**	**3463**	**-3342**	**4025**	**-10169**	**-7358**
a) Assets	-9923	-22007	3463	-3342	4025	-10169	-7358
i) Equity Securities	---	---	---	---	---	---	---
ii) Debt Securities	-9923	-22007	3463	-3342	4025	-10169	-7358
b) Liabilities	---	---	---	---	---	---	---
3. Other Investment	**2733**	**-12366**	**-254**	**253**	**4394**	**8840**	**5181**
a) Assets	3551	-12871	-1310	1436	4252	9115	3208
i) Monetary Authorities	---	-595	---	---	---	---	---
ii) General Govt.	2650	1975	---	---	---	---	---
iii) Banks	-566	-4220	-5617	-1234	46	-2188	1777
iv) Other sectors	1467	-10031	4307	2670	4206	11303	1431
b) Liabilities	-818	505	1056	-1183	142	-275	1973
i) Banks	262	505	1056	-1183	142	-275	1973
ii) Other sectors	-1080	---	---	---	---	---	---
OVERALL BALANCE	**8984**	**5193**	**-7619**	**-5378**	**1216**	**-1778**	**651**
RESERVE & Related Items	-8984	-55193	7619	5378	-1216	1778	-651
RESERVE Assets	-8984	-55193	7619	5378	-1216	1778	-651
Use of Fund Credit & Loans	---	---	---	---	---	---	---
Exceptional Financing	---	---	---	---	---	---	---

Source: CA is from SAMA 1998 annual report, and FA is from IMF 1998 IFS Yearbook.

The decline in the relative importance of imports of consumer goods does not reflect any decline in their absolute volume. This volume has been growing, but not nearly as rapidly as that of investment goods (Johany et al., 1986).

The services and transfers account was in deficit over the period of the study (1969-1997) as mentioned before. The two important sources of payments in the services and transfers account are government services and private transfers. In 1997, they constituted 62 percent of the payments (Table 2.4). Government services include (a) official transfers and contribution or capital subscription to international and regional development agencies, and (b) certain government imports. Private transfers are comprised largely of the remittances made by foreigners working in the kingdom. In the receipts section investment income represents the largest portion, accounting for about 55 percent of total 1997 receipts.

The surplus enjoyed in the current account over the 1969-1982 period enabled the kingdom to build up substantial reserves of gold and foreign exchange, both in the government and private sectors. "The precise size of the government's holdings is not known, but some estimates have been offered. The IMF estimates the level at $160-180 billion in 1982 (Johany et al., 1986, p. 82)." This huge reserve held by the government and banks enabled the kingdom to finance the current account deficit for the 1983-1995 period, as shown in Table 2.4.

CHAPTER THREE

SURVEY OF THE LITERATURE

3.1. INTRODUCTION

A country's current account balance over any time period is the increase in residents' claims on foreign incomes or outputs, minus the increase in similar foreign-owned claims on home income or output. Thus, the current account includes not only the exports minus the imports but also the income on, and payouts on, cross-border assets (dividends, interest payments, insurance premiums and payments, etc.) and net capital gains on existing foreign assets (Obstfeld and Rogoff, 1995).

The current account of a country is, by the national income accounting relationship, the difference between a country's saving and investment. If a country has a current account deficit, its domestic investment exceeds national saving, with the net inflow of real goods and services filling the gap between investment and saving. A current account surplus on the other hand, necessarily implies an excess of saving over investment. This can be seen through the standard national income accounting identities:

Let Y be Gross National Product (GNP), Q be Gross Domestic Product (GDP), and F be net factor payments from abroad such as remittances or interest on foreign bonds. By definition,

$$Y = Q + F \tag{3-1}$$

GNP plus unilateral transfers from abroad, R, may be used for consumption, C, gross private saving, S^P, and taxes, T:

$$Y + R = C + S^P + T \tag{3-2}$$

Government saving, S^G, is given by $T - G$, where G is government consumption of goods and services. Output market equilibrium requires

$$Q = C + I + G + X - M \tag{3-3}$$

where X is export, M is import, and I is gross domestic investment.

If the current account *(CA)* is defined as the net export of goods and services plus unilateral transfers and net factor payments from abroad, equations (3-1) through (3-3) provide those equivalent definitions.

$$CA = X - M + F + R \tag{3-4}$$

$$CA = X - M + (Y - Q) + R$$

$$CA = X - M + (Y - C - I - G - X + M) + R$$

$$CA = Y - (C + I + G) + R \tag{3-5}$$

$$CA = C + S^P - C - I + (T - G)$$

$$CA = (S^P + S^G) - I \tag{3-6}$$

The equality (3-4) is the standard definition of the CA. The equality (3-5) reflects that CA must also equal income minus absorption $(C + I + G)$. The equality (3-6) represents CA surplus as the excess of saving over investment. When rewritten as $CA + I = S^P + S^G$, the expression shows that national saving must equal national investment, which is the sum of domestic I and foreign CA components (Sachs, 1981).

In a closed economy, the current account balance is zero since income is equal to expenditure on consumption and investment goods, and therefore, national saving is identical to the domestic investment $(S \equiv I)$. On the other hand, in an open economy macroeconomic model with perfect capital mobility, investment could be seen as independent from domestic saving due to perfect substitutability between domestic capital and foreign assets.

It should be noted that if the saving exceeds the investment, then the savings that are not invested domestically could be used to make loans to foreigners (capital outflow). Similarly, if the domestic investment exceeds domestic saving, the extra investment must be financed by borrowing from abroad (capital inflow), which is essential to stimulate the economy.

3.2. CAUSES OF CURRENT ACCOUNT IMBALANCES

Since the current account balance is the difference between national saving and domestic investment, the factors that are relevant for saving and investment decisions have a direct bearing on the current account balance of the country (Hassain, 1995). Domestic policy responses, such as government spending and monetary policy, and external shocks, such as exchange rate and terms of trade, play a major role in determining saving-investment co-movement and current account variability. Therefore, it is essential to examine the underlying factors that cause the current account variability and the saving-investment co-movement.

An array of theories has been developed to analyze the behavior and the significance of the current account balance. According to Pitchford:

> They range from Hume's 'specie flow' mechanism, through the 'elasticities', the 'monetary', the 'portfolio balance', to the recent 'intertemporal optimising' approach to the balance of payments, to mention just a few. The evolution of these theories reflects not only the changes in international monetary institutions but also the failure of each successive theory to adequately explain the behavior of the current account in the face of changing economic circumstances (Pitchford, 1995, p.17).

Empirical investigations of the saving-investment co-movement and the variability in the current account have been based mainly on two theories: the neo-Keynesian and neoclassical theories. The neo-Keynesian theory has employed macroeconomic models that rely on postulated behavioral relationships, which describe how the economy works in aggregate without assuming optimizing behavior on the part of the individual economic agents. The neoclassical theory assumes that the important macroeconomic relationships mirror the microeconomic optimization behavior of an individual (Hamam, 1995).

The conventional approach to the current account is based on neo-Keynesian theory. In this approach, an increase in income or deterioration in terms of trade tends to reduce the current account surplus while the depreciation of the real exchange rate tends to improve the current account surplus. On the other hand, the intertemporal optimization approach to the current account, which is based on the neoclassical theory, takes into consideration temporal and intertemporal budget constraints and forward looking behavior in saving and investment decisions. The expectations of future productivity

growth, government spending demands, and real interest rates play a crucial role in determining the current account position.

The key factors governing the nature of macroeconomic equilibrium differ dramatically between the two approaches. In the conventional approach these factors reflect relative magnitudes of parameters measuring the effects of change in income on spending and money demand. In contrast, in the intertemporal optimization approach, the key factors reflect intertemporal parameters and debt-income position (Razin, 1993).

The policy implications of both approaches are completely different. In the conventional approach, the government can intervene and improve the position of the current account. However, the "intertemporal optimization approach to the current account suggests that countries should finance temporary shocks through external borrowing while they should adjust to permanent ones (Roubini, 1988, p.1)."

In the remainder of this chapter, a detailed description of the theoretical analysis and empirical investigations of the intertemporal approach and the conventional approach to the current account are provided.

3.3. INTERTEMPORAL APPROACH TO THE CURRENT ACCOUNT

3.3.1. Theoretical Analysis

Jeffrey Sachs (1981) made a well-stated defense for the intertemporal approach to the current account:

> A one-period theory of the current account that describes a static balance of imports and exports makes as much sense as a one-period theory of saving or investment. Because current account imbalances reflect

> intertemporal choices, expectations of future events can be a decisive factor in determining the size of deficits and surplus (Sachs, 1981, p.212).

The intertemporal approach to the current account is derived from the permanent income theory of consumption and saving. It applies the consumption smoothing idea to the optimal external borrowing problem of open economies and derives relations between the current account and temporary versus permanent economic disturbances (Roubin, 1985). The intertemporal approach combines the assumptions of capital mobility and consumption smoothing behavior to predict that the current account acts as a buffer to smooth consumption in the face of shocks to output, investment, and government expenditure (Ghosh, 1995).

One of the basic features of the intertemporal optimizing approach is the importance of distinguishing between the effect of permanent and temporary shocks. Thus the response of consumption *(C)* to an exogenous drop in income *(Y)* is affected by how permanent the shift is expected to be. A temporary drop in Y will not be matched by an equal fall in C, while a permanent drop in Y will. Similarly, changes in investment should be small if the dip in Y is temporary, but should fall substantially if the slump is expected to be permanent. Clearly, $CA = Y - (C + I + G) + R$ tends to worsen in the first case, but not in the second.

Thus, to forecast the magnitude of the effects of a disturbance on the current account, one must ask whether that disturbance is temporary or permanent, and unanticipated or anticipated. A permanent decrease in price of oil exports that permanently decreases Y will, after a period of adjustment, decrease C by about an equal amount. But a temporary price decrease has a different result. Saudi Arabia and other

exporting countries that depend heavily on oil will have a transitory fall in Y that will be unmatched by a fall in C. These countries will find it worthwhile to borrow temporarily in order to smooth consumption over time. Because transitory income changes should have small effects on C, a temporary price shock should lead to large deficits in the current account in oil exporting countries.

The intertemporal optimization approach to the current account can be illustrated graphically. Figure 3-1 illustrates an intertemporal utility maximizing approach over two periods. Assume an economic unit, which is able to make a living by producing and consuming one good. The intertemporal transformation curve has the usual shape that implies a trade off between production today and production tomorrow. Point 1 is the equilibrium in the state of autarky. Consumption and production in t is C_t^A and C_{t+1}^A in $t+1$.

Now suppose that economic relations are opened to the rest of the world. Now, the economic unit will be able to raise both consumption in t and $t+1$ as C_t^L and C_{t+1}^L show. The individual has to borrow the difference between production and consumption in period $t, (C_t^L - P_t^L)$, which is equal to the deficit in the current account. In period $t+1$, the opposite holds: in order to pay the principal plus interest, the current account has to show a surplus, $(P_{t+1}^L - C_{t+1}^L)$, that exactly matches the deficit on the current account in period t. The intertemporal utility of the individual has been raised by borrowing a certain amount of the goods in t and by paying off this amount plus interest in $t+1$, as the indifference curves U_1 and U_2 show (Dluhosch et al., 1996).

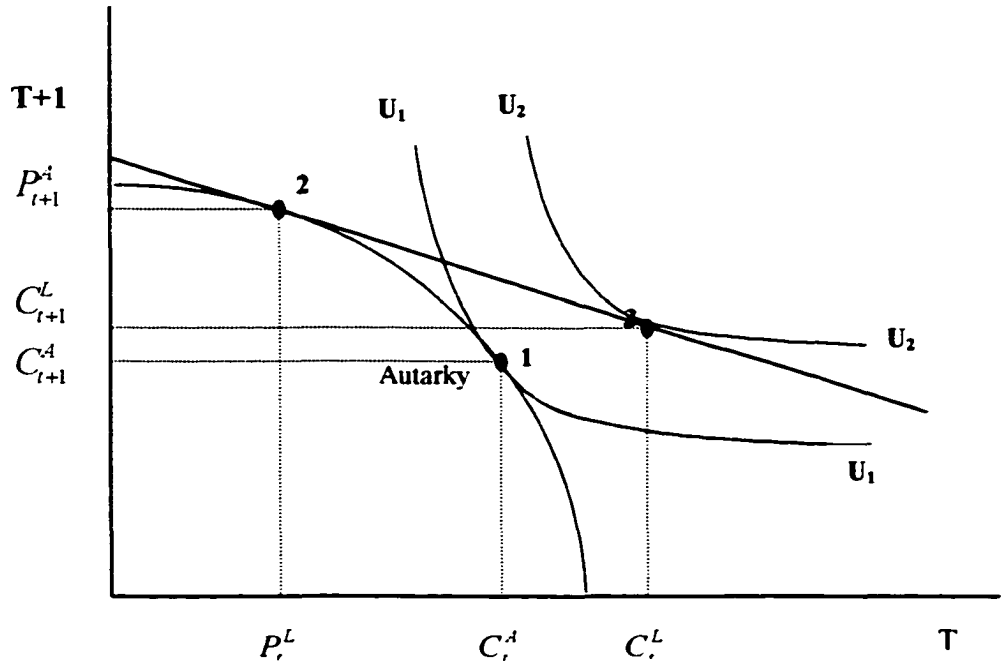

Figure 3-1. Intertemporal Utility Maximization

Aggregating individual intertemporal utility maximization yields the country's utility maximization. This graphical illustration suggests that the country can be better off by running a current account deficit. For example, if there is a sudden drop in income, the country can borrow from foreign countries to keep the consumption smooth and maintain the same utility level.

3.3.2. Empirical Investigations

While there has been extensive theoretical work on the determinants of the current account within an intertemporal framework, the empirical implications have not been exposed until recently. Systematic empirical tests of the intertemporal approach to the

current account had been scarce because of the difficulty in distinguishing correctly between the temporary and permanent components of output and spending. But testing the intertemporal approach became easier with the introduction of Campbell and Shiller's (1987) methodology for testing the permanent income theory of consumption.

Most of the structural time series studies of the intertemporal approach to the current account use the present value model of the current account, which is built on the methodology developed by Campbell and Shiller (1987) for testing the permanent income theory of consumption. The other two methodologies that have been used to test the intertemporal approach are saving-investment correlations and expressing the current account as a function of temporary and permanent components of output and spending. In the following sections a brief review of some of the existing empirical studies associated with each method is given.

1). Saving-Investment Correlations Method

As we have seen before, in a closed economy national saving equals domestic investment and the current account is always zero. An increase in national saving will automatically be accompanied by an equal rise in domestic investment. One of the basic assumptions of the intertemporal approach is that capital is internationally mobile, so that imbalances in the current account are a possibility. Given this assumption, the intertemporal approach predicts a number of situations in which a divergence between saving and investment will occur. The empirical finding that national saving affects domestic investment with unit coefficients would, therefore, appear to be strong evidence against the applicability of the intertemporal approach (Obstfeld and Rogoff, 1995).

Feldstein and Horioka (1980), tested the intertemporal approach using the saving and investment correlations method. Using a sample of sixteen OECD countries over the 1960-1974 period, Feldstein and Horioka did cross-sectional regressions of gross domestic investment rate averages (I/GNP) on gross national saving rate average (S/GNP). They found that capital mobility is limited, at least over long horizons, and that changes in national saving rates ultimately feed through fully to domestic investment rates. Therefore, their findings do not provide support for the basic assumption of the intertemporal approach to the current account, i.e., capital mobility.

Sachs (1981) carried out a similar study by analyzing the relationship between investment and the current account for fourteen industrial countries for the period of 1971-1979. His empirical test differed from the test conducted by Feldstein and Horioka because he regressed the ratio of the current account to GNP (CA/GNP) on the ratio of fixed national investment to GNP (I/GNP), as opposed to Fieldstein and Horioka who regressed (I/GNP) on (S/GNP). He found the sign of the coefficient to be negative and significantly different from zero. His findings provide support for the prediction of the intertemporal approach, i.e., the strong relation between the current and domestic investment.

Murphy (1984) examined a cross-section of seventeen countries for the period extending from 1960 to 1980 by regressing investment on saving. He found that saving-investment correlations were larger for larger countries and smaller for smaller countries. Murphy showed that the average coefficient on the saving ratio is only 0.59 for the ten smallest countries in his sample compared with an average coefficient of 0.98 for the seven largest countries. His findings, especially for large countries, are similar to those of

Feldstein-Horioka; the basic assumption of the intertemporal approach (capital mobility) does not hold.

Obstfeld and Rogoff (1995) criticized the Saving-Investment Correlations method by arguing that even in a world of complete capital mobility, correlations between investment and saving are not necessarily surprising and can easily be explained by the intertemporal approach. For example, a shock to total factor productivity or a global economic shock will induce positive saving-investment correlations even if the capital is mobile. Therefore, they concluded that the results generated using this method do not provide a sufficient basis for dismissing the basic assumption of the intertemporal approach.

2). Temporary and Permanent Components of The Output Method

The standard formulation of the output method consists in expressing the current account as a function of temporary and permanent components of output or spending. A temporary shock to output or public expenditure must have an effect significantly different from zero on the current account, and permanent changes must have no significant effect. The disadvantage of such a formulation is that it relies on econometric techniques to distinguish between the temporary and permanent components of output and spending (Lvssiotou, 1990).

Ahmed (1986) used this approach in a time series analysis, which examined the impact of temporary and permanent movements in government spending on the trade balance in the U.K. for the period of 1908-1980. Ahmed argued that the expenditures accompanying Britain's wars were largely exogenous and were almost certainly viewed

as temporary by the public. Thus, on the basis of the intertemporal approach, one might expect Britain to have been running external deficits during the war years. His regression results showed that the temporary component of government spending had a significantly negative influence on the current account, whereas the permanent component did not. This finding is consistent with the intertemporal approach prediction. The shortcoming of these studies is that government spending is the only determinant of the current account.

Obstfeld and Rogoff (1995) ran a similar regression with data from the U.K. over the period 1701-1938 using the current account instead of trade balance as the dependent variable. They found neither temporary nor permanent government spending to be individually significant. They concluded, "it is unclear whether the intertemporal approach is simply false, or whether the many extraneous simplifications and maintained hypotheses imposed by the econometrician are to blame. It is therefore useful to turn to a newer empirical approach based on a less restrictive framework (p. 1784)."

3). Present Value of The Current Account Method

The basic assumption of the current account method is that today's current account is related to the expected future changes in an economy's national cash flow, defined as output less investment and government expenditures. According to this method, the intertemporal approach to the current account will be accepted if the predicted current account equals the actual current account. "The fundamental difference between the present value model of the current account and earlier studies concern how one proxies for private agents' expectations of future values of net cash flow (Obstfeld and Rogoff, 1995, p.1785)."

Applying this method, Sheffrin and Woo (1990) examined the intertemporal approach for the current account for four countries: Belgium, Canada, Denmark, and the U.K. using annual data for the period 1955-1985. They found that the approach performs well for Belgium and Denmark where the restriction that the predicted current account equals the actual current account was not rejected; while for Canada and the U. K. the restriction was rejected.

Otto (1992) examined the U.S. current account for the period from 1950:1 to 1987:4, using the present value method. His empirical results suggested that the intertemporal approach was unable to provide a statistically adequate explanation for the dynamic behavior of the U.S. or Canadian current accounts. For both countries the formal restriction implied by the present value method, i.e., the predicted value equals the actual current account value, is strongly rejected.

Ghosh (1995) investigated the degree of capital mobility between the major industrialized countries (U.S., Japan, Germany, U.K., and Canada) over the period 1960-1988 from the perspective of the intertemporal approach of the current account. His findings indicated that the approach performed well in characterizing the direction and turning points of all five countries studied.

Ghosh and Ostry (1995) applied the present value method to a large sample of developing countries (forty-five countries from Africa, Middle East, Asia, and Latin America). They examined whether the current account in developing countries had been as volatile as would be expected, given the shocks experienced by these countries. They argued that if the variance of the actual current account is not statistically different from the variance of the predicted current account, then the null hypothesis, that the agents

indeed have been able to fully smooth consumption in the face of shocks, cannot be rejected. They found that in about two thirds of the sample, the data were consistent with the restrictions imposed by the model. For this sample of developing countries, therefore, the null hypothesis, that the agents have indeed been able to fully smooth consumption in the face of shocks, could not be rejected.

Ostry (1997) examined the current account imbalances in ASEAN countries: Indonesia, Malaysia, Philippines, Singapore, and Thailand for the period 1960-1995 using the present value of the current account method. On the whole, he found that the model fit the data reasonably well in the sense that the predicted optimal current account balance, based on the assumption of full consumption smoothing, is highly correlated with the actual current account data.

3.4. CONVENTIONAL APPROACH TO THE CURRENT ACCOUNT

3.4.1. Theoretical Analysis

The conventional approach of the current account is performed within the framework of the neo-Keynesian theory of income determination in an open economy. In this approach, the current account of a country is assumed to be a function of the factors underlying the determination of income such as fiscal and monetary policy, terms of trade, real exchange rate, and foreign income. In such an approach, an increase in domestic income brought about by an increase in domestic aggregate demand (for example, an increase in government spending) leads to a current account deficit (Hossain, 1995).

The conventional approach to the current account is not based on a rigorously developed theoretical framework as we have seen in the intertemporal optimization approach to the current account (Chinn, 1992). It assumes that the factors relevant for saving and investment decisions have direct bearing on the current account balance of the country. However, no distinction is made between transitory and permanent changes in these factors as was made by the intertemporal approach. These factors and their impact can be summarized as follows (Krugman and Obstfeld, 1994):

Fiscal Policy: Expansionary fiscal policy in the form of an increase in government spending or a tax cut raises aggregate demand. The rise in income will lead to an increase in imports and therefore, to a current account deficit. The changes in foreign fiscal policy play the opposite role of the home policy. The fiscal expansion in foreign countries (main trade partner) will lead to an increase for the home country's exports and therefore to an improvement in the current account position.

Monetary Policy: An increase in the money supply will depress the home country's interest rates, causing a depreciation of the domestic currency and therefore, an improvement in the current account. However, if the central bank decides to prevent the currency depreciation by holding a fixed exchange rate, it needs to sell foreign assets for domestic money in the foreign exchange market, leading to a shrinking money supply. By fixing the exchange rate, the central bank loses its ability to use monetary policy for the purpose of macroeconomic stabilization. Therefore, under a fixed exchange rate, an increase in the money supply will not affect the current account.

Changes in the Exchange Rate: A country with a fixed exchange rate sometimes decides on a sudden change in the value of the domestic currency as measured in terms of some foreign currency. The devaluation makes goods and services cheaper relative to foreign goods and services, leading to an increase in exports and a decrease in imports. To maintain the exchange rate at its new fixed level, the central bank must buy foreign assets and expand the money supply. Devaluation thereby causes a rise in output, an increase in official reserves, and an expansion of the money supply. Taken together these effects result in improvements in the current account. This improvement occurs only if the relative prices do not change. Changes in relative prices may offset the change in the relative currency price (nominal exchange rate), and in the long run what will matter is the real exchange rate.

Terms of Trade: Terms of trade can be defined as the price of exports over the price of imports. A decrease in the price of exports due to a change in foreign demand or increase in the supply from competitor countries will lead to terms of trade deterioration. This means that even with the same quantity of exports the home country will have less income from exports. Similarly, an increase in the price of imports will lead to terms of trade deterioration, with the country having to pay more for the same quantity of imports.

The final impact of the changes in the price of exports and imports will depend on the elasticity of supply and demand. For example, if the demand on the exports is inelastic, an increase in the price of exports will not have a significant impact on the quantity of exports.

3.4.2. Empirical Investigations

The empirical studies that have examined the external balance using the conventional approach have varied in their methodology, countries studied, variables considered, and results obtained. The methodology that has been used to investigate the current account determinants can be divided into three types of models: 1) the single equation model; 2) the simultaneous equations model; and 3) the vector autorregression model (VAR). Most studies have identified the real exchange rate, budget deficits, money supply, and terms of trade as the main determinants of the current account balance or trade balance. In the following paragraphs some of the studies that investigated the current account are reviewed by model type.

1). Single Equation Model:

Miles (1979) investigated the relationship between the trade balance and those factors affecting domestic expenditure relative to domestic output in fourteen countries for the period of 1956-1972. The factors included in his model were: the change in the ratio of trade balance to output as the dependent variable, with the changes in growth rate of income, the ratio of high-powered money to output, the ratio of government consumption to output, and in the real exchange rate as the independent variables. Using Ordinary Least Squares (OLS) and regressing each country's equations separately, Miles found that the exchange rate was a significant factor for three of the fourteen countries. In eight of the fourteen countries Miles found the expected negative sign and the growth rate coefficients were significant, while only four of the monetary coefficients and six of the government consumption coefficients were negative and significant.

Khan and Knight (1983) discussed and tested the relative importance of internal and external factors in determining current account balances for a sample of thirty-two non-oil developing countries during the 1973-1980 period. They identified the factors exerting an important influence on the current account positions of the non-oil developing countries during the 1970s as follows: (1) the deterioration of the terms of trade; (2) the slowdown of economic activity in the industrial countries; (3) the sharp increase in the level of real interest rates in international credit markets; (4) the expanding fiscal policy; and (5) the appreciation of real effective exchange rates. These five factors were divided into external and internal factors: the first three were labeled as external factors and the last two were labeled as internal factors.

After the theoretical discussion, Khan and Knight empirically estimated the impact of each factor by regressing the current account on these five factors using pooled time-series and cross-section data. The results revealed that all the coefficients have the expected signs, and, with the exception of the coefficient for the growth rate of industrial countries, all were significant. In summary, the empirical test results support the hypothesis that external factors as well as internal factors were relevant in explaining the deterioration of the current accounts of non-oil developing countries.

Bahmani-Oskooee (1984) studied the trade balance relationship in the following form:

$$TB = f(Y_t, YW_t, M_t, MW_t, \sum_{i=0}^{n} \beta_i \left(\frac{E}{P}\right)_{t-i}$$

where, *TB* is the trade balance, *Y* is the output, *YW* is world income, *M* and *MW* are domestic and world powered money respectively. The last term of the equation is the ratio of the nominal exchange rate to the domestic price level with a lag structure.

Bahmani-Oskooee estimated the above equation for four developing countries (Greece, India, Korea, and Thailand) over the 1973-1980 period. He found that the sign of the coefficient of the exchange rate variable is positive followed by a negative sign on the distributed lag coefficient (consistent with the J-curve phenomenon) for all countries except Thailand.

Domestic income had the expected sign and was significant only for of Korea. The world income variable also had the expected sign; however, it was significant only for Greece and India. The domestic monetary variable had the expected negative sign in the results for Greece and Korea and was significantly different from zero in the case of Greece and Thailand. The world monetary variable had the expected positive sign only in the case of Korea and was significant for India and Thailand.

Giraldo and Mann (1989) analyzed the Latin American external debt growth by taking the current account deficit as a proxy for debt accumulation and relating these deficits to both internal and external factors over the period of 1973-1984 for eleven countries. They argued that current account deficits and debt accumulation were the result of a variety of external and internal factors. These factors identified as the causes of current account deficits were: (1) terms of trade; (2) real GDP changes in the Organization for Economic Cooperation and Development (OECD); (3) real external interest rate; (4) real effective exchange rate; and (5) government fiscal deficits.

They estimated the effects of these factors on the current account using pooled time-series and cross-section data in a linear regression model. The results showed that all of the variables emerged as statistically significant determinants of current account deficit. The economic growth rate in industrialized nations emerged as the most significant explanatory variable. The terms of trade and the real exchange rate occupied intermediate relative positions, and the real interest rate and the fiscal deficit turned out to be the least important elements.

They also divided the countries into two groups, petroleum exporters and non-exporters, and ran regression tests on both groups. The estimation results were found to be similar to those of the one-group test. The primary difference between them was that for non-exporter countries the real interest rate was an important explanatory variable, whereas the terms of trade emerged as significant for the three petroleum exporter countries.

In order to examine the relationship between the current account and budget deficits in Australia, Winner (1993) regressed the current account on the budget balance in addition to other factors considered important in determining the current account. These additional factors were interest rate, real exchange rate, real output, the monetary base, inflation, and foreign real income. His estimation results for the 1970-1989 period revealed that only the real interest rate coefficient and the inflation coefficient were statistically significant. The budget balance coefficient shows that the budget balance is consistently insignificant indicating that the relationship between the current account and budget balances was doubtful for Australia.

Craigwell and Samaroo (1997) examined and compared the determinants of the current account of a non-oil developing country (Barbados) with that of an oil-dependent economy (Trinidad and Tobago) over the 1967-1991 period. The explanatory variables included in their models were: (1) terms of trade; (2) real exchange rate; (3) foreign incomes; (4) budget balance; (5) long term capital inflows; and (6) the U.S. prime lending rate. Time series and pooled data were used in their estimation of the two models.

The results of the pooled fixed effects model revealed that all the variables except the real exchange rate were significant and, with the exception of the prime-lending rate, all the variables had correct signs. The co-integration error correction model suggested that in Trinidad and Tobago the exchange rate, the budget balance, foreign income, and lagged current account were important explanatory variables in both the short and long run. In the case of Barbados, the terms of trade and the budgetary variables were influential in the long run while long term capital flows and the budgetary variable were important in the short run.

2). Simultaneous Equation Model:

Zietz and Pemberton (1990) analyzed the effect of both federal deficits and sluggish foreign income growth on the U.S. trade deficit of the early 1980s. They used a structural simultaneous equation framework. The structural macroeconomic model was comprised of the bond, foreign exchange, and goods markets. The result of their estimate revealed that budget deficit affected the trade deficit primarily through its impact on domestic absorption and income rather that through higher interest and exchange rates. The results also revealed that sluggish foreign income growth contributed significantly to

the U.S. trade deficit of the 1980s. Finally, the results showed that the persistence of the U.S. trade deficit of the 1980s could not be fully explained by macroeconomic fundamentals alone.

Genberg and Swoboda (1989) analyzed the determinants of current account imbalances between the United States, Japan, and Germany under floating exchange rates. They argued that a partial equilibrium approach is not adequate for the analysis of the current account adjustment since the exchange rate and income changes are treated as exogenous variables, each of which can be independently influenced by government policy. For this and other reasons, they used in their analysis of current account imbalances a complete macroeconomic model, which is capable of explaining simultaneous movements in several variables. The results revealed that the current account disequilibrium was to a significant extent due to international imbalances in fiscal policy.

Fry (1991) examined Korea's current account imbalances in a variety of ways. A small-scale macroeconomic model was used in an attempt to resolve the issue of whether or not the net stock of foreign claims exerted a corrective influence on Korea's current account imbalance. The model contained five simultaneous equations. The equations were national saving, real investment, real GNP, real imports, and real exports. The results showed that the model failed to detect any role for the lagged value of Korea's net foreign claim on the current account.

Atesoglu and Dutkowsky (1997) assessed the dynamic effects of trade deficit remedies, and investigated their ability to achieve long-run current account balance as well as their effect upon economic growth. Their methodology centered on a dynamic

international trade model of macroeconomic base. The model contained a five-equation system. The first one described the aggregate demand function. The second and third represented the traditional behavioral functions of export and import demand respectively. The fourth equation focused on the dynamic movement of the ratio of nominal exports to nominal imports. Equation five portrayed the policy reaction function used to correct a current account deficit encountered in previous periods. Simulations based upon the United States revealed that autonomous spending, import, and export policies behave similarly in correcting trade deficits. Exchange rates were determined to generate considerably slower adjustments.

3). Vector Autorregression Model:

Darrat (1988) examined empirically the conventional argument that the escalation in the U.S. federal budget deficit has been the prime cause of trade deficit. He performed multivariate Granger causality tests combined with Akoike's final predictor error (FPE) criterion on quarterly data covering the period of 1960:I to 1984:IV. In addition to testing for Granger causality linkages between budget and trade deficits he included other potentially important determinants of both variables in the causality analysis. These variables are the real exchange rate, the monetary base, short-term interest rates, inflation, foreign real income, long-term interest rates, real output, and wage cost.

The empirical results revealed strong evidence of bi-directional causality between the trade balance and the budget balance. The dollar exchange rate, interest rates, and the monetary base along with budget deficits are the key variables causing changes in the trade deficit. However, foreign income had a weak causal influence on the trade balance.

This study does not provide any evaluation about the magnitude and the sign of the relationship between these variables.

Abell (1990) examined the linkage between U.S. federal budget deficits and the merchandise trade balance using the vector autorregression model on quarterly data from 1979:II to 1985:II. He included in his estimation the following variables: money supply, the yield on Moody's AAA rated bonds, dollar exchange rate, and the consumer price index in addition to budget and merchandise trade balances. He tested for the causality between the merchandise trade balance and these variables using the Granger causality test and the variance decomposition test. Abell found that the federal budget deficit affected the trade balance through the interest rate and the exchange rate. However, the direct effect of the budget deficits on trade budget was quite small.

Kearney and Munadjemi (1990) estimated the relation between the current account and four variables (government expenditures, tax revenues, monetary creation, and the exchange rate) in eight OECD countries (Australia, Britain, Canada, France, Ireland, Germany, Italy, and the United States). They used the VAR model over the 1972:I to 1984:IV period. The findings that emerged from their empirical analysis of eight countries showed the existence of a temporary twin deficit relations between the stance of fiscal policy and performance on the current account, which did not persist over time, and evidence of reverse causation between the two deficits.

Bachman (1992) tested four different explanations for the U.S. current account deficit during the 1980s. These explanations are: 1) saving investment imbalance; 2) falling productivity in the U.S. compared to its main trading partners; 3) the U.S. assets becoming relatively less risky than foreign assets in the early 1980s; and 4) the rise of the

dollar not being caused by market fundamentals. For his study Bachman used a bivariate VAR model because he was not interested in the relationship among the explanatory variables. He was trying to show which variables could be empirically eliminated as possible explanations, and to determine which variables best explained what happened to the current account.

The Granger causality test showed that only the federal surplus Granger-causes the current account. None of the other variables passed the test. Therefore, the results of Granger causality tests are consistent only with the hypothesis that the current account deficit has been caused by the federal government's deficit. The impulse response functions test showed that the impact of the budget was reasonably large in the estimated system. A one standard deviation rise in the federal budget surplus caused the current account surplus to rise by almost 0.4 percent of GNP after about ten quarters. Investment, which had the next largest impact, appeared to have affected the current account perversely: a one standard deviation rise in investment caused the current account surplus to rise, contrary to what the theory implies. The small effect of the risk premium indicated that it was unlikely to have caused the substantial change in the current account in the 1980s. What should be noticed is that these results may change if the variables included in the model interact with each other and if a multivariate VAR model is used instead of a bivariate VAR.

CHAPTER FOUR

INTERTEMPORAL APPROACH: MODEL SPECIFICATION, EMPIRICAL ESTIMATION AND POLICY IMPLICATIONS

4.1. INTRODUCTION

As shown in chapter three, in the national income account, the counterpart to the current account deficit is an imbalance of national saving and domestic investment. Several theories have contributed to the explanation of the determinants and the economic effects of current account imbalances. In chapter three, both a theoretical and an empirical review of the two most important approaches in explaining the determinants of the current account were presented. One approach is "the conventional approach in which trade flows are essentially determined by prices and income flows, supplemented with judiciously and pragmatically chosen variables (Howard, 1989, p. 156)." The other approach is the intertemporal approach, in which the imbalance in the current account is assumed to be the result of optimization behavior.

Figure 4-1 illustrates Saudi Arabia's gross national saving and gross domestic investment both as percentages of the GDP for the 1969-1997 period. The gross domestic investment constituted less than 20% of the GDP for the period of 1969-1974. After that, the gross domestic investment increased to about 30% for the 1975-1988 period, due to the extensive investment in building the country's infrastructure at the time, stabilizing

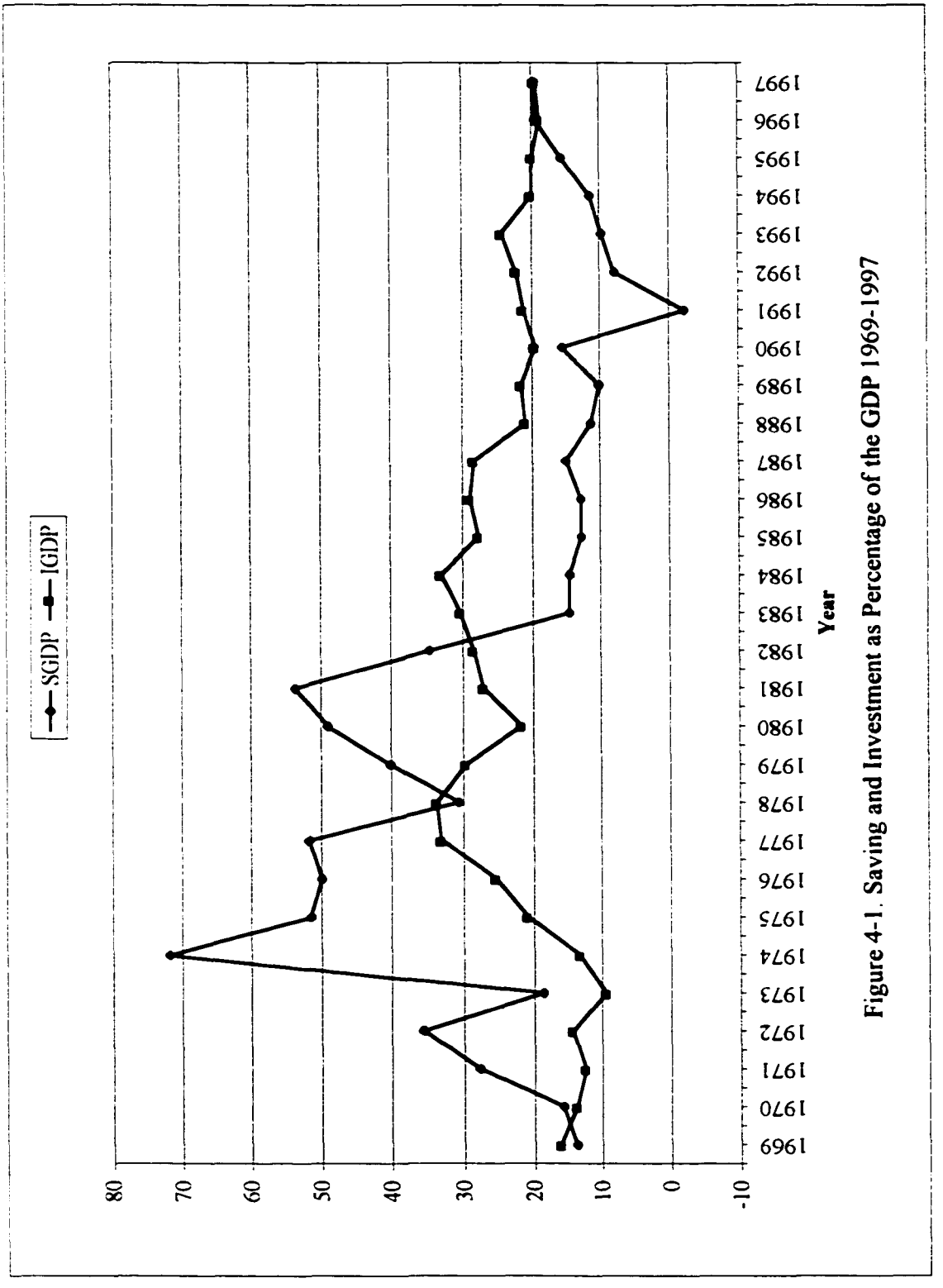

Figure 4-1. Saving and Investment as Percentage of the GDP 1969-1997

after that at around 20%. For the period 1969-1982, Saudi Arabia accumulated a vast official reserve by saving more than it invested, but after 1982 the country saved less causing the current account to fall into a deficit until the last two years of the period covered by this study.

As shown in chapter two, the current account in Saudi Arabia experienced sharp fluctuations throughout the period of study. To find the determinants of these sharp fluctuations it is necessary first to find which model best fits the Saudi Arabian current account. "If the rule of thumb behavior takes some simple proportion of income, then the current account will follow income in a Keynesian fashion. Hence, it is not surprising that conventional ad hoc models of the current account predict it fairly accurately (Chinn, 1992, p. 225). "

The Saudi Arabian current account will be examined empirically using both the intertemporal and the conventional approaches to find out which one is applicable to the current account data. This chapter will examine whether the movement in Saudi Arabia's current account can be explained by the intertemporal approach. In the next chapter, the factors that affect the current account position will be determined by using the conventional approach.

4.2. MODEL SPECIFICATION

In this study, the present value of the current account method will be used to test the intertemporal approach to the current account in Saudi Arabia. As it was shown in chapter three, this method is superior to the preceding ones (saving-investment

correlation and temporary and permanent component of output methods) because it is easy to estimate and gives more precise results.

As Sachs (1982) argued, the current account can be decomposed into two components. The first is a time-preference motive whereby a country tilts its consumption towards the present or towards the future, due to divergences in the current and future periods between world interest rate and the domestic rate of time preference.

When the home country is on average more impatient in consumption than the rest of the world, the rate of time preference exceeds the world interest rate, and there will be a tendency toward current account deficit. In contrast, when the world's interest rate exceeds the rate of time preference, the home country accumulates wealth.

The second component is the consumption-smoothing motive, which stabilizes consumption in the face of shocks to output, investment or government expenditure. When government expenditure exceeds its permanent level (temporary increase), total absorption is temporarily high and the country runs a current account deficit as it tries to smooth consumption. Likewise, an investment boom results in a current account deficit, as the investment is financed by the world capital markets rather than crowding out consumption.

The analysis in this study will focus on the consumption-smoothing component of the current account and the consumption-tilting component will be ignored. This is done for the two reasons stated by Ghosh (1990). First, it is simple to model the consumption-smoothing motive, and therefore the optimal current account movement, while it is difficult to identify how much a country should borrow in order to tilt consumption. Second, the component of the current account that reflects consumption-tilting will be

non-stationary, while the consumption-smoothing component is usually stationary and is therefore more amenable to econometric analysis.

4.2.1. Optimal Consumption Path

Following Obstfeld and Rogoff (1996), a small open economy of international borrowing and lending will be used as the theoretical framework for this study. Consider then a representative consumer, who maximizes the discount value of utility,

$$U_t = U(C_1) + \beta U(C_2) + \beta\, U(C_3) + \ldots + \beta\, U(C_T) = \sum_{t=1}^{T} \beta^t U(C_t) \qquad (4\text{-}1)$$

where β is the discount factor $(0<\beta<1)$ and C is the consumption, subject to the economy's dynamic (intertemporal) budget constraint. The budget constraint for one period is expressed as:

$$CA_t = B_{t-1} - B_t = rB_t + Q_t - C_t - G_t - I_t \qquad (4\text{-}2)$$

or,

$$B_{t-1} = (1+r)B_t + Q_t - C_t - G_t - I_t \qquad (4\text{-}3)$$

where B is the net foreign asset, r is the fixed world interest rate, Q is the level of output (GDP), I is the level of investment, and G is the level of government expenditure.

To get the intertemporal budget constraint, proceed by an iterative argument based on the one-period budget constrain:

$$\sum_{t=1}^{T}\left(\frac{1}{(1+r)}\right)^t (C_t + I_t) + \left(\frac{1}{(1+r)}\right)^T B_{T-1} = (1+r)B_t + \sum_{t=1}^{T}\left(\frac{1}{(1+r)}\right)^t (Q_t - G_t) \qquad (4\text{-}4)$$

To find the consumption/investment plan maximizing U_t in equations (4-1) subject to (4-4), first use the current account identity, written as:

$$B_{t+1} - B_t = rB_t + A_tF(K_t) - C_t - (K_{t+1} - K_t) - G_t$$

where $Q = A_tF(K_t)$ and $I_t = K_{t+1} - K_t$. Then, substitute it for consumption level in equation (4-1) thus U_t is expressed as:

$$U_t = \sum_{t=1}^{T} \beta^t U[(1+r)B_t - B_{t+1} + A_tF(K_t) - (K_{t+1} - K_t) - G_t]$$

Maximizing U_t with respect to B_{t+1} and K_{t+1} yields the first-order conditions:

$$U'(C_t) = (1+r)\beta U'(C_{t+1}) \tag{4-5}$$

$$A_{t+1}F'(K_{t+1}) = r \tag{4-6}$$

The first order conditions are the consumption Euler equation and the equality between the marginal product of capital and the world interest rate respectively.

Since the lenders will not permit the individual to die with unpaid debts, nor can it be optimal for the individual to leave with unused resources,

$$B_{T+1} = 0 \tag{4-7}$$

By combining the necessary first order condition with the intertemporal budget constraint and $B_{T+1} = 0$, the result is the economy's unique optimal consumption path:

$$\sum_{t=1}^{T}\left(\frac{1}{(1+r)}\right)^t (C_t + I_t) = (1+r)B_t + \sum_{t=1}^{T}\left(\frac{1}{(1+r)}\right)(Q_t - G_t) \tag{4-8}$$

The consumption Euler equation shows that optimal consumption must be constant in this special case. Therefore, by calculating the maximum constant consumption level that satisfies equation (4-8):

$$C_t^* = \left[\frac{1}{\left(1-(1+r)^{-(T+1)}\right)}\right]\left(\frac{r}{(1+r)}\right)\left[(1+r)B_t + \sum_{t=1}^{T}\left(\frac{1}{(1+r)}\right)^t (Q_t - G_t - I_t)\right] \tag{4-9}$$

This is the optimal consumption function derived from time-separable (additive) utility function (finite horizon optimization). By letting $T \to \infty$, the optimal consumption function derived from the instantaneous utility function $U_t = \sum_{t=0}^{\infty} \beta^t U(C_t)$ (infinite horizon optimization) can be obtained:

$$C_t^* = \left(\frac{r}{(1+r)}\right)\left[(1+r)B_t + \sum_{t=0}^{\infty}\left(\frac{1}{(1+r)}\right)^t (Q_t - G_t - I_t)\right] \qquad (4\text{-}10)$$

Thus, along the optimal path, consumption is proportional to the present value of national cash flow (GDP net of investment and government expenditure), rather than cash flow at any instant. This is the essence of the consumption-smoothing model (Ostry, 1997).

4.2.2. A Fundamental Current Account Equation

For a constant interest rate r, the permanent level of variable X on date t is defined by:

$$\sum_{t=0}^{\infty}\left(\frac{1}{(1+r)}\right)^t \tilde{X}_t = \sum_{t=0}^{\infty}\left(\frac{1}{(1+r)}\right)^t X_t$$

therefore,

$$\tilde{X}_t = \frac{r}{(1+r)}\sum_{t=0}^{\infty}\left(\frac{1}{(1+r)}\right)^t X_t \qquad (4\text{-}11)$$

A variable's permanent level is its annuity value at the prevailing interest rate, that is, the hypothetical constant level of the variable with the same present value as the variable itself.

Let's assume initially that $\beta = \frac{1}{1+r}$. By substituting the consumption function (4-10) into the current account identity, equation (4-2), the result is the fundamental equation of the current account (optimal current account):

$$CA_t = B_{t-1} - B_t = Q_t + rB_t - \left\{\left(\frac{r}{1+r}\right)\left[(1+r)B_t + \sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t (Q_t - G_t - I_t)\right]\right\} - G_t - I_t$$

$$CA_t = B_{t-1} - B_t = \left(Q_t - \frac{r}{1+r}\sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t Q_t\right) - \left(I_t - \frac{r}{1+r}\sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t I_t\right)$$
$$- \left(G_t - \frac{r}{1+r}\sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t G_t\right) \qquad (4\text{-}12)$$

Making use of the definition (4-11):

$$CA_t = B_{t-1} - B_t = \left(Q_t - \tilde{Q}_t\right) - \left(I_t - \tilde{I}_t\right) - \left(G_t - \tilde{G}_t\right) \qquad (4\text{-}13)$$

This simple equation yields a number of predictions (Obstfeld and Rogoff, 1996):

1). Above its permanent level, output contributes to a higher current account surplus because of consumption-smoothing. Rather than raising consumption to that point when output rises temporarily above its long run discounted average, individuals choose to accumulate interest yielding foreign assets as a way of smoothing over future periods.

2). Similarly, people use foreign borrowing to cushion their consumption in the face of unusually high investment needs. Rather than financing extraordinarily profitable opportunities entirely out of domestic savings, countries wish to avoid sharp temporary drops in consumption by borrowing foreign savings.

3). Abnormally high government spending needs to have the same effect as abnormal output. A higher current account deficit enables people to minimize such shock's impact in any given period by spreading that impact over the entire future.

Equation (4-13) assumes perfect foresight about the future. With uncertainty, the representative individual maximizes the expected value of lifetime utility:

$$U_t = E_t\left[\sum_{t=0}^{\infty} \beta^t U(C_t)\right]$$

therefore, the optimal consumption function is,

$$C_t^* = \left(\frac{r}{(1+r)}\right)\left[(1+r)B_t + \sum_{t=0}^{\infty}\left(\frac{1}{(1+r)}\right)^t E_t(Q_t - G_t - I_t)\right] \qquad (4\text{-}14)$$

and the fundamental current account equation is:

$$CA_t = B_{t-1} - B_t = \left(Q_t - E\tilde{Q}_t\right) - \left(I_t - E\tilde{I}_t\right) - \left(G_t - E\tilde{G}_t\right) \qquad (4\text{-}15)$$

Defining net output Z as output less government consumption and investment:

$$Z \equiv Q - G - I$$

therefore,

$$CA_t = Z_t - E_t\tilde{Z}$$

by rearranging the terms in equation (4-15):

$$CA_t = -\sum_{t=1}^{\infty}\left(\frac{1}{1+r}\right)^t E_t \Delta Z_t \qquad (4\text{-}16)$$

where, $\Delta Z_t = Z_t - Z_{t-1}$. Equation (4-16) shows that the current account is in deficit when the present discount value of futures net output changes is positive, and that it is in surplus in the opposite case. While consumption is equal to the present value of the

expected future stream of national cash flow, the optimal current account is equal to the present value of expected future change in national cash flow (Ostry, 1997).

Equation (4-16) has been used as the basis for tests of current account behavior by Sheffrin and Woo (1990), Otto (1992), and Ghosh (1995) for a number of industrial countries, and by Ghosh and Ostry (1995) and Ostry (1997) for developing countries. The basic idea is an application of Campbell's (1987) methodology for testing the permanent income theory of consumption, and consists on the estimation of simple VAR model linking the current account and changes in net output to past values of the same variables (Razin, 1996).

4.2.3. Econometric Specification

It is necessary to find a model that may allow the estimation of the optimal current account given by the right hand side of equation (4-16), and then compare it with actual current account data. But first, some proxy is needed for the expected values that equation (4-16) contains. Current and lagged net output changes are useful in predicting future net output changes, but consumers plainly have more information than that available. One way to capture the additional information from consumers is to have them base forecasts on the current and lagged current account in addition to current and lagged net output changes (Obstfeld and Rogoff, 1996).

These considerations lead one to assume that consumer's forecasts of ΔZ are based on the first-order vector autoregressive (VAR) model:

$$\begin{bmatrix} \Delta Z_t \\ CA_t \end{bmatrix} = \begin{bmatrix} \psi_{11}\psi_{12} \\ \psi_{21}\psi_{22} \end{bmatrix} \begin{bmatrix} \Delta Z_{t-1} \\ CA_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \qquad (4\text{-}17)$$

where ε_1 and ε_2 are errors with conditional means of zero and where ΔZ and CA are now expressed as deviations from unconditional means.

Equation (4-17) can be used to forecast future output changes. In analogy with one-variable case,

$$E_t\begin{bmatrix}\Delta Z_t \\ CA_t\end{bmatrix} = \begin{bmatrix}\psi_{11}\psi_{12} \\ \psi_{21}\psi_{22}\end{bmatrix}^t\begin{bmatrix}\Delta Z_t \\ CA_t\end{bmatrix}$$

premultiplication by a 1x2 vector [1 0] yields $E_t\Delta Z_s$:

$$E_t\Delta Z_t = \begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}\psi_{11}\psi_{12} \\ \psi_{21}\psi_{22}\end{bmatrix}^t\begin{bmatrix}\Delta Z_t \\ CA_t\end{bmatrix}$$

By substituting this formula in equation (4-16) and defining ψ as the matrix $[\psi_{ij}]$, the result is the model's prediction of the current account, CA_t *. Let I be the 2x2 identity matrix. Then,

$$CA_t^* = -\begin{bmatrix}1 & 0\end{bmatrix}\left(\frac{1}{1+r}\psi\right)\left(\mathrm{I}-\frac{1}{1+r}\psi\right)^{-1}\begin{bmatrix}\Delta Z_t \\ CA_t\end{bmatrix} \equiv \begin{bmatrix}\Phi_{\Delta Z}\Phi_{CA}\end{bmatrix}\begin{bmatrix}\Delta Z_t \\ CA_t\end{bmatrix} \qquad (4\text{-}18)$$

The simple behavioral model sketched above allows one to set up a predicted (optimal) current account path, which can be compared with the actual one to determine whether the deficits or surpluses have been excessive in a given period (Milesi-Ferretti and Razin, 1996).

It is clear from equation (4-18) that if the intertemporal approach to the current account is valid then the coefficient on ΔZ, $\Phi_{\Delta Z}$, should be zero, and that the coefficient on CA, Φ_{CA}, should be equal to unity. In other words, the actual CA should equal the optimal CA (Ghosh and Ostry, 1995).

A less formal test (weak test) of the intertemporal approach to CA is to determine if the current account Granger causes changes in the net cash flow, Z, as implied by equation (4-16). Both the formal and the less formal tests of the intertemporal approach to the current account will be carried out in the next section.

4.3. EMPIRICAL ESTIMATION AND RESULTS

In the previous section the model that will be used to generate the predicted (optimal) current account in Saudi Arabia was established:

$$CA_t^* = -\begin{bmatrix} 1 & 0 \end{bmatrix} \left(\frac{1}{1+r}\psi\right)\left(I - \frac{1}{1+r}\psi\right)^{-1}\begin{bmatrix} \Delta Z_t \\ CA_t \end{bmatrix} \equiv \begin{bmatrix} \Phi_{\Delta Z} & \Phi_{CA} \end{bmatrix}\begin{bmatrix} \Delta Z_t \\ CA_t \end{bmatrix} \qquad (4\text{-}19)$$

It is necessary to construct the variables ΔZ_t and CA_t that will be used to obtain the optimal CA. For the national cash flow, Z, GDP minus total investment (I) and government consumption (G) is used. Since the primary focus of the present analysis is on the consumption-smoothing component of CA, the CA data need to be de-trended by removing the consumption-tilting component to correctly identify the consumption-smoothing component of the current account (Ghosh, 1995). The data are taken annually from the IMF's International Financial Statistics and expressed in billions of 1990 Saudi Riyals (converted into real terms by dividing by the implicit GDP deflator).

4.3.1. Removing Consumption-Tilting from CA Series

The non-stationary component of the actual series associated with consumption tilting needs to be removed to construct the (stationary) consumption-smoothing component of the current account (Agenor, 1995).

The consumption-smoothing component is given by

$$CA_t = Y_t - I_t - G_t - \theta C_t \qquad (4\text{-}20)$$

where CA is consumption-smoothing current account, Y_t is gross national product, or GDP plus interest income on existing foreign assets, $Q_t + rB_t$. This study follows the model presented by Ghosh and Ostry (1995) to obtain the consumption-tilting parameter θ as the cointegrating parameter between private consumption, C_t, and national cash flow inclusive of interest payment $(Y_t - I_t - G_t)$.

To obtain the cointegration parameter, $(Y_t - I_t - G_t)$ is regressed on C_t using the ordinary least squares regression. But first it is necessary to verify that $(Y_t - I_t - G_t)$ and C_t are integrated of order one, *I(1)*, and that they are cointegrated. Two methods for testing for cointegration are performed: the Augmented Engle-Granger (AEG) Test and the Cointegrating Regression Durbin-Watson (CRDW) Test.

For the AEG Test, the residual of the cointegrating regression needs to be obtained and tested using the Augmented Dickey-Fuller Statistics (ADF). The null hypothesis is that the estimated error term is non-stationary (it does have a unit root) or no cointegration. The tests with a constant and one lag result in an estimated t-value (t-statistics) of –3.4146 and a critical value of –2.9750 at a 5 percent level. Since in absolute terms the estimated t-value exceeds the critical value at a 5 percent level, the null hypothesis of no cointegration is rejected. Therefore, in spite of $(Y_t - I_t - G_t)$ and C_t being individually non-stationary, they are cointegrated (Table 4-1).

Table 4-1. Unit Root Tests*		
	ADF Test Statistics	Critical Value at a 5% Level
National Cash Flow (Z)	-2.33	-2.97
Consumption (C)	-1.09	-2.97
Changes in National Cash Flow (ΔZ)	-3.49	-2.97
Actual Current Account CA	-3.41	-2.97

*Performed using one lag and a constant term.

For the CRDW, the Durbin-Watson d-value obtained from the cointegrating regression is used and the null hypothesis is that d = 0, or no cointegration. Thus, if the computed d-value is smaller than the critical value, the hypothesis of cointegration is rejected. The computed d-value in our cointegrating regression is equal to 0.56977 and since it is above the critical value of 0.511 at a 1% level, the null hypothesis of no cointegration is rejected, indicating that $(Q_t - I_t - Y_t)$ and C_t are cointegrated. Therefore, based on both the AEG and CRDW tests, $(Y_t - I_t - G_t)$ and C_t are cointegrated.

From the cointegrating regression of $(Y_t - I_t - G_t)$ on C_t an estimated consumption-tilting parameter $\hat{\theta}$ of 0.5814 was obtained, showing the presence of consumption-tilting dynamics. This estimate therefore indicates that Saudi Arabia has consumed more than its permanent cash flow and has foregone future consumption in favor of present consumption. By definition, the residual series from the cointegrating

regression of $(Y_t - I_t - G_t)$ on C_t is equal to CA_t, the actual consumption-smoothing component of the current account (Gosh, 1995).

4.3.2. Constructing Optimal Current Account Series

In order to determine whether the simple consumption-smoothing model generates an optimal current account series that tracks actual current account developments in Saudi Arabia, it is necessary to generate the predicted (optimal) CA series from equation (4-19). First, the VAR parameters need to be estimated from equation 4-17. To implement the VAR, all data must be stationary. To ensure that the variables entering the VAR are stationary, the Augmented Dickey Fuller test (ADF) is used to check for the presence of a unit root in the series. The results reported in Table (4-1) confirm that the consumption-smoothing current account and the change in national cash flow, ΔZ, are stationary variables.

The VAR system is estimated in terms of ΔZ_t and CA_t including a constant term. The result is shown in Table 4-2. All of the coefficients are individually statistically significant at a 5% level on the basis of the t-test and collectively significant on the basis of the standard F-test.

Therefore, the VAR model, equation (4-17), can be rewritten with its estimated parameters as:

$$\begin{bmatrix} \Delta Z_t \\ CA_t \end{bmatrix} = \begin{bmatrix} 0.336514 & -0.379416 \\ 0.464353 & 0.627938 \end{bmatrix} \begin{bmatrix} \Delta Z_{t-1} \\ CA_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \qquad (4\text{-}21)$$

Table 4-2. VAR Coefficients and Associated Standard Errors and t-statistics (in parentheses)		
	ΔZ_t	CA_t
ΔZ_{t-1}	0.336514	0.464353
	(0.15497)	(0.19528)
	(2.17152)	(2.37818)
CA_{t-1}	-0.379416	0.627938
	(0.09955)	(0.12543)
	(-3.81141)	(5.00637)

The F-statistic associated with ΔZ_t regression is 8.69 and the F-statistic associated with CA_t regression is 17.20.

The parameter estimates from the VAR model, equation (4-21), and the real interest rate of r=0.04 are used to form the 1X2 matrix $[\phi_{\Delta Z}\phi_{CA}]$ in equation (4-19). The model yields the estimate $[\phi_{\Delta Z}\phi_{CA}] = [0.080 \;\; 0.846]$. Using these estimates, the actual time series of the expected present value of future declines in cash flow, i.e., the optimal consumption-smoothing current account is derived.

It is important to note that the expression in (4-19) is not a regression; one is not estimating the optimal current account using data on the actual current account and the first difference of national cash. Rather the formula for the optimal current account depends on the estimated weights (determined in the VAR estimation) on cash flow and the current account. In some cases, the weight on cash flow will be significantly different from zero, while that on the current account will be significantly different from unity, in which cases the model will perform badly (Ostry, 1997).

Figure 4-2 shows the actual and predicted current account balances for Saudi Arabia. The actual and predicted (optimal) current accounts move closely together over most of the period. This suggests that the intertemporal optimizing model indeed can account for development in the current account in Saudi Arabia.

4.3.3. Testing the model

There are a number of different ways of testing the model's performance. First, an implication of the intertemporal model is that the current account should Granger-cause subsequent movement in national cash flow. This test can be performed using the results of the VAR estimation. Second, a more formal test rests on the stringent time series properties of the model. According to equation (4-18), the actual current account series will be identical to the optimal series if the $\phi_{\Delta Z} = 0$ and $\phi_{CA} = 1$, so these two restrictions can be tested. Third, the variances of the actual consumption-smoothing current account and the optimal consumption-smoothing current account should be equal. Therefore, the equality-of-variances restriction can be also tested.

4.3.3.1. Granger-Causality Test

One implication of the intertemporal smoothing model is that the current account should, in general, Granger-cause changes in national cash flow. From equation (4-16), CA is equal to the expected present discount value of $\Delta(Q-G-I)$, where the expectation is conditional on agents' entire information set. If agents have more information about the evolution of national cash flow than is contained in its own past

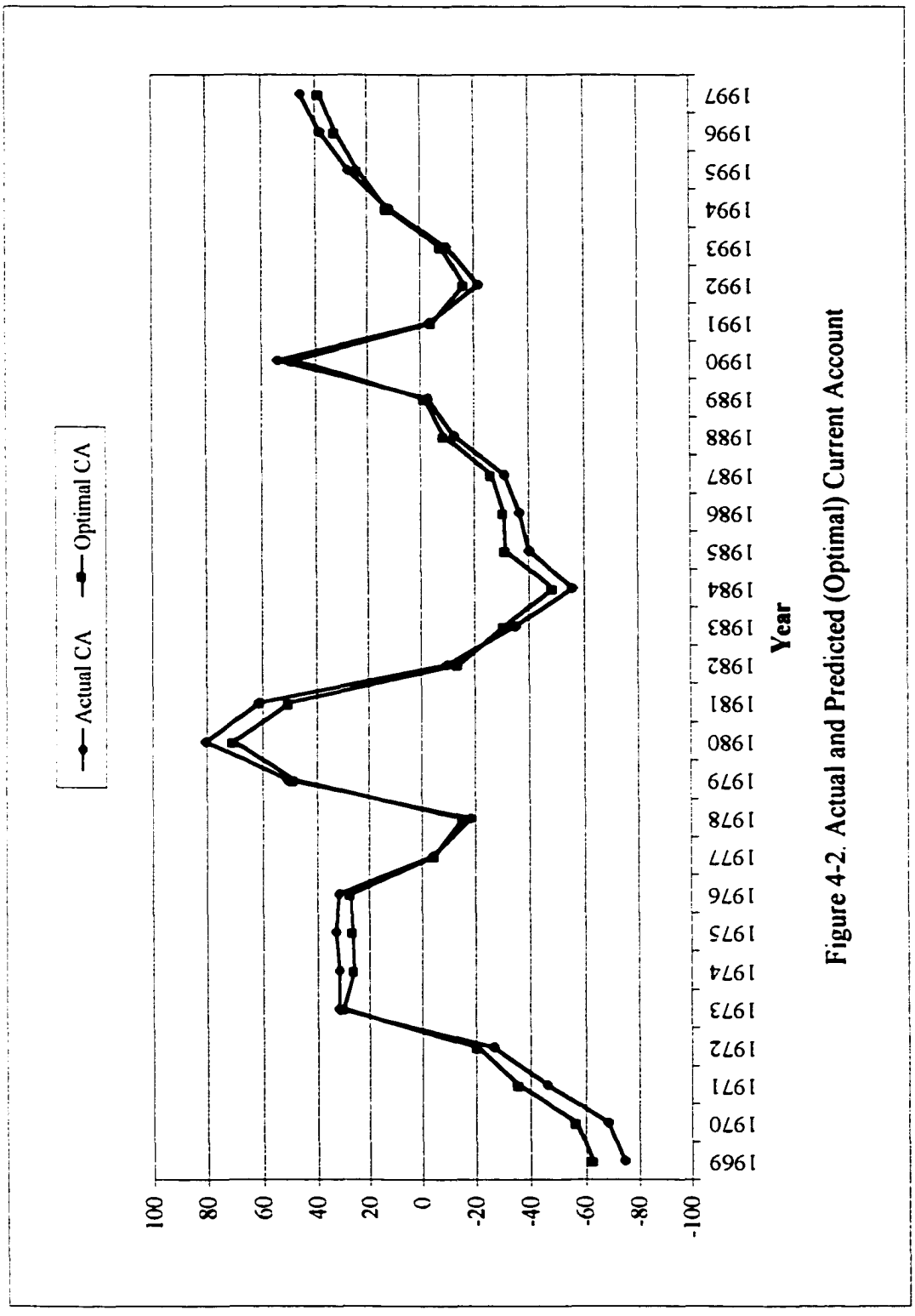

Figure 4-2. Actual and Predicted (Optimal) Current Account

values, then the current account ought to Granger-cause changes in cash flow (Ghosh and Ostry, 1992). A current account deficit today, for example, should signal an expected increase in future cash flows.

From the VAR estimates given in the previous section, the coefficient of the current account, CA_{t-1}, in the equation explaining the change in national cash flow, ΔZ_t regression, is equal to –0.379416 with t-statistics equal to –3.811407. So, the coefficient is negative as predicted by the theory and statistically significant at a 1% level. The F-statistic is equal to 8.691776, which exceeds the critical value at a 1% level of confidence. Therefore, the null hypothesis of no Granger causality or that the current account does not Granger cause the change in national cash flow can be comfortably rejected. This is weak (informal) evidence in favor of the intertemporal optimization approach to the current account in Saudi Arabia.

4.3.3.2. Formal Test of the Model

It is clear from equation (4-19) that if the intertemporal approach to the current account is valid, then the coefficient on the first difference of cash flow, $\Phi_{\Delta Z}$, should be equal to zero, and that the coefficient on the actual (de-trended) current account, Φ_{CA}, should be equal to unity. In other words, the actual current account will be equal to the predicted (optimal) current account if the parameters' restrictions $\Phi_{\Delta Z} = 0$ and $\Phi_{CA} = 1$ are satisfied. These two parameters' restrictions can be tested individually through the use of the standard t-test and jointly by a Chi-squared test (Ghosh and Ostry, 1995).

To test the coefficients $\Phi_{\Delta Z}$ and Φ_{CA} individually using the t-test, it is necessary to calculate the standard error of the coefficient numerically. We first calculate the variance-covariance of the coefficient as $\nabla\Phi'\Sigma\nabla\Phi$, where Σ is the variance-covariance matrix of the parameters of the VAR, and $\nabla\Phi$ is the gradient of $[\Phi_{\Delta Z} \ \Phi_{CA}]$ with respect to the VAR parameters. From this covariance-variance matrix the standard error of the coefficients and the t-statistic of the coefficient are obtained, as reported in Table (4-3).

Table 4-3. Formal Test: Individual and Joint Tests

Change in National Cash Flow		**Actual Current Account**	
Coefficient, $\Phi_{\Delta Z}$	**t-statistic, $\Phi_{\Delta Z} = 0$**	**Coefficient, Φ_{CA}**	**t-statistic, $\Phi_{CA} = 1$**
0.08	0.15	0.85	-1.02

χ^2 statistic: 0.07.

The results show that the coefficient of the change in cash flow, $\Phi_{\Delta Z}$ is not statistically different from zero and the coefficient of the actual current account is not statistically different from unity at a 5% confidence level.

To test the restriction of the coefficient, $\Phi_{\Delta Z} = 0$ and $\Phi_{CA} = 1$ jointly, it is necessary to calculate a χ^2 statistic for the hypothesis that $\Phi = [0 \ \ 1]$. If $\tilde{\Phi}$ is the difference between the actual Φ and the hypothesized value, then the χ^2 statistic can be calculated as $\tilde{\Phi}[\nabla\Phi' \ \Sigma \ \nabla\Phi]^{-1}\tilde{\Phi}'$. A value of 0.07 is obtained as the χ^2 statistic of the joint test. Since the critical value for χ^2 with two degrees of freedom at a 5% confidence

level is 5.99, the null hypothesis that $\Phi_{\Delta Z} = 0$ and $\Phi_{CA} = 1$ is accepted jointly. Therefore, by using individual and joint tests, the restrictions that $\Phi_{\Delta Z} = 0$ and $\Phi_{CA} = 1$ are accepted. By using the formal test, the results indicate that the intertemporal approach to the current account in Saudi Arabia is valid.

4.3.3.3. Equality-of-Variances Test

As a further test of the intertemporal model of the current account (consumption-smoothing model), this study will examine whether the current account in Saudi Arabia has been as volatile as would be expected. If the variance of the actual current account is not statistically different from the variance of the predicted current account, the null hypothesis that agents indeed have been able to fully smooth consumption in the face of shocks cannot be rejected (Ghosh and Ostry, 1995).

The estimate of the ratio of the variance of predicted current account to the variance of the actual current account is 0.7495. It was tested whether this ratio is significantly different from unity. The null hypothesis states that variances are equal against the alternative that actual and predicted current accounts have different variances. The F-statistic for the equality of the variances is 1.37 and χ^2 statistics is 0.68. Both tests suggest that the null hypothesis of equal variances cannot be rejected. Therefore, the equality variance test of the actual and predicted current account result is in favor of the intertemporal approach of the current account.

The estimation results of the three tests suggest that the intertemporal approach to the current account explains the fluctuations of the current account in Saudi Arabia during the period of the study, 1969-1997.

4.4. POLICY IMPLICATIONS

The key prediction of the intertemporal approach is that a country's current account will be in deficit (surplus) whenever national cash flow, defined as gross domestic product less investment and government spending, is expected to rise (fall) over time. Intuitively, if the cash flow is expected to grow over time, the country will find it optimal to borrow against future resources by running a current account deficit. If, by contrast, national cash flow were expected to fall over time, the country would run a current account surplus (increase its savings or reduce external indebtedness) today in order to maintain consumption in the future, at a level consistent with permanent income (Agenor and Cashin, 1995). This implies that the current account should act as a buffer to smooth aggregate consumption in the presence of shocks to national cash flow.

Our estimation results showed that the model fit the data perfectly well in the sense that the predicted (optimal) current account balance, based on the assumption of full consumption smoothing, was highly correlated with actual data on the current account in Saudi Arabia for the period of 1969-1997. These statistical results (Granger-causality test, formal test, and equality-of-variances test) in combination with the chart illustrating the movements of actual and optimal current account balance, suggest that the model captures the statistically important aspects of the current account behavior in Saudi Arabia.

In order to determine appropriate policy responses it is necessary to see if these statistical results of the intertemporal approach-consumption smoothing model can be justified by the economic fundamentals of Saudi Arabia. Therefore, it is important to identify the factors underlying the widening of current account surplus and deficits.

As presented in chapter two, Saudi Arabia's current account (with some exceptions) experienced a surplus for the period of 1969-1982, and a deficit for the period of 1983-1995. The statistical results indicate that during the period of surplus, the private sector was expecting future growth in national cash flow to fall; therefore, it saved more by running a current account surplus. In contrast, during the second period the people were expecting the national cash flow to grow; therefore, they ran current account deficits by borrowing or actually drawing from their savings. This qualitative analysis can be correct if the government's fiscal policy is sustainable. But the government's budget balance moved in the same direction as the external balance during most of the period, which may suggest that the external surplus and deficit are the result of an unsustainable fiscal policy and not of optimization behavior by individuals.

The government in Saudi Arabia derives most of its revenues from petroleum. In 1997, oil revenue represented 79% of the total revenue and oil exports accounted for almost 88% of the total exports. This unique case of Saudi Arabia as an oil exporting country affects the relationship between the current account and government budget balance. The current account deficit due to oil price (or quantity) drop will have a similar effect on government budget balance if there are no spending cuts. The government's budget balance deficit also may cause the current account to be in deficit due to an

increase in imports. Therefore, there will be a two-way effect between the current account and the budget balance.

This analysis of the relationship between the current account and the budget balance in Saudi Arabia may lead one to consider government expenditure as endogenous. It is clear that when the oil prices were high and the government was receiving high revenues, the government was saving some of it. When the prices dropped, the government used its savings to finance its expenditure. The behavior of the government during the period of study is consistent with the prediction of the intertemporal approach to the current account. The government was saving when it was expecting future income to decrease and running a deficit later to keep the same consumption level. This qualitative analysis helps to understand why the intertemporal approach can be considered as the main reason for the movement in the current account in Saudi Arabia during the period of study.

The fact that the model fits the data so well enables one to illustrate how the current account might respond to a variety of disturbances including oil prices changes, an investment boom, or fiscal consolidation. Any such shocks, which caused the private sector to revise upwards its expectations of future growth in national cash flow (or net output, that is output net of investment and government spending), would contribute to the widening of the optimal current account deficit for the country, as consumption would increase in line with expected future growth rather than current income. Any observed widening in the external deficit in such cases, therefore, would not be a cause for concern, as it would be fully justified on the basis of the economic fundamentals captured by the model (Ostry, 1997).

While the evidence of both statistical results and the qualitative indicators discussed above in favor of the intertemporal approach (consumption smoothing model), strong judgments about the appropriate policy response will also depend upon the risks associated with widening external deficits in the event of unfavorable shocks (Ostry, 1997). The factors that may affect the risks associated with running a large external deficit in Saudi Arabia are:

1). Single commodity export economy: Saudi Arabia heavily depends on oil for its external revenues. The fluctuation in oil prices has a big impact on its economy. Running a large deficit by borrowing from international markets is risky since the oil revenue will be used to pay back the debt, and oil prices are not stable.

2). Openness of the economy: Saudi Arabia has a very open economy in the real sector. The share of trade in the GDP is large. Saudi Arabia has to import most of the food needed to feed its people; as a consequence the costs of default are too high.

3). The composition of the current account: The services and transfers account is one of the two components of the current account. This account was in deficit during the period of study. The two important sources of the deficit in this account are the government services payments and the private transfers. The government services include official transfers and contributions or capital subscription to international and regional development agencies and certain government imports. The private transfers constitute mostly the remittances by foreigners working in the kingdom. These payments contribute largely to the deficit in the current account as a whole but nothing to finance the deficit in the current account in the future.

In conclusion, the intertemporal approach to the current account captures both economically and statistically important aspects of the current account behavior in Saudi Arabia during the 1969-1997 period. According to the intertemporal theorists' interpretation, the widening in the external deficit or surplus should not be a cause for concern since it would be justified on the basis of the economic fundamentals captured by the model. Hence, there is no need for policies to deal with the deficit or the surplus since they are the result of maximization behavior by both the individuals and the government.

But for the factors mentioned above, widening external deficits may pose risks in the event of unfavorable shocks. Due to the continuation in sharp fluctuations in oil prices and the uncertainty of the quantity of oil exported, as well as the growth in imported goods due to a population boom, the government needs to be in a state of alert to set appropriate policies to be able to deal with any sudden problems that may arise in the current account position. For these reasons, it is necessary to determine the variables that would have the greatest impact on the current account balance in Saudi Arabia, to assist the country's policy makers in taking appropriate measures. In the following chapter, these factors will be studied using the conventional approach to the current account in Saudi Arabia.

CHAPTER FIVE

CONVENTIONAL APPROACH: MODEL SPECIFICATION, EMPIRICAL ESTIMATION AND POLICY IMPLICATIONS

5.1. INTRODUCTION

As shown in chapter four, the current account imbalances in Saudi Arabia during the period of study (1969-1997) can be explained by the intertemporal approach (consumption smoothing model). In other words, the current account surplus and deficit are both the result of optimization behavior. But with the risks associated with widening external deficits, the intertemporal approach policy implications cannot be relied upon. Therefore, it is essential to examine and determine the factors that cause the current account variability in Saudi Arabia to assist the country's policy makers in making appropriate decisions.

In theory, domestic policy responses such as government spending and monetary policy, as well as the external shocks such as exchange rate and terms of trade, play a major role in determining the current account variability. The intent of this chapter is to investigate the underlying factors that cause variabilities in the current account in Saudi Arabia. The best empirical method that can capture, and be used to examine the impact of, these factors on the current account will be sought. It is first necessary however, to

specify and discuss the factors that may have a significant influence on the current account position in Saudi Arabia.

5.2. FACTORS SPECIFICATION AND DATA

5.2.1. Variables Affecting the Current Account Position:

1). Terms of Trade: the terms of trade expressed here as the price of exports relative to the price of imports, clearly have a direct impact on the current account. Many researchers have included terms of trade as one of the most important factors determining saving-investment correlations. Fifty years ago, Laursen and Metzler (1950) argued that a deterioration of the terms of trade leads to a reduction in real income, causing an increase in expenditure relative to income. Given investment, that implies a current account deficit.

A rise in the terms of trade means that the price of exports has increased relative to the price of imports, and that with the same physical quantity of exports a country can import more goods and services, while a decline in the terms of trade means that any given volume of exports pays for a smaller volume of imports, adversely affecting domestic saving-investment relationships. To eliminate the impact of the decline in the terms of trade, a country must increase its export volume (increase savings) or reduce its imports volume (reduce expenditure).

Oil constitutes the principle export of Saudi Arabia. In 1996, oil made up 89% of the total volume of exported goods. A fluctuation in oil prices, which can be linked to fluctuations in the oil market, will lead to fluctuations in the terms of trade of Saudi Arabia. Figure (5-1) shows the change in the terms of trade and current account balance

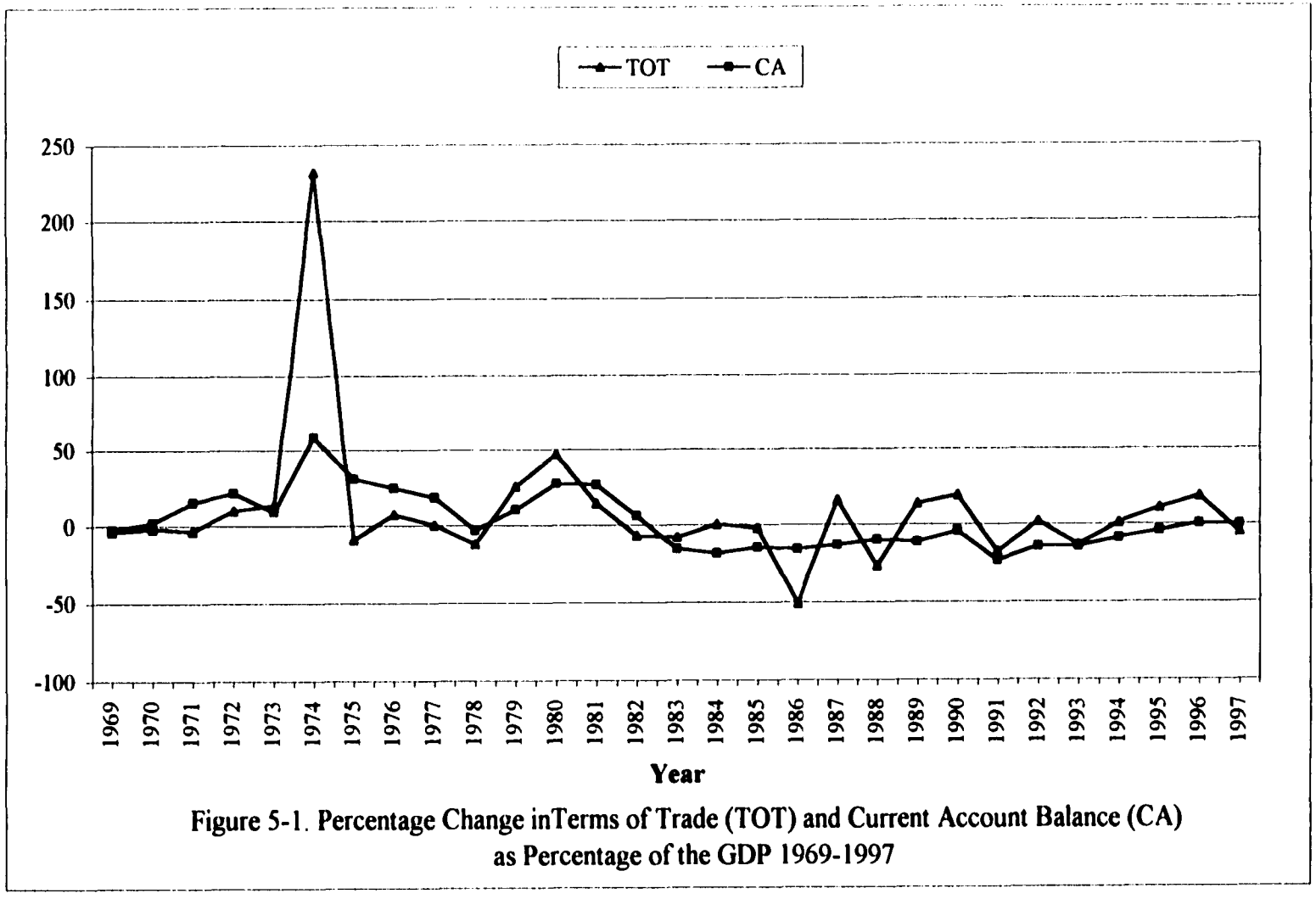

Figure 5-1. Percentage Change inTerms of Trade (TOT) and Current Account Balance (CA) as Percentage of the GDP 1969-1997

as a percentage of the GDP. In 1974, after the correction in oil prices, the terms of trade increased to about 230%. The change in terms of trade and current account as a percentage of the GDP moved in the same direction until 1985. After that the terms of trade continued to fluctuate while the current account remained in negative territory until 1996. It can therefore be concluded that there is a positive relation between terms of trade and current account especially for the 1969 to 1985 period, when oil constituted most of the exports.

2). Government Budget Balance: the most direct way in which the government budget balance and the current account are related can be observed within the framework of national income identity, which links the current account to the gap between total saving and investment. In an open economy, a budget deficit (negative public sector saving) with unchanged private saving will be transformed either into a reduced investment and hence lowered capital stock or into a reduced current account surplus (or increased deficits).

Saudi Arabia, as one of the oil exporting countries, accumulated high wealth during the first oil price correction in the 1970s. The budget was in surplus during the period of 1969 to 1982 with exception of 1977 and 1978 as can be seen in Figure (5-2). After 1982 the budget fell into a deficit due to the decline in government revenue while the government continued to spend on development programs. What should be noticed is that the budget balance as percentage of the GDP and current account as percent of the GDP has moved in the same direction during most of the entire period of study.

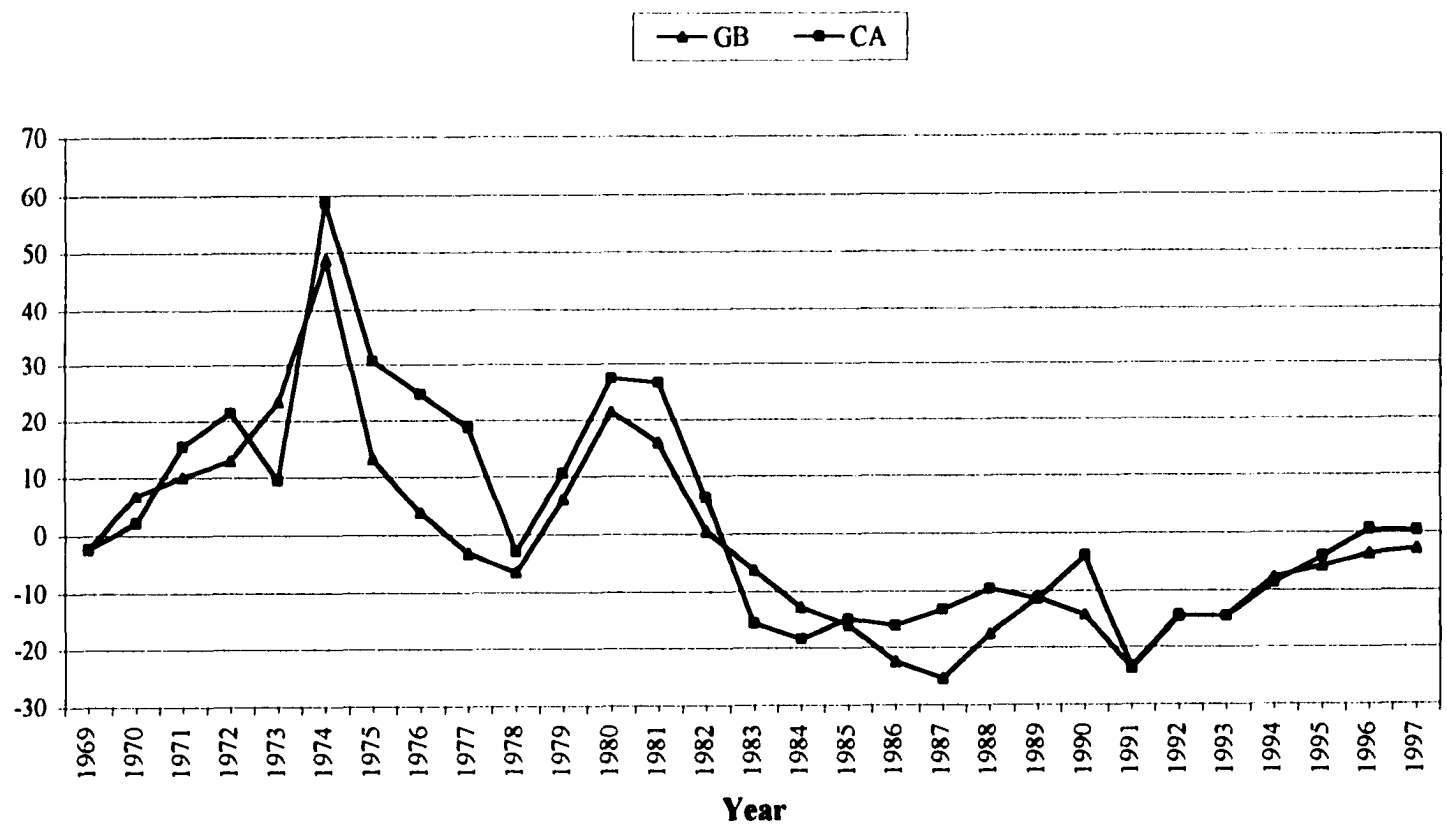

Figure 5-2. Government Budget Balance (GB) as Percentage of the GDP and Current Account Balance (CA) as Percentage of the GDP 1969-1997

3). Money Stock: one of the most important factors determining the current account balance is the money stock growth. Under perfect capital mobility conditions, if the exchange rates are flexible, changes in the money supply will affect the aggregate demand and the nominal exchange rate. An expansionary monetary policy for instance will cause the exchange rate to depreciate, improving the competitiveness and therefore increasing exports. In this case, the current account and the money supply might be positively related (Ali, 1996).

Under fixed exchange rates, as is the case of Saudi Arabia, the central bank is committed to buy or sell foreign currencies on demand in order to prevent the exchange rate from moving away from its peg. This means that the central bank's holdings of international reserves are influenced by the international transactions of domestic and foreign residents. Therefore, under a fixed exchange rate, the central bank controls the exchange rate but not the overall monetary base.

In Saudi Arabia the government gets most of its revenue by selling oil to foreign countries. Therefore, the fiscal policy can be considered also as a monetary policy. When the government spends its revenue, the money supply increases by the same amount as the revenue generated by selling oil since it is not generated by tax or borrowed from the domestic market. In this case, it might have the same impact from an increase in money supply as from fiscal policy expansion. Indeed, Figure (5-3) illustrates a negative relationship between money supply as a percentage of the GDP and current account as percentage of the GDP.

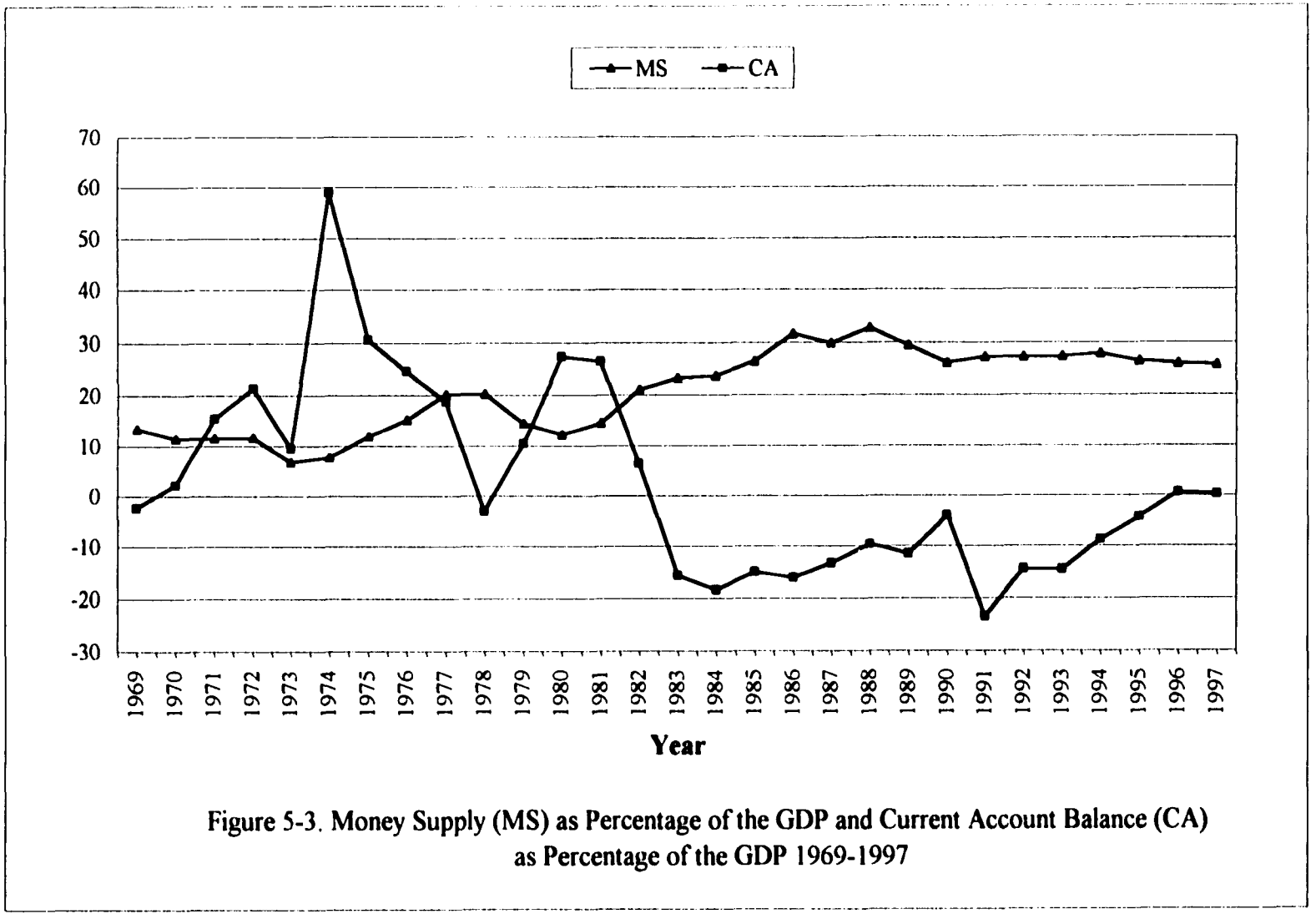

Figure 5-3. Money Supply (MS) as Percentage of the GDP and Current Account Balance (CA) as Percentage of the GDP 1969-1997

4). Real Exchange Rate: the real exchange rate between two countries' currencies is a broad summary measure of the prices of one country's goods and services relative to another's. The real exchange rate is defined as the nominal exchange rate times the ratio of foreign price level to home price level. It has two components, the price level and the nominal exchange rate. Depreciation in the nominal exchange rate can occur without change in the real exchange rate if the price level decreases by the same magnitude.

The real exchange rate is an important explanatory variable in determining the current account balance. An increase in the real exchange rate (depreciation) tends to decrease the demand for imports and increase the foreign demand for exports, since domestic goods and services are less expensive relative to the foreign ones. This means more net exports of domestic goods and services abroad, more income, more savings and investment, and current account improvement.

Figure (5-4) shows the relationship between the current account and the real exchange rate in Saudi Arabia. The data revealed an inverse relationship most of the time, contradicting what the theory predicts. The following three reasons may explain this relationship: First, since the nominal exchange is fixed against the U.S. dollar (Saudi Arabia's second largest trade partner), its impact on the real exchange rate is reduced. Second, oil constitutes most of the exports of Saudi Arabia, with the price and quantity demanded determined by the international oil market. Therefore, the change in general price level in Saudi Arabia will not have a big impact on the quantity of exports. Third, most of Saudi Arabia's imports are necessity goods, which may not be affected by an increase in the price of imports; instead their value might increase. Therefore, either no

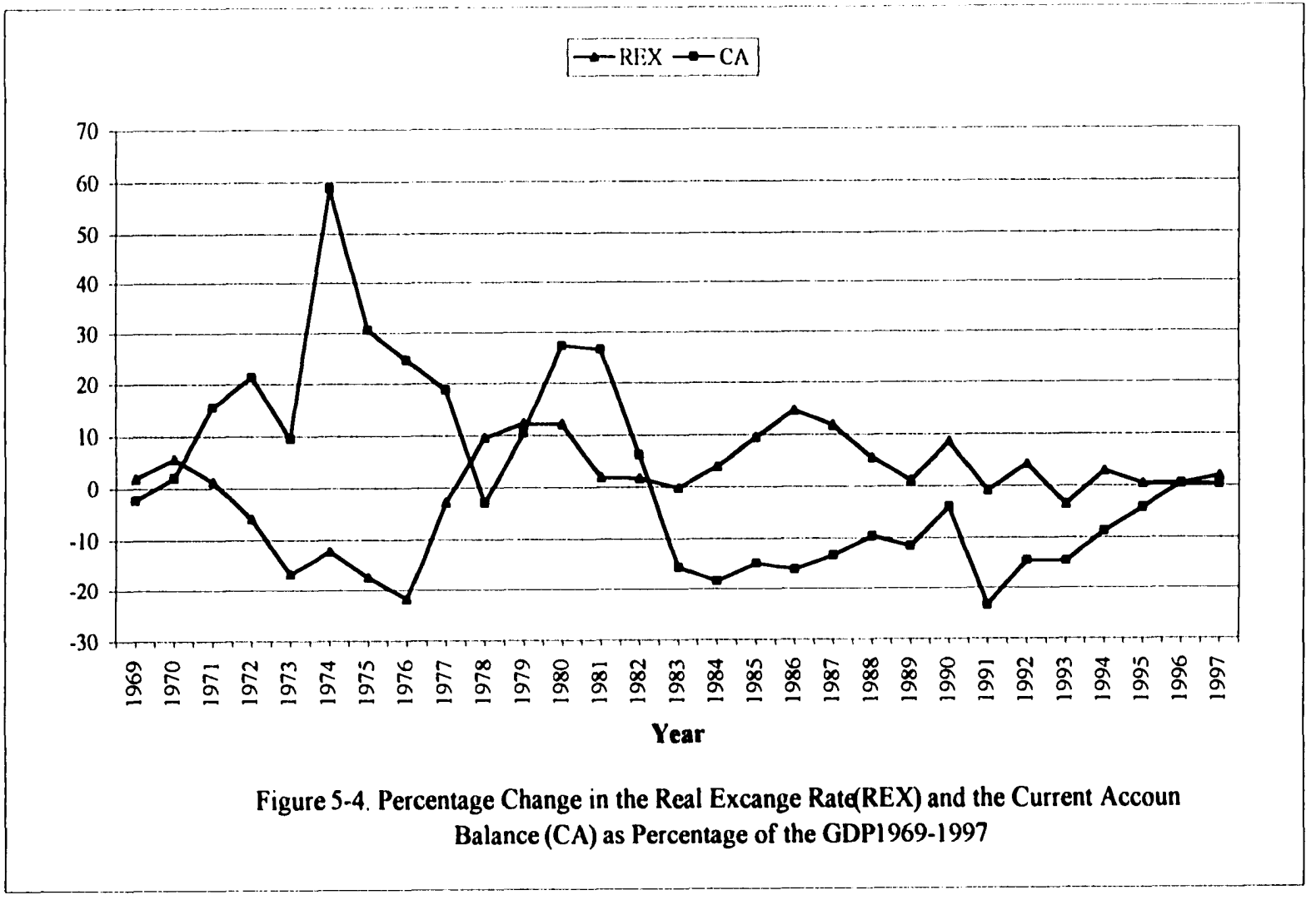

Figure 5-4. Percentage Change in the Real Excange Rate(REX) and the Current Accoun Balance (CA) as Percentage of the GDP1969-1997

relation or a negative one between the real exchange rate and the current account balance may exist.

5). Domestic Investment: Saudi Arabia has experienced a significant transformation in the last three decades. The oil prices correction in 1973 enabled the government of Saudi Arabia to directly promote economic development through economic expenditure on large-scale investments, as well as the provision of interest-free loans to the private sector through public financial institutions, leading to high growth in domestic investment, especially in the late 1970s and the beginning of the 1980s.

A current account deficit may be expected in the first stage of a country's development due to the increase in imported physical capital followed by a surplus in the next stage. However, this is not the case of Saudi Arabia, which has experienced a current account surplus and high economic growth in the first stage of development due to the increase in the price and quantity of oil exports. Figure (5-5) shows that the domestic investment as a percentage of the GDP went up from less than 10% in 1973 to about 33% in 1977, stabilizing at around 20% after 1985.

6). Private Consumption: as outlined in chapter two, one of the features of the Saudi Arabian economy is its degree of interdependence with the rest of the world. In 1997, imports of goods and services amounted to 47% of the GDP. The kingdom is the 24th largest exporter of merchandise trade in the world, accounting for approximately 1% of the world's total. Therefore, private consumption can be expected to have a strong negative relation with the current account balance as the economic theory predicts. Figure

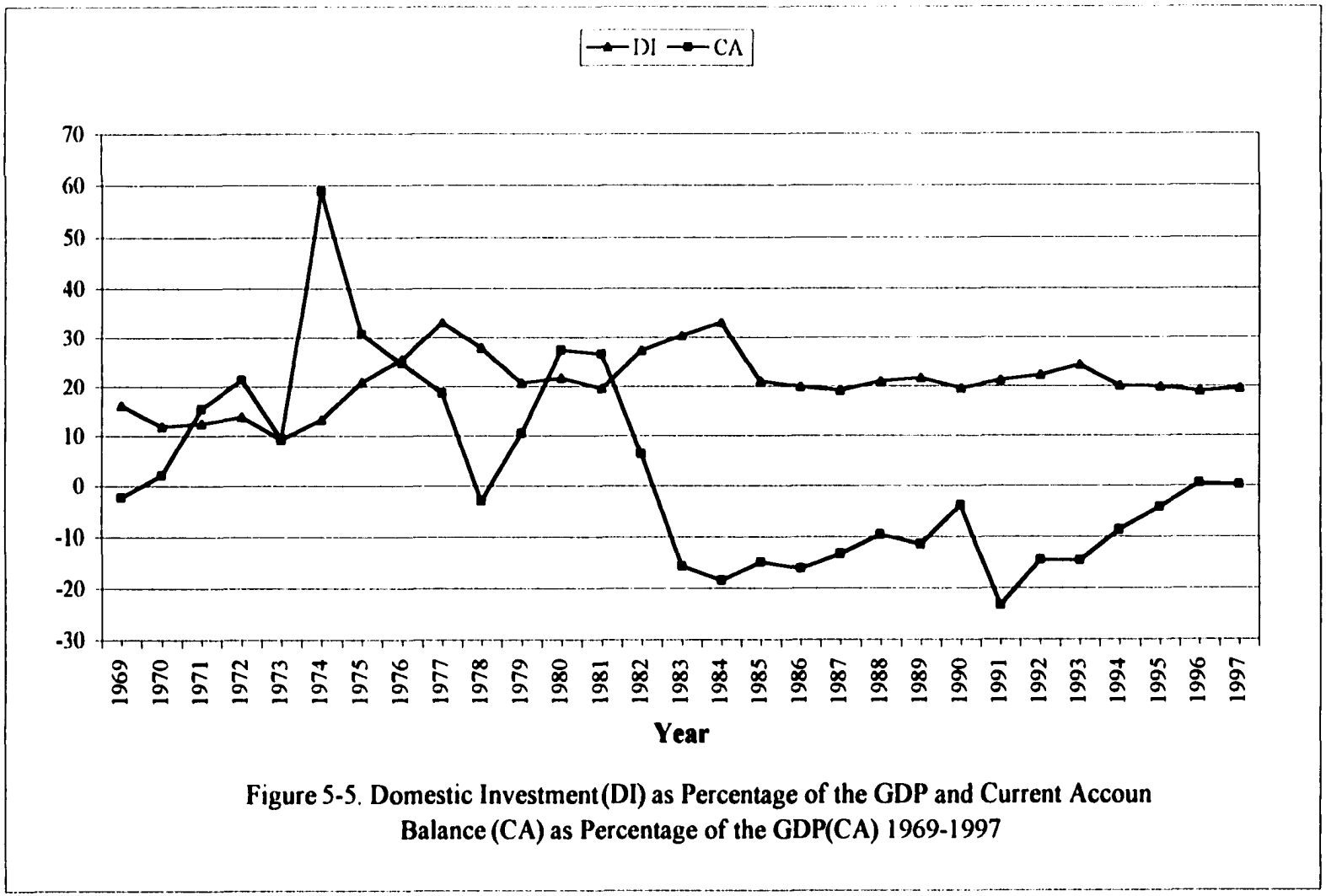

Figure 5-5. Domestic Investment(DI) as Percentage of the GDP and Current Accoun Balance (CA) as Percentage of the GDP(CA) 1969-1997

(5-6) illustrates the relation between the current account and private consumption in Saudi Arabia. Private consumption and the current account had a strong negative relationship during the entire period of the study.

The domestic and the foreign economic growth have a significant influence on the current account. Domestic investment, private consumption, and government balance have been included in the model, which takes care of domestic economic growth. Foreign economic growth is not included since oil constitutes most of Saudi Arabia's exports and oil prices are determined mostly through factors other than growth in industrial countries, such as the quantity of oil supplied by oil-producing countries and the fluctuations in demand due to weather changes in oil-importing countries.

5.2.2. Data Description

In order to conduct the empirical analysis in the next section, annual time series data from 1969 through 1997 were collected from international financial statistics (IMF), world tables (World Bank), and annual reports (Saudi Arabian Monetary Agency), to derive the variables needed in the empirical estimation. These variables are defined as follows:

1). Current Account Balance (CA) measures net outflows of goods, services, income, and unilateral transfers, including government grants. It reflects the net foreign capital flows or net foreign investment.

2). Government Budget Balance (GB) is equal to the actual total government receipts minus the actual total government expenditures. If receipts are greater (lower) than expenditures, the budget will be in surplus (deficit).

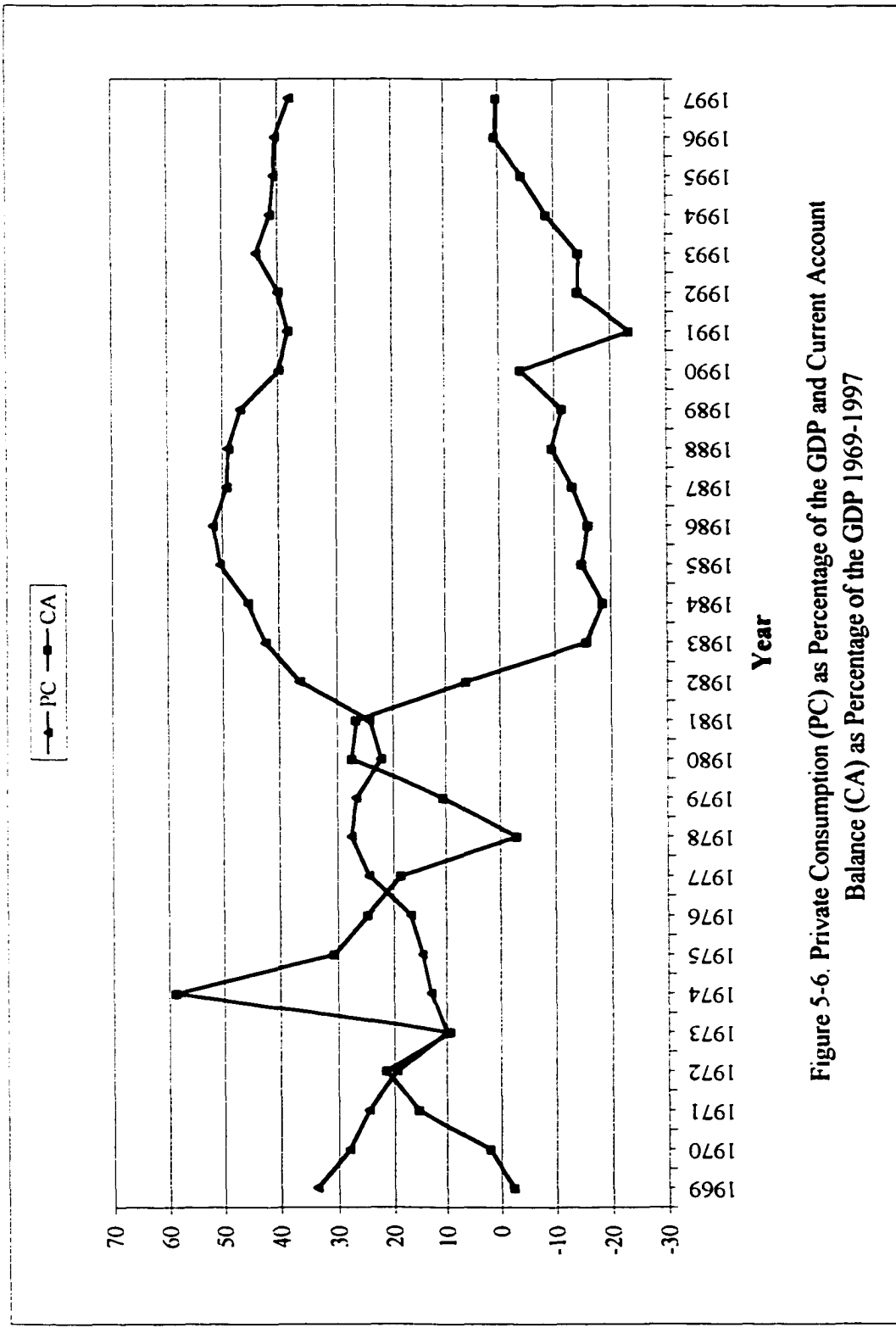

Figure 5-6. Private Consumption (PC) as Percentage of the GDP and Current Account Balance (CA) as Percentage of the GDP 1969-1997

3). Money Supply (MS) is measured by M1 (currency outside banks plus demand deposits).

4). Private Consumption (PC) is defined as the household consumption expenditure.

5). Gross Domestic Investment (DI) is measured by gross fixed capital formation (government and private) plus net change in the stock.

6). Terms of Trade (TOT) is defined as the price of exports relative to the price of imports.

7). Real Exchange Rate (REX) is defined as the weighed average of the ratios of the consumer price indices in the main trade partner countries to Saudi Arabia's price index, adjusted to the nominal exchange rates.

In order to make these variables stationary, the first five variables are measured as percentage of the GDP. The remaining variables are measured as percentage change.

5.3. MODEL SPECIFICATION

It is necessary to find an appropriate model to investigate the relative impact of each of the above-mentioned variables on the current account position of Saudi Arabia empirically. A single-equation regression model can be used if there is a unidirectional cause and effect relationship between the current account and the other variables. But since there is a high correlation between the current account and the other variables, as has been shown in the previous section, the single equation model or one-way cause and effect model will not give precise results. The most widely used model to test this kind of relations is the simultaneous equations and vector autoregression (VAR).

5.3.1. Simultaneous Equations and VAR Models

The simultaneous (or structural) equations can be defined as a set of two or more equations, which have variables in common whose values must satisfy all of the equations simultaneously. The solution to a set of simultaneous equations is the set of values of the endogenous variables, which results in all equations being satisfied simultaneously. The VAR on the other hand, constitutes a reduced form of some unknown structural system of equations similar to what would be derived from a structural econometric model. The model does not distinguish between endogenous and exogenous variables, but it is concerned with the path through time of a vector of variables, which are considered of interest to the problem in hand (Pearce, 1992).

The simultaneous equations model uses economic theory to describe the relations between the variables of interest. The resulting model is then estimated and used to test the empirical relevance of the theory.

> In their heyday during the 1960s and 1970s elaborate models of the U.S. economy based on simultaneous equations dominated economic forecasting. But of late, the glamour about such forecasting has subsided owing to the oil price shocks of 1973 and 1979 and the Lucas critique. The thrust of their critique is that the parameters estimated from an econometric model are dependent on the policy prevailing at the time the model was estimated and will change if there is a policy change. In short, the estimated parameters are not invariant in the presence of policy changes. For example, in October 1979, the Fed changed its monetary policy dramatically. Instead of targeting interest rates, it announced that it would henceforth monitor the rate of growth of the money supply. With such a pronounced change, an econometric model estimated from past

> data will have little forecasting value in the new regime (Gujarati, 1995, p. 735).

This breakdown of many macroeconomic relationships convinced many macroeconomists of the necessity of a more general modeling strategy that imposed fewer restrictions and gave greater emphasis to dynamics. Sims (1980) introduced VAR as an alternative to the large simultaneous equations models for analyzing the relationships among macroeconomic aggregate.

> According to Sims if there is true simultaneity among a set of variables, they should all be treated on an equal footing; there should not be any priori distinction between endogenous and exogenous variables. It is in this spirit that Sims developed his VAR model. The seeds of this model were already sown in the Granger causality test (Gujarati, 1995, p. 746).

Sims argued that the identification restrictions imposed to obtain estimates of the structural parameters of macroeconomic models were unrealistically strong (Hamam, 1995).

The VAR models had been used for forecasting, and it was only in the 1980s as a result of Sims' work that they became a useful tool in policy analysis in macroeconomic and international economics. The use of the VAR model reduces the influence that economic theories bear on the form of the system to be estimated. The two principal uses of the VAR model are to test theories, which imply particular behavior for vector autoregression, and to learn about the dynamics of macroeconomic variables. The dynamic nature of economic relationships is considered by introducing lags on the endogenous and exogenous variables (Hamam, 1995).

McNees concluded his article entitled "Forecasting Accuracy of Alternative Techniques":

> The VAR approach to economic modeling is attractive in that it does not require the modeler to express an explicit theoretical point of view about how the economy works. It eschews designating which economic variables are to be regarded as the underlying determinants driving the economy. It also does not require the explicit imposition of theoretical restrictions that are employed in estimating the conventional model. Consequently, VAR models can generate forecasts that are not conditional on explicit assumptions about the future course of the presumed determinants of economic activity (McNees, 1986, p. 14).

While the VAR model does not impose a priori exogenicity assumptions, and does not specify the structural relationships between the variables included in the model, it is not completely atheoretical and without a structure since the selection and ordering of the variables is based on a particular theoretical framework. The results are still sensitive to the choice of variables and their ordering (Hamam, 1995).

As presented in chapter three, the VAR model has been used by many researchers in the last years to examine the link between the current account balance, the budget balance, the money supply, the terms of trade, the real exchange rate, consumption, and investment. These researchers claim that the VAR proves to be a useful analytical tool and provides a better understanding of macroeconomic relationships than the structural models because the structural model required incredible identifying restrictions.

The theoretical links between the current account balance in Saudi Arabia and its underlying determinants are complicated by a number of direct and indirect channels that cannot be explained using only the economic theory, as seen in the preceding section.

The complexity of the links makes it difficult to estimate these channels by using the structural model without running the risk of misspecification bias. Therefore, the VAR model seems appropriate for understanding the empirical relations between the current account balance, budget balance, and the other variables identified in the previous section, since it does not require the complete specification of an underlying theoretical model and because of the dynamic nature of the relationships between these variables.

5.3.2. Econometric Specification

This study will use a multivariate framework to test for the causes of the current account imbalance in Saudi Arabia rather than a bivariate framework in order to avoid distorting the causality inferences due to omission of relevant variables.

Let x_t denote a n component vector of arbitrary length, i.e., $x_t = (x_1, x_2, x_3, ..., x_n)$. Then an n-variable, VAR model can be represented as follows (Hamam, 1995):

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ . \\ . \\ . \\ x_n \end{bmatrix} = \begin{bmatrix} a_{11}(L)a_{12}(L)..a_{1n}(L) \\ a_{21}(L)a_{22}(L)..a_{2n}(L) \\ a_{31}(L)a_{32}(L)..a_{3n}(L) \\ . \\ . \\ . \\ a_{n1}(L)a_{n2}(L)..a_{nn}(L) \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ . \\ . \\ . \\ x_n \end{bmatrix} + \begin{bmatrix} a_{10} \\ a_{20} \\ a_{30} \\ . \\ . \\ . \\ a_{n0} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ . \\ . \\ . \\ e_{nt} \end{bmatrix} \qquad (5\text{-}1)$$

where:

Subscripts = Matrix ordering;

$$a_{ij} = \sum_{1}^{m_{ij}} (a_{ijk}) L^k$$

m_{ij} = Degree of the polynomial $a_{ij}(L)$;

L = Lag operator such that $L^k X_t = x_{t-k}$;

a_{i0} $(i = 1 \text{ to } n)$ = Intercepts in each equation; and

$e'_t = e_{t1}, e_{t2}, e_{t3}, \ldots, e_{tn}$) = White noise vector satisfying $E(e_t) = 0$, $E(e_t, e_s) = \Sigma$ for $t = s$, $E(e_t, e_s) = 0$ for $t \neq s$. These assumptions imply that the white noises are independent and distributed around zero.

The system of equations (5-1) models each of the n variables as a function of its own lagged values and the lagged values of all the other variables in the system. The right-hand side variables are predetermined because only lagged values are used. These lagged values are the same in each equation. All variables in the system of equations (5-1) are considered as potentially endogenous.

The VAR model requires the specification of three elements: 1) the set of variables that should be included in the economic system modeled; 2) the number of lags needed to capture the impact that variables have on each other; and 3) the ordering of the variables included in each model tested (Hamam, 1995).

In the previous section the variables that may have an impact on the Saudi Arabian current account and that will be included in the model were specified. And since the result is sensitive to the ordering of these variables, we will use the economic theory to make the ordering. The ordering is consistent with the sequence implied by Keynesian (neo-Keynesian) models to a small open economy with fixed exchange rates, taking into account the special case of the Saudi Arabian economy. It starts the ordering with the terms of trade. A shock to oil prices (terms of trade) will have a large impact on the

current account position since the oil exports constitute a high percentage of the total exports for Saudi Arabia. The changes in the current account position will affect the government budget balance due to a decrease in its revenue, which comes mostly from oil exports. The money stock will change immediately with changes in government expenditure (as explained in the previous section). Changes in government expenditure and money stock will have a direct impact on domestic investment and private consumption, which will have an impact on price level (real exchange rate). Therefore, the ordering runs from TOT to CA, to GB, to MS, to DI, to PC, and to REX.

In order to capture the dynamic relationship between the current account and the other variables, the lag has to be chosen. It is necessary to take into account that the more lags are added to the model, the greater the number of parameters that must be estimated, and the fewer the degrees of freedom. "In the VAR model, there is a trade-off between having a sufficient number of lags and having a sufficient number of free parameters (Hamam, 1995, p. 153)." Sims (1980) claimed that a relatively small number of variables associated with a low lag length capture most of the information available about the economy. Since there is a relatively small sample size for this study, the model will be estimated with one lag, which will allow adding more variables that may have an impact on the current account in Saudi Arabia.

The stationary time series data is required in the VAR model because non-stationarity may give biased results and statistical inferences. The stationarity must be addressed before estimating the model. The stationarity implies that the impact of unexpected shocks will disappear over time. It also ensures that there are no fundamental changes in the structure of the process that would make the predictions difficult.

The Augmented Dickey-Fuller statistics (ADF) was used to test for stationary data. The null hypothesis is that the data is non-stationary (it has a unit root). The data were tested in level form and in first difference form. The results of the unit root tests are presented in Table (5-1).

Table 5-1. Unit Root Tests*

Variables	ADF Test Statistics (levels)	ADF Test Statistics (first differences)
CA	-1.73	-4.18
GB	-2.03	-3.94
MS	-1.58	-3.82
TOT	-3.48	-5.64
PC	-1.64	-3.09
DI	-2.88	-3.55
REX	-2.35	-3.21

*Performed using one lag and a constant term.
Critical values: at 1% = -3.69; at 5% =-2.97; at 10% = -2.63.

The ADF test statistics for the data in level form implies rejection of the null hypothesis at 5% significance level for only TOT (only TOT is stationary). But when the data are expressed in first differences, the ADF test statistics indicated rejection of the null hypothesis of non-stationarity at 5% significance level for all the variables. The power of the ADF test statistics is influenced by the time span of the data. This research covers a relatively short period of time (1969-1997) for this test due to insufficient data.

Since there is uncertainty about the stationarity of the data, the model will be estimated in both level and first difference forms in the following section.

5.4. EMPIRICAL ESTIMATION AND RESULTS

The VAR model, which will be used to analyze and determine the causes of the current account imbalances in Saudi Arabia, has been described. The order of the variables that may have an impact on the current account has been set and the lag length has been chosen. The stationarity of the time series data was checked by the Augmented Dickey-Fuller (ADF) test and it was found that the data expressed in first difference form are stationary. Since there is some doubt about the stationary test in the short term, the model will be tested in both levels and first differences.

The VAR model will be estimated, using equations (5-1). The dynamic effects of structural shocks to an endogenous variable on the variables in the VAR will be traced out by using impulse response functions. To test the direction of causality between the variables two methods will be used. The first method of testing the direction of the causal relationship between the variables in the model is the Granger causality test. The second test of causality is based on variance decomposition of the forecast error variance. According to Abell:

> Sims introduces a more discerning test of causality based on the variance decomposition of a variable's forecast error variance. The decompositions are generated from a moving average representation of the VAR system and show the proportion of forecast error variance for each variable that is attributable to both its own innovations and those from the other variables.

> Thus, relationships among the variables may be evaluated in terms of causality (Abell, 1990, p.91).

The Granger causality test allows finding the direction and significance of causality that exists between one variable and the other variables in the model. However it does not indicate the size or the sign of the impact of a variable on the other variables in a system of equations. While the variance decomposition makes it possible to find the direction and the size of the impact, it does not show the signs of the estimate relationships and also does not indicate significance levels. The impulse response functions allow determining the signs of the effect of innovations in each variable on the other variables or on itself (Hamam, 1995).

The study tested for normality in the VAR equation (seven equations in levels and seven in first differences) using the Jarque-Bera test. The null hypothesis states that the residuals are normally distributed. In all the equations the null hypothesis of normal distribution at a 5% significance level was accepted. The stationarity of the residuals was checked using the ADF Test and it was found that all of the residuals are stationary.

It was also checked whether autocorrelation exists in the disturbances of the VAR equations using the Q-statistics test. The null hypothesis states that there is no autocorrelation. The null hypothesis of no autocorrelation existing in the residuals of all the equations at a 5% significance level was accepted. Since the estimated coefficients of the variables in a VAR system do not provide any information of interest to this study, they are not reported here.

5.4.1. Granger-Causality Test

The direction and the significance of the causality that exists between the variables in the model can be found using the Granger-causality test. In testing for the Granger causality both bivariate and multivariate causality tests will be used. The bivariate causality test will be used to determine the relation between the current account and each single variable in the system while the multivariate causality test will help determine the impact of a block of variables on the current account.

The results of the bivariate Granger-causality tests are reported in Table (5-2) for both series in level form and first difference form. The most powerful factors causing changes in the current account balance are government budget balance and money stock with the data in level and first difference forms. On the other hand, while the current account causes changes in the budget balance it does not have a significant impact on the money stock. The tests therefore, revealed a strong correlation between the government budget balance and the current account in Saudi Arabia.

The domestic investment and private consumption have a strong effect on the current account in all the tests but not the opposite direction. The null hypothesis that real exchange rate does not Granger cause the current account was accepted but the hypothesis that the current account does not Granger cause the real exchange at a 5% level of significance was rejected. The results confirm that the terms of trade and current account have no causality in any direction with the data in level and one direction from current account to the terms of trade with the data in first difference.

Table 5-2
Bivariate Granger-Causality Test

Null Hypothesis	Level	First Difference
	F-Statistic (Probability	F-Statistic (Probability)
TOT does not Granger Cause CA	0.31 (0.58)	0.24 (0.63)
CA does not Granger Cause TOT	0.65 (0.43)	4.49 (0.04)
GB does not Granger Cause CA	12.49 (0.00)	18.53 (0.00)
CA does not Granger Cause GB	4.73 (0.04)	19.84 (0.00)
MS does not Granger Cause CA	17.21 (0.00)	24.22 (0.00)
CA does not Granger Cause MS	1.95 (0.17)	1.12 (0.30)
DI does not Granger Cause CA	7.23 (0.01)	11.29 (0.00)
CA does not Granger Cause DI	4.24 (0.05)	0.58 (0.45)
PC does not Granger Cause CA	21.40 (0.00)	14.53 (0.00)
CA does not Granger Cause PC	0.12 (0.73)	0.54 (0.47)
REX does not Granger Cause CA	1.11 (0.30)	1.44 (0.24)
CA does not Granger Cause REX	5.87 (0.02)	4.84 (0.04)

The main finding is the strong correlation between budget balance and current account (bi-directional causality). Strong evidence of budget balance to current account causality and current account to budget balance causality was found. The bivariate causality tests further indicate that money stock, domestic investment, and private consumption along with the budget balance have significantly caused changes in the

current account deficit. The current account causes changes in the real exchange rate and terms of trade (only with data in first differences), but not the opposite. It should be noticed that the tests for the relationship between the current account and these variables were carried out using the bivariate Granger causality tests and omitting other variables, which may affect the relationship between the variables. Nevertheless the test was performed to obtain a general view of the relation between the current account and the other variables.

The multivariate relationship between the current account and the other variables was tested using a block Granger non-causality test. The null hypothesis states that the coefficients of a subset of jointly determined variables in the VAR are equal to zero (jointly determined variables do not have an impact on the current account). The Chi-square statistics and the statistical significance levels (p-values) for each block of variables are reported in Table (5-3) with the data in level and first difference forms. For the block Granger non-causality test, a low p-value signifies that the null hypothesis can be rejected and, therefore, the block of variables have a significant impact on the current account balance.

The results reported in Table (5-3) reveal that with the series in levels, domestic investment and private consumption are not statistically significant in explaining the current account. When the real exchange rate is added to the model, the results improve but still the block of variables has no significant effect. The government budget balance increases the explanatory power of the model and changes the results from accepting into rejecting the null hypothesis at a 5% level of significance.

Table 5-3 Multivariate Granger-Causality Test		
CA Granger caused by:	Level	First Difference
	Chi-square (P-value)	Chi-square (P-value)
DI and PC	0.09 (0.96)	19.37 (0.00)
DI, PC, and REX	1.09 (0.78)	19.99 (0.00)
TOT, GB, and MS	14.08 (0.00)	27.59 (0.00)
GB, DI, and REX	10.06 (0.04)	30.09 (0.00)
TOT, GB, DI, PC, and REX	13.78 (0.02)	30.55 (0.00)
TOT, GB, MS, DI, PC, and REX	15.67 (0.01)	32.25 (0.00)

Overall, with series in levels, domestic investment, private consumption, and the real exchange rate as a block of variables do not have a significant impact on the current account while the government budget balance, money stock and terms of trade do. On the other hand, the results with the series in first differences show that any combination of block variables has a significant effect on the current account.

5.4.2. Variance Decomposition Test

Variance decomposition shows the proportion of the forecast error variance for each variable in the system that is attributable to innovations in itself and in other variables in the same system. Since the variance decompositions must be calculated at particular time intervals after a hypothetical shock, the results for two, five and ten years

of forecast error variance are presented with the ordering that has been set in the previous section, where the order set was: TOT prior to CA prior to GB prior to PC prior to DI prior to REX.

Tables (5-4), (5-5), and (5-6) present the variance decompositions of the forecast error variances for each variable in the system with the series in levels for two, five and ten-year horizons respectively. The results for two years are summarized in Table (5-4), showing that 18.2% of the forecast error variance of the current account is caused by innovations in the terms of trade, 30.3% by innovations in its own past, 32.6% by innovations in the government budget balance, 10.0% by innovations in the money stock, 5.6% by innovations in private consumption, 2.8% by innovations in domestic investment, and 0.4% by innovations in the real exchange rate. What should be noticed is that innovations in the real exchange rate account for less than 1% of the forecast error variance of the current account balance and for less than 2% of any other variable in the system. The government balance and the current account explain a sizable proportion of the variance on the current account balance. The terms of trade and the money stock come next.

The results for the five- and ten-year horizons are reported in Tables (5-5) and (5-6) respectively. The effects of the terms of trade (8.7% and 7.3% for five and ten years, respectively) and government balance (23.4% and 20.1% for five and ten years, respectively) on the current account are smaller than what was obtained with a two-year horizon. The impact of the money stock is far greater than for the two-year horizon. The effect of domestic investment and the real exchange rate are slightly larger, but there is no significant change in private consumption.

Table 5-4
Variance Decomposition – Using Levels
(2 Year Horizon)

Percent Variation In:	Due to innovations in:						
	TOT	CA	GB	MS	PC	DI	REX
TOT	43.7	9.2	39.1	1.0	5.9	1.1	0.0
CA	18.2	30.3	32.6	10.0	5.6	2.8	0.4
GB	10.3	3.9	68.2	10.5	4.0	1.8	1.3
MS	0.8	0.3	38.3	57.1	1.2	0.3	2.0
PC	0.0	2.3	21.8	56.3	15.9	3.4	0.3
DI	0.5	1.5	18.9	22.7	4.7	50.1	1.6
REX	6.7	9.1	7.6	0.0	6.1	7.6	62.9

Table 5-5
Variance Decomposition – Using Levels
(5 Year Horizon)

Percent Variation In:	Due to innovations in:						
	TOT	CA	GB	MS	PC	DI	REX
TOT	39.1	8.6	34.9	7.5	6.2	3.3	0.4
CA	8.7	14.4	23.4	38.3	6.1	6.0	3.1
GB	5.7	2.2	43.0	37.6	3.8	2.7	5.0
MS	0.5	0.2	24.3	67.0	1.5	0.4	6.2
PC	0.0	1.1	14.9	63.8	10.6	7.3	2.3
DI	0.9	2.6	16.4	25.5	5.9	42.9	5.8
REX	3.3	4.5	18.8	13.9	7.2	20.8	31.6

Table 5-6
Variance Decomposition – Using Levels
(10 Year Horizon)

Percent Variation In:	Due to innovations in:						
	TOT	CA	GB	MS	PC	DI	REX
TOT	38.5	8.5	34.4	8.6	6.1	3.4	0.6
CA	7.3	12.1	20.1	45.3	5.2	5.3	4.6
GB	4.9	1.9	37.2	44.3	3.4	2.4	5.9
MS	0.4	0.2	19.4	71.0	1.6	0.3	7.0
PC	0.1	0.8	12.3	68.0	8.4	6.1	4.3
DI	0.8	2.4	16.0	25.5	6.9	43.0	5.5
REX	3.1	4.3	17.4	17.9	7.0	20.4	30.1

The results of measuring the variables in first differences are shown in Tables (5-7), (5-8), and (5-9) for the two-, five- and ten-year horizons respectively. In the two-year horizon, 9.9% of the variations in the current account balance are caused by innovations in terms of trade, 33.8% by innovations in its own past, 41.6% by innovations in government balance, 10.3% by innovations in money stock, 0.5% by innovations in private consumption, 3.3% by innovations in domestic investment, and 0.6% by innovations in the real exchange rate. The same conclusion holds for the current account variations in the five and ten-year horizon, except that there is a minor improvement in the effect of the real exchange rate (6.2% for both five and ten-year horizons).

The results for all three-time horizons (two, five, and ten years) suggest that the effect of the government budget balance on the current account with first differences is stronger than that with the series in levels. In all cases however, the government budget balance seems to explain a sizable proportion of the variance in the current account (no less than 20%). The effects of money stock on the current account on the other hand appear to be greater with series in levels than in first differences. It also has a large relative impact on the current account in all the cases. The impact of terms of trade on current account variations is almost equally strong with both series in levels and first differences. The innovations in private consumption, domestic investment, and real exchange rate are weak in all the results obtained with series in levels and in first differences (the effect of these variables on the current account is 6.2% or less). The effect of innovations in the current account balance on its own variance is strong with the series in first differences and moderate with the series in levels.

Table 5-7
Variance Decomposition – Using First Differences
(2 Year Horizon)

Percent Variation In:	Due to innovations in:						
	DTOT	DCA	DGB	DMS	DPC	DDI	DREX
DTOT	40.7	17.3	36.7	2.6	2.1	0.4	0.2
DCA	9.9	33.8	41.6	10.3	0.5	3.3	0.6
DGB	14.7	13.6	61.9	8.0	0.7	1.1	0.0
DMS	0.1	4.1	44.5	43.4	0.8	1.1	6.0
DPC	0.0	1.7	28.3	46.8	21.8	0.0	1.3
DDI	1.7	1.2	14.3	5.6	1.0	63.1	13.2
DREX	6.1	18.4	4.8	3.2	2.1	0.8	64.5

Table 5-8
Variance Decomposition – Using First Differences
(5 Year Horizon)

	Due to innovations in:						
Percent Variation In:	DTOT	DCA	DGB	DMS	DPC	DDI	DREX
DTOT	30.4	20.4	39.6	2.5	1.6	2.1	3.4
DCA	9.3	32.1	37.9	9.5	0.5	4.5	6.2
DGB	13.5	14.2	57.0	7.6	0.7	2.7	4.3
DMS	0.3	4.5	44.6	42.6	0.8	1.2	5.9
DPC	0.2	2.2	30.5	44.9	20.3	0.1	1.8
DDI	2.2	3.6	16.3	7.9	1.4	56.3	12.2
DREX	5.5	15.7	13.5	7.4	1.9	1.8	54.1

Table 5-9
Variance Decomposition – Using First Differences
(10 Year Horizon)

Percent Variation In:	Due to innovations in:						
	DTOT	DCA	DGB	DMS	DPC	DDI	DREX
DTOT	30.4	20.3	39.6	2.5	1.7	2.1	3.4
DCA	9.3	32.0	38.1	9.4	0.6	4.4	6.2
DGB	13.5	14.2	57.0	7.5	0.7	2.7	4.3
DMS	0.4	4.5	44.6	42.5	0.8	1.2	5.9
DPC	0.2	2.2	30.5	44.9	20.3	0.1	1.9
DDI	2.2	3.6	16.4	7.9	1.4	56.2	12.2
DREX	5.5	15.7	13.7	7.5	1.9	1.8	53.9

5.4.3. Impulse Response Functions Test

The short-run and long-run effects of various shocks to the system can be summarized by using impulse responses based on innovation accounting (Enders and Lee, 1990). The Impulse Response Functions (IRF) will allow determining the signs of the effect of innovations in each variable on other variables. Therefore, it will complement the results in variance decompositions in the previous section. Since this study is interested only in the determinants of the current account balance and their signs, the response of the current account to the innovations in all variables as well as the results with series in levels and first differences will be presented.

Figure (5-7) shows the impulse response functions from one standard deviation shock in each of the six variables with the data in levels. This figure shows how much the current account would change from one to ten years after the shock. The impulse response functions show that the impact of positive innovation of the terms of trade is reasonably large on the current account. A one-standard deviation rise in the terms of trade causes the current account surplus to rise by 4% of the GDP in the first period. The response of the current account balance to an innovation in the government balance is positive and significantly large. It reaches its maximum during the second period, and then starts to decrease until it almost disappears after ten years. The increase in money stock, on the other hand, has a negative impact on the current account. A one-standard deviation increase in money stock causes the current account deficit to rise by 6% of the GDP. Private consumption and domestic investment have a moderate impact while the real exchange rate has a moderate positive impact on the current account.

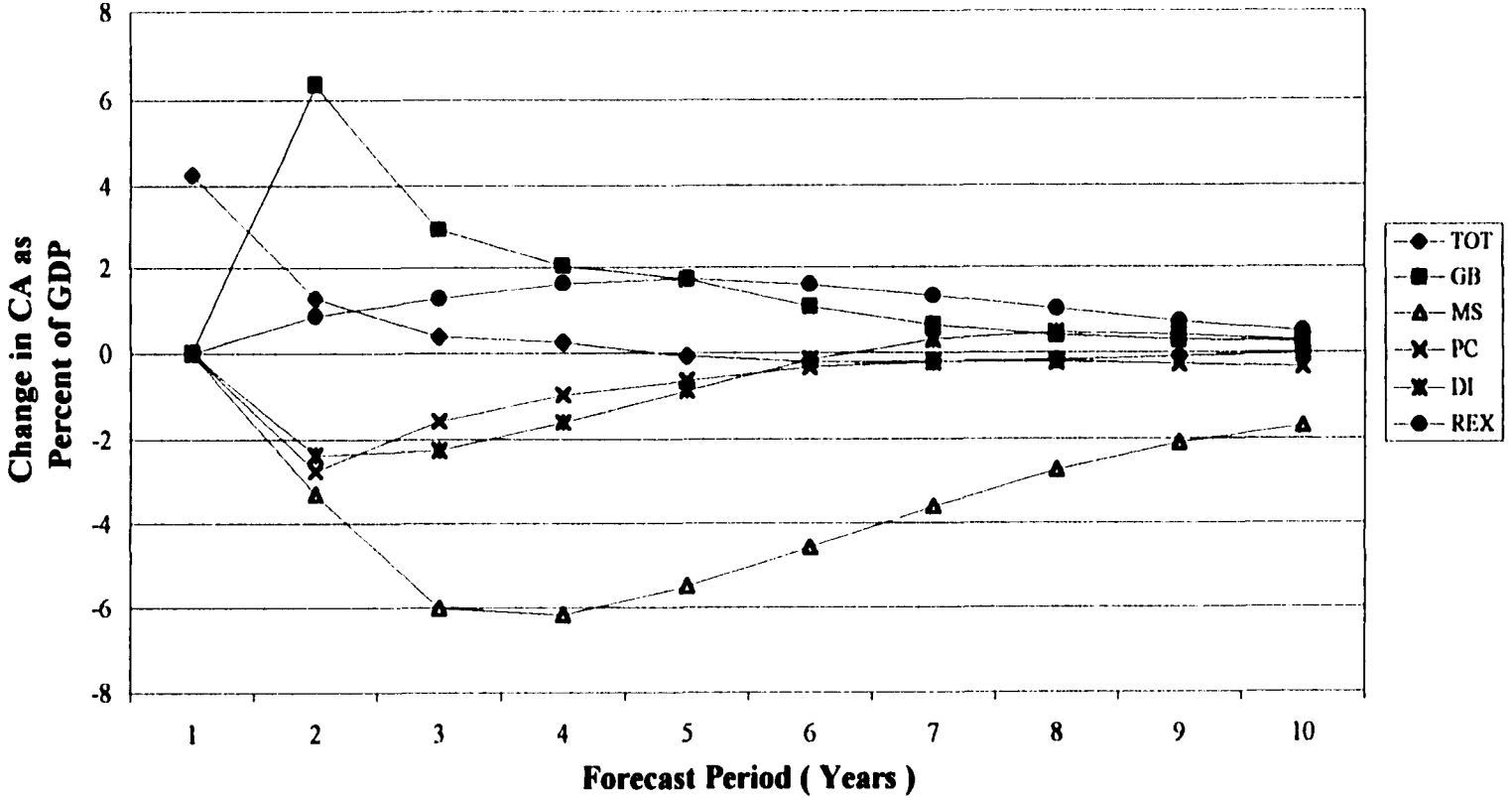

Figure 5-7. Response of CA to Shock in TOT, GB, MS, PC, DI, and REX
(Using Data in Levels)

Figure (5-8) shows the impulse response functions of the current account from innovation of the six variables with the data measured in first differences. The result shows that the effects of these variables on the current account are similar to the ones with series in level form except for the real exchange rate. The positive shock to the real exchange rate causes the current account deficit to rise, while for the data in level form, the impact on the current account is positive. But the impact of the real exchange rate is still moderate.

The main findings from the three tests (Granger causality test, variance decomposition test, and impulse response functions test) indicate that fiscal and monetary policies and terms of trade have a strong effect on the current account variability in Saudi Arabia, while private consumption, domestic investment, and the real exchange rate have weaker effects.

These results confirm the great role of oil prices and government policies on the current account position in Saudi Arabia. The impact of government fiscal policy is consistent with the neo-Keynesian model of a small open economy with fixed exchange rate, while the money stock is not. The results show that the money stock (supply) has a negative impact on the current account while the model predicts that the money supply will be neutral with fixed exchange rate. This supports the analysis of the impact of money stock presented in the previous section (5.2.1.).

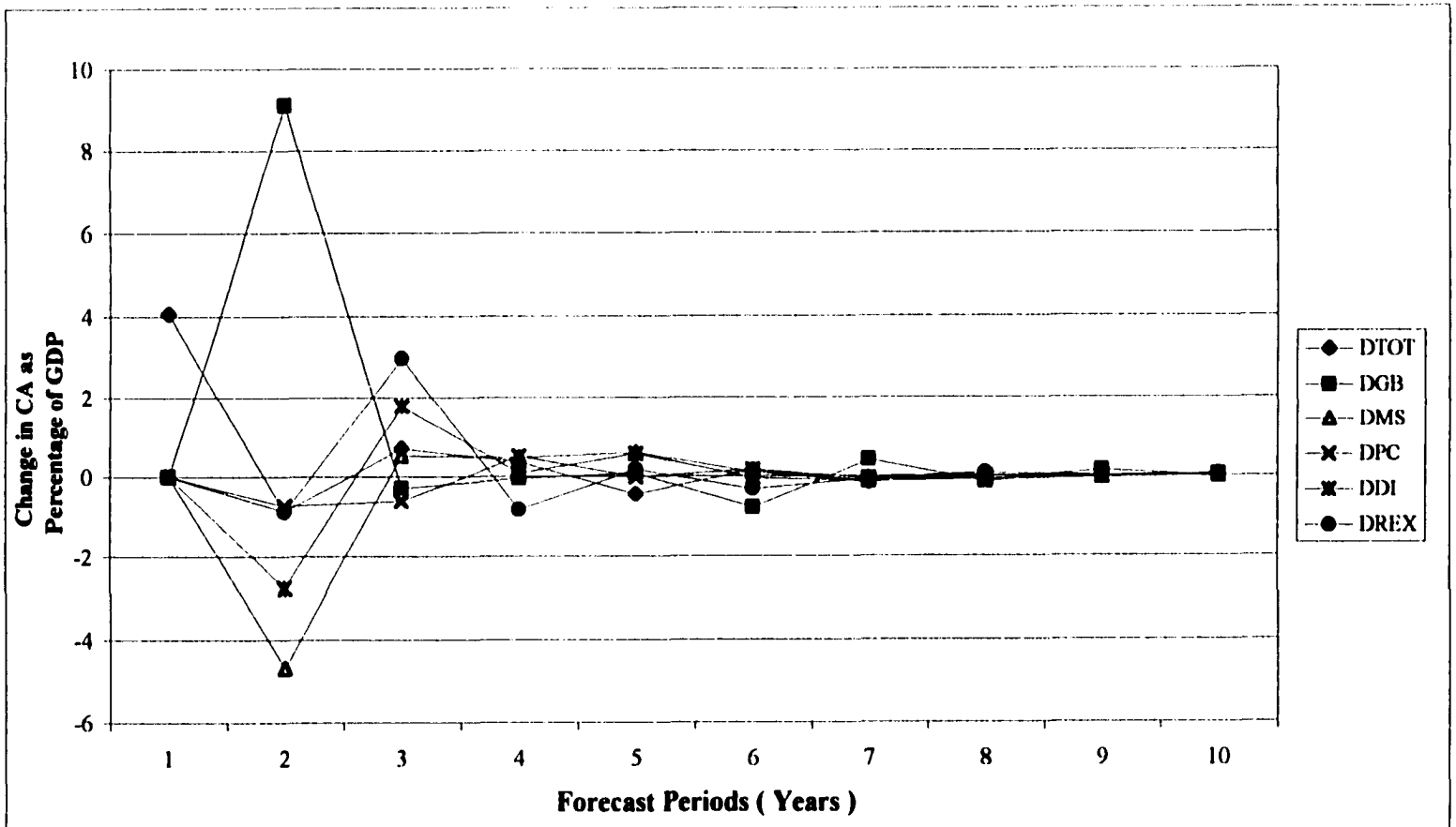

Figure 5-8. Response of D (CA) to Shock in DTO, DGB, DMS, DPC, DDI, and DREX (Using Data in First Differences).

5.5. POLICY IMPLICATIONS

The empirical results revealed that the most powerful factors causing changes in the current account position in Saudi Arabia are government budget balance, money stock, and terms of trade. The policy makers can use these factors to manage the current account imbalances in the short term only since they have a temporary effect on current account. For the long term, a structural adjustment in the economy is the only solution. In this section, the short and long-term policies will be discussed and evaluated using the descriptive, analytical, and empirical analyses presented in this study.

5.5.1. Austerity Policies

In theory, the government budget balance and money stock play a big role in determining the current account position. A reduction in government deficit will lead to a decline in absorption and therefore to an improvement in the current account. Our empirical results support the theory of the large impact of fiscal and monetary policies on the current account in Saudi Arabia. The results of the variance decomposition show that on average 32% of the current account deficit is due to the budget deficit, and that 20% of the deficit in the current account is caused by an increase in money stock. Therefore, tightening the fiscal position is the main policy that can be used to deal with the current account imbalances in the short term. A reduction in the fiscal deficit will lead to an improvement in the current account position and help to control the growth in the money stock, which is a fiscal phenomenon.

How should governments reduce the deficit, given the choice between placing the emphasis on raising revenue and placing it on reducing expenditure? Steep revenue

increases in a country in which the tax effort is already quite respectable may lead to undesirable effects on incentives to produce, invest, and save. On the other hand, large expenditure cuts in a country in which the supply of public goods is already quite low, or in which current expenditure for operations and maintenance have already been severely cut, may impair the country's social and economic prospects (World Bank, 1995).

In the early 1980s the World Bank initiated a structural adjustment-lending program to help developing countries out of economic crises into which external shocks and macroeconomic mismanagement had plunged them. In 1996, the Bank conducted a study entitled "Fiscal Management in Adjustment Lending" to assess how well Bank-supported fiscal adjustment worked on how loan performance can be improved in future operations. The study's findings can be summarized as follows:

1. Deficit reduction leads to improved external balance and stimulated growth. Because fiscal deficits contribute to many economic ills (inflation, credit shortages, and current account imbalances), they can crowd out private investment and hurt economic growth. The data confirm that while other conditions are necessary for growth, good fiscal management helps. The data also indicate a strong association between improvements in fiscal deficits and current account deficits.
2. Sustained deficit reduction was achieved primarily through revenue enhancements and to a lesser extent through reductions in capital spending. Targeted reductions in current expenditure proved to be more elusive. Fiscal adjustments were not sustained in countries that reduced their deficits through short-term shifts in revenue or

expenditure. Most countries that made fiscal improvements over the longer term did so by increasing revenue through broadening tax bases and simplifying tax systems.

Table (5-10) shows the actual government budget in Saudi Arabia for the 1969-1997 period. Looking more closely at the numbers presented in this table, it may be observed that the revenue showed a volatile trend. During 1974, 95% of total revenues were comprised of oil revenues, while in 1997, 78% of total revenues were generated from oil revenues. Even with the improvement in non-oil revenues, oil revenues still represent a significant share and hence would fluctuate in line with fluctuating oil prices. It is important to note that total revenue for 1994 is just 35% of total revenues for 1981. The expenditure section of the government budget shows that total expenditures increased during the 1970s, reaching their peak in 1981, after which they started to decline for the remainder of the 1980s. The expenditure increased again in 1990 and 1991 due to the Gulf War, and then showed a decline for the rest of the 1990s. The total expenditure in 1994 was just 57% of expenditures in 1981.

The decline in revenues during the 1980s and 1990s has caused the government to cut its expenditure sharply. Infrastructure spending has been cut drastically, with few new projects being commissioned. Cuts in education and health budgets largely reflect in a decline in capital expenditure on new schools and hospitals. To keep expenditures to a minimum, the government has had to borrow to finance the gap between the remaining expenditures and the revenues. The absence of a well-developed domestic capital market makes the government rely on borrowing from the banking system and public financial funds to meet its financing requirements. The government also imposes fees for public goods and services to increase its revenue.

Table 5-10.
Actual Government Budget (in Millions of Saudi Riyals)

Year	Revenues			Expenditures	Surplus (+) / Deficit (-)
	Oil	Other	Total	Total	
1969	5,119	549	5,668	6,079	-411
1970	7,122	818	7,940	6,418	1,522
1971	9,685	1,435	11,120	8,303	2,817
1972	13,480	1,888	15,368	10,148	5,220
1973	39,285	2,420	41,705	18,595	23,110
1974	94,190	5,913	100,103	32,038	68,065
1975	93,481	9,903	103,384	81,784	21,600
1976	121,191	14,766	135,957	128,273	7,684
1977	114,042	16,617	130,659	138,048	-7,389
1978	115,078	16,427	131,505	147,971	-16,466
1979	189,295	21,901	211,196	188,363	22,833
1980	319,305	28,795	348,100	236,570	111,530
1981	328,594	39,412	368,006	284,650	83,356
1982	186,006	60,176	246,182	244,912	1,270
1983	145,123	61,296	206,419	230,185	-23,766
1984	121,348	50,161	171,509	216,363	-44,854
1985	88,425	45,140	133,565	184,004	-50,439
1986	42,464	34,034	76,498	137,422	-60,924
1987	67,405	36,406	103,811	173,526	-69,715
1988	48,400	36,200	84,600	134,850	-50,250
1989	75,900	38,700	114,600	149,500	-34,900
1990	118,142	36,579	154,721	210,430	-55,709
1991	124,879	37,000	161,879	266,370	-104,491
1992	127,077	38,308	165,385	232,545	-67,160
1993	105,976	35,469	141,445	205,496	-64,051
1994	95,505	33,486	128,991	163,776	-34,785
1995	105,728	40,772	146,500	173,945	-27,445
1996	135,982	43,103	179,085	198,117	-19,032
1997	159,985	45,515	205,500	221,272	-15,772

Source: SAMA

This shows that the government has been dealing with the sharp decline in revenues caused mainly by the fluctuation in oil prices in three ways. The first one is the reduction on its expenditures to a minimum level. The second way is financing the gap

between revenues and expenditures by borrowing from the domestic market. The government has been borrowing heavily and its total debt has reached almost 100% of the GDP. The third one, which has been used to a lesser extent to generate revenue, is imposing fees for public services.

The question is, should the government continue with these policies to cope with the fluctuation in revenues? The government of Saudi Arabia has contributed to the economic development and rapid economic growth both directly and indirectly, and must continue to do so. The current expenditures are already at a minimum level. Therefore, any cut in expenditures will impair the economic growth and hurt all social programs that target low-income citizens. The second policy that has been used, borrowing to finance expenditures, is not without limitations. The government's debt has reached almost 100% of the GDP. The government therefore, cannot continue borrowing and accumulating debt indefinitely.

The third policy that has been used with less weight is the hiking of the fees for public services. The government has used this method to generate more revenue since it is easy to implement and control. This kind of hidden tax does not discriminate between who is paying the tax and does not account for the economic impact. As an example, in 1999 the government increased the price of gas sold in the kingdom. Since the gas is considered a necessity good, the burden of this kind of tax will be on the low-income people and its impact on the economy is unclear. In conclusion, all these policies are not appropriate to deal with sharp declines in revenues caused by the fluctuation in oil prices.

In order to keep the budget deficit under control, and since the deficit is mostly caused by the decline in oil revenues, the government of Saudi Arabia must diversify its

revenues through a new tax system instead of relying only on fees. The tax system must take into account social equity. Taxes should be levied in a fair and equitable manner. In other words, the tax burden should not be on the low-income people. More studies are needed to determine what kind of taxes (such as income or sales taxes) to apply and how to implement them, in order to maximize the social benefits.

5.5.2. Import-Export Prices Alteration Policies

The prices of imports and exports can be changed through three channels. The first channel is by changing the relative price of exports to imports i.e., changing the terms of trade. The second is through changes in the real exchange rate by changing the general price levels (inflation or deflation) or changing the nominal exchange rate. The third one is by using trade barriers such as tariffs and quotas. The changes in import or export prices will influence the quantities of imports or exports and will have an immediate impact on the current account position. Therefore, these kinds of policies can be used as short-term policies to cope with current account fluctuations. These policies will be discussed and evaluated to determine which ones can be used to deal with Saudi Arabia's current account imbalances.

A). Terms of Trade

Terms of trade are defined as the price of the goods a country initially exports divided by the price of the goods it initially imports. Oil constitutes the principle export of Saudi Arabia. In 1996, oil made up 89% of the total value of exported goods. In chapter two, Table (2-2) showed Saudi Arabia's oil production, exports and prices. The

price was just $2.70 per barrel in 1973 before increasing sharply in 1974 to $9.76 per barrel. The price continued to increase until it reached its peak at $34.22 per barrel in 1981. Since then, the oil price has fallen to finally stabilize in the high teens. This sharp fluctuation in oil price led to sharp fluctuations in the terms of trade.

The empirical results of the variance decomposition show that on average 10.5% of the current account deficit is caused by deterioration in terms of trade. The terms of trade is the third largest factor to have an impact on the current account position in Saudi Arabia after government budget balance and money stock. Therefore, it can be used as a short-term policy to correct the current account imbalances. Since the import prices are not under the control of the policy makers, the only components of terms of trade that can be influenced are the export prices, specifically the price of oil.

At the end of 1998, the oil prices plunged to the low teens. The prices remained at that level until the end of the spring of 1999 when Saudi Arabia and two other oil-exporting countries intervened in the oil market. Saudi Arabia, Venezuela, and Mexico agreed to reduce the oil exports in order to keep the price of oil at its real value level, not market level. The oil prices have improved since. After the spring correction in the oil prices, the terms of trade improved, and consequently the current account balance. This shows how the government can influence the terms of trade and reduce the deficit in the current account. The question is, can this kind of policy succeed in the long-term? History has shown that this is not the case. Oil–exporting countries, both members and non-members of the OPEC have the tendency to deceive and collapse any agreement. Therefore, policy makers should not rely on this as a means of managing the current account imbalances in the long run.

B). Real Exchange Rate

Real exchange rate defined as the nominal exchange rate times the foreign general price level to home general price level, is one of the essential instruments for adjusting the current account imbalances. Real exchange rate changes affect the current account because they reflect changes in prices of domestic goods and services relative to foreign countries. An increase in the real exchange rate (depreciation or devaluation) tends to decrease the demand for imports and increases the foreign demand for exports, since the domestic goods and services are less expensive than foreign ones. This leads to an increase in net exports of domestic goods and services abroad and therefore to a current account improvement.

Saudi Arabia's monetary authority pegs the Saudi currency (Riyal) to the U.S. dollar and guaranties full conversion of its currency to any hard currency. In other words, it has an open foreign exchange market without any exchange controls. To sustain the nominal anchor, the authorities have the obligation to convert local currency to foreign currency at the price set at any time to defend the peg during periods of speculative pressures. At the end of 1993, end of 1994 and during the summer of 1998, the authority defended the Saudi Riyal against speculative pressure. With foreign exchange accumulated from exporting oil (the oil is owned by the government) and a closed stock market (no hot money), the monetary authority faced less pressure defending the currency than in the South East Asian countries, which could not keep their exchange rate from devaluation in 1997.

The empirical results show a weak relation between the real exchange rate and the current account, which is not a surprising outcome. As it has been argued in section (5.2),

the current account is determined independently from the real exchange rate in Saudi Arabia for the following reasons: First, the nominal exchange rate is fixed against the U.S. dollar and never changes sharply. The monetary authority has been adjusting the exchange rate gradually and only when it is needed. It ranged between 4.5 and 3.5 Riyals per U.S. dollar during the period of the study, settling at 3.75 for the last thirteen years. Therefore, its impact on the real exchange rate is reduced. The second reason is that the general price level, which is part of the real exchange rate, does not have any impact on the quantity of oil exports. The international oil market determines the oil prices and the quantity demanded. Therefore, the change in Saudi Arabia's general price level will not have an impact on the quantity of exports. The third reason is that most of Saudi Arabia's imports are necessity goods, which may not be affected by an increase in the price of imports.

The real exchange rate can be used by policy makers in Saudi Arabia as an adjusting instrument of the current account in two different ways. The first one is to keep the exchange rate fixed and to devalue the currency when there is a current account deficit. The second one is to let the exchange rate float.

The usefulness of the exchange rate devaluation varies considerably from country to country depending on the degree of elasticity and diversification of the economy concerned. For instance, if the world market determines export prices and there are no close domestic substitutes for imports, the exchange rate changes needed to secure equilibrium in the current account will be large. The exchange rate variability will have a negative impact on domestic objects such as investment promotion and income distribution (Dell and Lawrence, 1981). Since the demand for imports in Saudi Arabia is

inelastic (there are almost no domestic substitutes for the products imported) and export prices (oil and petrochemicals) are determined by the international market, the exchange rate devaluation policy is not a good option to correct the deficits in the current account.

As international currency prices erupted in the late 1960s, most economists began advocating greater flexibility of exchange rates. Many argued that a system of floating exchange rates would not only automatically ensure exchange rate flexibility but would produce several other benefits for the world economy (Krugman and Obstfeld, 1994). The opponents of the flexible exchange rate system argued that since the end of the Bretton Woods system, the exchange rates are not stable. The inherent instability of the flexible exchange rate may lead to negative effects on the country's internal and external balance. The supporters of flexibility argued that the simple fact that exchange rates have not been stable does not mean that a flexible exchange rate system does not work properly. A volatile exchange rate may also be due to volatile fundamentals. In this case, they reduce distortion rather than increase it (Elger, 1996).

In the Saudi Arabian case, the same reasons that have been used against the devaluation as an instrument of improving the current account position can also be used against the floating exchange rate. With much needed structural changes in the economy such as the diversification of exports, and the inevitable changes in the economy due to globalization such as opening of the financial and stock markets to foreign investors (indeed the government of Saudi Arabia, on November 1999, allowed foreign investors to invest in the stock market through mutual funds), the authority should consider moving to a flexible exchange. The advantages of having a flexible exchange rate will not only help to stabilize the external balance, but will help Saudi Arabia's exports to compete in the

global market and to remove distortions in the domestic economy created by fixing the price of domestic currency. The impact of the sharp fluctuation in the floating exchange rate is reduced by the latest development of future markets. "If the exchange rate moves regularly, banks and firms will have incentives to hedge their foreign exposures, and they will then posses insurance against the negative financial effects of unexpected large currency fluctuations if and when these occur (Eichengreen, 1999, p. 105)."

C). Trade Barriers

Restrictions on trade such as tariffs and import quotas are often used as a means of tackling current account pressures. In fact, these restrictions may compound the problem of imbalances in the current account instead of solving them.

> Several considerations may make tariffs and quotas less effective than broader policy actions as a means of reducing a current account deficit. When they are applied broadly enough to affect import prices generally, they focus domestic demand on domestic goods and can cause competition for labor and capital that could raise the prices of all domestically produced goods, including exports. The potential in export prices could cause the real exchange rate to appreciate and could offset some of the reduction in the current account deficit that would otherwise be caused by increase in trade restrictions (Congressional Budget Office, 1989, p.32).

Since most of Saudi Arabia's imported goods are necessity and capital goods, imposing tariffs will lead to a rise in prices but not to a reduction in the quantity of imports. Therefore, tariffs may increase the deficit when the current account is calculated in domestic currency. Saudi Arabia is in negotiations with the World Trade Organization

(WTO) in order to become a member and one of the essential principles of the WTO is to liberate trade. For these reasons and given the recent trends worldwide towards freer trade, doubts exist regarding the practicality of this policy as a means of managing current account imbalances in Saudi Arabia.

5.5.3. Structural Reforms

The austerity and changes in relative prices of export to import policies may help to manage the current account imbalances in the short term. In the long term, structural reforms are the only solution. The structural reforms in the sector that have a direct impact on the current account imbalances will be addressed. This does not mean that these are the only sectors that need to be reformed to keep economic prosperity in Saudi Arabia and indirectly help to reduce the imbalances in the current account.

A). Diversification of Exports

A major concern for developing countries is the problems associated with the fluctuation in their export revenues. Most developing countries rely on primary products for their export earnings. The price and demand of some of these primary products (agricultural) has risen at generally slow rates, while some others (fuel and some minerals) have been sensitive to short-term fluctuations. The slow-down of export-earnings and often-sharp fluctuations lead to the existent current account imbalances in most developing countries. Many of these developing countries have tried to diversify their economies by following different strategies such as import-substitution (inward looking) and export-promotion (outward looking).

The import-substitution strategy has been used by some developing countries to eliminate the deficits in the current account and to promote domestic growth. It entails an attempt to replace commodities that are being imported with domestic sources of production. The typical strategy is first to erect tariff barriers or quotas on certain imported commodities, then try to set up local industries to manufacture those goods. The main argument behind this policy is that of the infant industry. The supporters of this policy argue that in order to be able to reap the benefits of large-scale production and lower costs the newly established industry must be protected from foreign competitors until it grows and is able to compete. The import-substitution policy even with its theoretical appeal is difficult to implement in real life. Nowadays with the new economic order, this policy is no longer an option for developing countries.

In his book "The Wealth of Nations" Adam Smith recognized that the export markets would permit the factories to produce more of any single item and thus specialize more than if they produced only for the home market. If industrial productivity improves with practice, learning by doing can be accelerated by more rapid growth of production through exports. Greater exposure to world markets enhances the opportunities to observe and adapt new technologies. Seven countries in Asia (South Korea, Taiwan, Hong Kong, Singapore, Indonesia, Malaysia, and Thailand) have set the pace for the rest of the developing world in using outward-looking strategies to stimulate rapid growth and industrialization (Gillis et al., 1996).

Export-promotion is a widely used and often recommended policy by international financial organizations such as the World Bank and the IMF. The export-diversification can tackle the problem of export instability and achieve higher rates of

export growth. A well-diversified export-based economy leads to more stable revenues and less current account imbalances. Some may argue that relying on export-led growth strategies is dangerous because of what happened to those Asian countries late in 1997. This is not a valid argument, however, since the cause of the crisis was not the export-promotion policy. What must be known is that the core idea behind an outward-looking trade strategy is that producers of exports must become competitive through market incentives. A government pursuing this strategy has to play the government's role and not to intervene in the production process.

Saudi Arabia generates most of its revenue from the export of crude oil. In 1997, the value of oil exports was $52,132 million or 88% of the total value of exported goods (all other exports account for only $7,340 million or 12% of the total value of exports). On the other hand, other exports have steady rising trends due to the kingdom's policy aimed at diversifying its exports to reduce reliance on oil exports and make non-oil exports more attractive to world markets. The rapid expansion of non-oil exports has coincided with the development of the petrochemical sector by the government, which constitutes $2,643 million or 36% of the total value of non-oil exports. Even with the improvement in non-oil exports, oil is still the dominant export in Saudi Arabia.

The Saudi Arabian government's objective of transforming the economy from an oil-export dependent one into a diversified economy began in the formal process two decades ago. It assigned the manufacturing sector a large role to play in moving towards the objective of diversification. In 1974, the government announced the main principles of its industrial development policy, the primary one being to stimulate and expand those manufacturing industries that could effectively contribute to an increase in the national

income, a rise in the standard of living and the levels of employment, and a broader diversification of the Saudi economy (Saufi and Mayer, 1991). The major objective of all development plans (1970-2000) was the creation of a modern and diversified economic base capable of sustaining future economic growth.

The government's main effort of diversification of exports has been to concentrate on establishing energy-intensive industries, particularly the petrochemical industries, and the oil refineries. "Despite their strong commitment to improve export-diversification, economic policy-makers in Saudi Arabia have not tried any systematic attempt to analyze directly the extent to which diversification may lead to greater stability in export proceeds (Al-Hasan, 1997, p. 2)." While Saudi Arabia has a comparative advantage in oil-related industries such as petrochemicals, it cannot rely on it as a means of exports diversification since the price of petrochemicals tends to fluctuate along with the price of oil. The only option is to let the private sector take the lead in diversifying the exports.

Indeed the government has recognized the important role of the private sector in diversifying the economy. Private sector expansion is one of the central themes of the sixth development plan (1995-2000). Unfortunately, the role of the private sector in the diversification of exports has been growing at a slow rate. Most of the private sector businesses are limited to small-scale manufacturing and commercial activities. The government must play an active role in strengthening the private sector. The private sector's role can be reinforced and extended through the following alternatives:

1. The public and private economic institutions and organizations should help the private sector find suitable industries for exports. They should investigate and study the appropriate projects that can successfully compete in international markets. To sustain profitability and competition these studies must take into account the kingdom's unique case. An example is the short supply of water in the region. Industries with large water requirements should therefore be eliminated from consideration.

   Entry into foreign markets or even maintaining existing positions in these markets is difficult without understanding consumer needs and the overall supply and demand conditions in these markets. Therefore, exporters must have this information on hand. The chambers of commerce and industry have been making efforts to provide information about the international market. Their efforts and those of other private organizations should be encouraged and extended.

2. The government must support export-oriented industries by giving them priority in obtaining loans from the Saudi Industrial Development Fund and eliminate any tariffs on importing capital goods or raw materials that will be used in export industries.
3. Most Saudi businesses are small and family-owned, engaging in local trade. To support domestic industries, especially those export-oriented, the Saudi government should encourage the small merchants to move into the industrial sector and form public companies.
4. The regional cooperation in industry may avail the region of the critical mass or scale needed to produce a diversified vector of goods economically (Kubursi, 1984). As the first steps for the Arabic countries economic integration, the Saudi Arabian

government and other countries in the Arabian Peninsula must integrate their economies if they want to survive in the midst of globalization. Industries in the region should be encouraged to expand their markets and merge with others in the region to form large-scale industries.

5. Foreign direct investment (FDI) plays an important role in accumulating economic growth and exports diversification in developing countries. In his study of the determinants of foreign direct investment and its economic impact, Bardesi (1998) found that FDI stimulates Saudi Arabia's non-oil exports and creates structural changes in the nature of the country's exports. Therefore, Saudi Arabia should make an effort to attract more foreign investment. Indeed, the Ministry of Industry and Electricity is addressing the failure of the kingdom to attract greater foreign direct investment by promising to change the old laws and regulations of foreign investment. One of the obstacles for foreign direct investment in Saudi Arabia is the requirement that joint ventures must be at least 51% Saudi-owned in order to qualify as a Saudi company. Any new foreign investment law must address this problem if it wants to attract foreign investors.
6. The government should maintain reasonable macroeconomic policies in order to avoid hurting export industries. For example, a faster increase in domestic prices and costs than the world averages may hurt domestic export industries' competitiveness in the international market and discourage exports, especially if the nominal exchange rate does not change to offset the changes in the general prices.

B). Reforming the Labor Market

The increase in Saudi Arabia's oil revenues during the early 1970s allowed the kingdom to proceed with massive development efforts. The main problem the kingdom faced at the time was the severe shortage of Saudi labor. Therefore, the policy makers allowed domestic employers to temporarily hire foreign workers. The country's rapid economic development of the last thirty years would have been impossible without the expatriate labor.

The open door for foreign workers policy was intended to be a temporary solution, which would be eliminated after the shortage of labor disappeared. Nowadays, the need for these workers has started to diminish with the increase in the supply of Saudi labor, which is more skilled and educated than its foreign counterpart. In its 1998 report, SAMA states:

> In recognizing that human beings are the ends and means of development, the kingdom has accorded special importance to the human resources sector in its development plans. It has given considerable attention to the fields of education and training. To this effect general schools, which receive increasing numbers of students every year have been constructed, and technical colleges and institutes have also been established to satisfy the kingdom's needs for skilled labor. In addition universities, higher institutes and specialized colleges have been set up and equipped with the latest scientific and technologic apparatus and equipment. All of these institutions have been receiving increasing enrollment and the number of graduates has been rising every year (SAMA, 1998, p.202).

Unfortunately, the increase in Saudi labor availability has not resulted in a decrease in foreign workers. In 1991, the number of foreign workers was 4.32 million, increasing to 6.33 million in 1996.

The economic and social effects of the large number of expatriates are difficult to overstate. The unnecessary fraction of them causes a high unemployment rate among the Saudi work force and constrains the government from providing social and infrastructure services for its citizens. The most important effect of the foreign workers to our study is their remittances. A high percentage of their income is transferred to their home countries, creating a burden on the Saudi Arabian current account. The services and transfers section of the Saudi current account have recorded a deficit for the entire period of study (1964-1997). The main cause of this is the private transfers, which constitute mostly foreign workers' remittances. In 1994 those remittances reached 15% of the GDP.

In his comprehensive study entitled "Towards Strategic Planning for Indigenizing the Workforce in the Saudi Arabian Private Sector", Alturaigi (1997) found out that the low cost of employment, the ease of managing, and the ease of hiring and firing them were the major reasons for employment of expatriates by the Saudi private sector. The short supply of qualified manpower was found to be an important, but secondary, reason for the existing workforce dilemma. Alturaigi's study revealed why the private sector relies and wants to continue relying on the foreign workers, which can be summarized as pure profit maximization by the private sector.

The government of Saudi Arabia has been making some efforts to solve the problem. Since the 1980s, the Saudization policy implemented by the authorities require a percentage of Saudi workers to be employed by large businesses, which should increase

every year until it reaches 100% Saudi. This policy for Saudization of the labor market has been a failure since it is easier for the private sector to manipulate and infringe the rules. The majority of economists have asked for stronger policies to solve what is considered to be the biggest economic and social problem facing Saudi Arabia today. One of the policies proposed is establishing a limit on the allowed immigration of expatriates, which is difficult to implement since it can be manipulated as the required percentage policy has been. The other policy that has been proposed is to tax the employers for hiring foreign workers, which may be considered as the best solution.

The Saudization policies have been rejected by the businessmen, who continue to do so arguing that the policies will hurt their ability to compete with foreign countries in domestic and international markets since they must replace the lower wages of foreign labor with the higher costs of Saudi labor. It is true that saudization will decrease their profit margin, but what is not true is that employing Saudi labor will decrease their ability to compete with foreign companies. Saudi workers are now more educated and skilled than before. Through practice and workplace training, their skills will increase and they will have ability equal or superior to foreign workers to compete in the global market.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

As with many other oil exporting countries, Saudi Arabia has experienced wide variations in export proceeds leading, along with other factors such as government balance and money stock, to sharp fluctuations in its current account balance. For the period of 1969-1982, with the exception of 1969 and 1978, the current account was in surplus, reaching 58.7% of the GDP in 1978. However, for the period of 1983-1997, the current account was predominantly in deficit, reaching its highest recorded level of -23.4% of the GDP in 1991. The sharp fluctuations in the current account balance have made it difficult for Saudi planners and policy makers to adopt appropriate economic policies that will promote economic growth.

The empirical investigations of the current account imbalance have been based mainly on two approaches: the conventional approach and the intertemporal optimization approach. The conventional approach is performed within the framework of the neo-Keynesian theory of income determination in an open economy. In this approach, the current account of a country is assumed to be a function of factors underlying the determination of income such as fiscal and monetary policy, terms of trade, real exchange rate, and foreign income. On the other hand, the intertemporal optimization approach to the current account, which is based on the neoclassical theory, takes into consideration

temporal and intertemporal budget constraints and forward looking behavior. The expectation of future productivity growth, government spending, and real interest rates play a crucial role in determining the current account position.

In this study both approaches to investigate the current account balance in Saudi Arabia have been used, in order to assist Saudi planners and policy makers in making appropriate decisions regarding the current account imbalances. The intertemporal optimization approach was used to determine if the current account imbalances are excessive under the neoclassical assumptions. The conventional approach on the other hand, was used to determine the factors that cause the current account variability under the assumptions of the neo-Keynesian theory.

The intertemporal approach was performed using the present value of the current account method, which is based on the consumption smoothing theory. The estimation results showed that the model fit perfectly the data of the current account in Saudi Arabia for the period of 1969-1997. The statistical results (Granger-causality test, formal test, and equality of variance test) in combination with the chart illustrating both the movements of the actual and the optimal current account balance, suggest that the model captures the statistically important aspects of the current account behavior in Saudi Arabia. According to the intertemporal theorists, the widening in the external deficit or surplus would not be a cause for concern because it would be justified on the basis of the economic fundamentals captured by the model. Hence, there is no need for policies to deal with the deficit or the surplus in the Saudi Arabian current account since they are the result of maximization behavior by both the individuals and the government.

One of the arguments of this study is that widening external deficits may pose risks in the event of unfavorable shocks in Saudi Arabia even if the surplus and deficits in the current account during the period of the study were the result of optimization behavior. The factors that may affect the risks associated with running a large external deficit in Saudi Arabia are: (1) single commodity export economy; (2) high degree of the openness of the economy; (3) the composition of the current account; (4) oil price fluctuations and the uncertainty of the quantity of oil exported; and (5) the growth in imported goods due to a population boom. For these reasons, this study has suggested that the government needs to be in a state of alert to set appropriate policies required to deal with any sudden problems that may arise in the current account position.

In order to assist Saudi planers and policy makers in taking appropriate measures in dealing with imbalances in the current account, it is necessary to determine the variables that would have the greatest impact on the current account balance. The conventional view is that the domestic policy responses such as government spending and monetary policy, as well as the external shocks such as exchange rate and terms of trade, play a major role in determining the current account variability. In chapter five, the factors that may have a significant influence on the current account position in Saudi Arabia, have been specified and discussed. These factors are (1) terms of trade; (2) government budget balance; (3) money stock; (4) real exchange rate; (5) domestic investment; and (6) private consumption.

To investigate empirically the relative impact of each of the above-mentioned variables on the current account position of Saudi Arabia, an appropriate model to carry out the test has been researched. A single equation regression model was considered, but

since there is a high correlation between the current account and the other variables, which may give imprecise results, it was ruled out. The most widely used model to test this kind of relations is the simultaneous equations and vector autorregression (VAR). The theoretical links between the current account balance in Saudi Arabia and its underlying determinants are complicated by a number of direct and indirect channels that cannot be explained using only the economic theory. The complexity of the links makes it difficult to estimate these channels by using the structural model without running the risk of misspecification bias. Therefore, the VAR was chosen since it does not require the complete specification of an underlying theoretical model and because of the dynamic nature of the relationship between these variables.

The following three tests were used to evaluate the VAR model: the Granger causality test, the variance decomposition test, and the impulse response functions test. The empirical results revealed that fiscal policies, monetary policies, and terms of trade have a strong effect on the current account variability in Saudi Arabia, whereas private consumption, domestic investment, and real exchange rate effects are weak. These results confirm the great role that oil prices and government policies play on the current account position in Saudi Arabia. The impact of government fiscal policy is consistent with the neo-Keynesian model of a small open economy with a fixed exchange rate, while the money stock is not. The results show that the money stock (supply) has a negative impact on the current account while the model predicts that the money supply will be neutral with a fixed exchange rate.

Hence, the most powerful factors causing changes in the current account position in Saudi Arabia are government budget balance, money stock, and terms of trade. Since

these factors have a temporary effect on the current account, the policy makers can use them to manage the current account imbalances in the short term only. For the long term, a structural adjustment in the economy is the only solution. In chapter five, the short and long-term policies were discussed and evaluated using the descriptive, analytical, and empirical analyses presented in this study. These policies can be summarized as follows:

1. Austerity Policies

The results of the variance decomposition test show that on average 32% of the current account deficit is due to the budget deficit, and that 20% of the deficit in the current account is caused by an increase in money stock. Therefore, tightening the fiscal position is the main policy that can be used to deal with the current account imbalances in the short term. It has been argued that since the budget deficit is mostly caused by the decline in oil revenues, the government of Saudi Arabia must diversify its revenues through a new tax system instead of relying only on fees and cutting expenditures which are at their minimum levels. The tax system must take into account social equity. Taxes should be levied in a fair and equitable manner.

2. Import-Export Prices Alteration Policies

The prices of imports and exports can be changed through three channels. The first is by changing the relative price of exports to imports, i.e., by changing the terms of trade. The second is through changes in the real exchange rate by changing the general price levels (inflation or deflation) or changing the nominal exchange rate. The third one is by using trade barriers such as tariffs and quotas. The changes in import or export

prices will influence the quantities of imports or exports and will have an immediate impact on the current account position.

The empirical results of the variance decomposition show that on average 10.5% of the current account deficit is caused by deterioration in the terms of trade. The terms of trade is the third largest factor to have an impact on the current account position in Saudi Arabia after government budget balance and money stock. Improving the terms of trade can be achieved through supporting the oil prices to be at their real value levels by all oil-exporting countries. But history has shown that this is not the case. Oil–exporting countries, both members and non-members of the OPEC, have the tendency to deceive and collapse any agreement. Therefore, policy makers should not rely on this as a means of managing the current account imbalances.

Policy makers can use the real exchange as an adjusting instrument of the current account in two different ways. The first one is to keep the exchange rate fixed and to devalue the currency when there is a current account deficit. The second one is to let the exchange rate float. Since the demand for imports in Saudi Arabia is inelastic (there are almost no domestic substitutes for the products imported) and export prices (oil and petrochemicals) are determined by the international market, the exchange rate devaluation policy is not a good option to correct the deficits in the current account. The same reasons that have been used against the devaluation as an instrument for improving the current account position can also be used against the floating exchange rate. But with most needed structural changes in the economy such as the diversification of exports and the inevitable changes in the economy due to globalization such as opening of the

financial and stock markets to foreign investors, the authorities should consider moving to a flexible exchange rate.

Saudi Arabia's imported goods are necessity and capital goods; imposing tariffs will lead to a rise in prices but not to a reduction in the quantity of imports. Therefore, tariffs may increase the deficit when the current account is calculated in domestic currency. Saudi Arabia is in negotiations with the World Trade Organization (WTO) in order to become a member and one of the essential principles of the WTO is to liberate trade. For these reasons and given the recent worldwide trends towards freer trade, doubts exist regarding the practicality of this policy as means of managing current account imbalances in Saudi Arabia.

3. Structural Reforms

A. Diversification of Exports

Saudi Arabia generates most of its revenue from the export of crude oil. In 1997, the value of oil exports was $52,132 million or 88% of the total value of exported goods (all other exports account for only $7,340 million or 12% of the total value of exports). On the other hand, other exports have steady rising trends due to the kingdom's export-diversification policy aimed at reducing reliance on oil exports and make non-oil exports more attractive to world markets. The rapid expansion of non-oil exports has coincided with the development of the petrochemical sector by the government, which constitutes $2,643 million or 36% of the total value of non-oil exports. Even with the improvement in non-oil exports, oil is still Saudi Arabia's dominant export.

The government's main efforts toward export-diversification have concentrated on establishing energy-intensive industries, particularly the petrochemical industries, and oil refineries. "Despite their strong commitment to improve export-diversification, economic policy-makers in Saudi Arabia have not tried any systematic attempt to analyze directly the extent to which diversification may lead to greater stability in export proceeds (Al-Hasan, 1997, p. 2). While Saudi Arabia has a comparative advantage in oil-related industries such as petrochemicals, it cannot rely on these as a means of export diversification since petrochemical prices tend to fluctuate along with the oil prices. The only option is to let the private sector take the lead in diversifying the exports. The private sector's role can be reinforced and extended in the following ways:

1. Public and private economic institutions and organizations should help the private sector find suitable industries for exports and provide the exporters with the information needed about the international market.
2. The government must support export-oriented industries by giving priority in obtaining loans from the Saudi Industrial Development Fund and eliminate any tariffs on importing capital goods or raw materials that will be used in export industries.
3. Since most Saudi businesses are small and family-owned, engaging in local trade, in order to support domestic industries, especially those which are export-oriented, the Saudi government should encourage the small merchants to move into the industrial sector and form public companies.

4. Industries in the region should be encouraged to expand their markets and merge with others to form large-scale industries if they want to survive in the midst of globalization.
5. Foreign direct investment (FDI) plays an important role in accumulating economic growth and exports diversification in developing countries. Therefore, Saudi Arabia should make an effort to attract more foreign investment.
6. The government should maintain reasonable macroeconomic policies to avoid hurting export industries.

B). Reforming the Labor Market

The economic and social effects of the large number of expatriates in Saudi Arabia are difficult to overstate. The unnecessary fraction of them causes a high unemployment rate among the Saudi work force and constrains the government from providing social and infrastructure services for its citizens. The most important effect of the foreign workers to our study is their remittances. A high percentage of their income is transferred to their home countries, creating a burden on the Saudi Arabian current account. The services and transfers section of the Saudi current account have recorded a deficit for the entire period of study (1964-1997). The main cause of the deficit is the private transfers, which constitute mostly foreign workers' remittances, which reached 15% of the GDP in 1994.

The government of Saudi Arabia has been working towards solving this problem. Since the 1980s, the government has implemented a 'Saudization' policy requiring a percentage of Saudi workers to be employed by large businesses. Such percentage should

increase every year until it reaches 100% Saudi. This policy for 'Saudization' of the labor market has been a failure since it is easier for the private sector to manipulate and infringe the rules. The majority of economists have asked for stronger policies to solve what is considered to be the biggest economic and social problem facing Saudi Arabia today. One of the policies proposed is establishing a limit on the allowed immigration of expatriates, which is difficult to implement since it can be manipulated as the required percentage policy has been. Another policy that has been proposed, and that may be considered a better solution, is to tax the employers for hiring foreign workers.

In sum, this study showed that the current account imbalances in Saudi Arabia were not excessive during the period of study (1969-1997) under the neoclassical assumptions, and therefore would not be a cause of concern. It was argued that widening external deficits in Saudi Arabia might pose risks in the event of unfavorable shocks. In order to assist Saudi planners and policy makers, the variables that have an impact on the current account using the conventional assumptions have been determined. It was found that government budget balance, the money stock and the terms of trade have the greatest impact on the current account. These factors can be used to deal with the current account imbalances in the short term, but in the long term, diversification of exports and reform of the labor market are the most important policies that need to be implemented.

REFERENCES

Abell, J. D. (1990). "Twin Deficits During the 1980s: An Empirical Investigation." *Journal of Macroeconomics*, 12(1): 81-96.

Agenor, P. R., C. Bismut, et al. (1995). "Consumption Smoothing and the Current Account: Evidence for France, 1970-94." Washington, D.C., International Monetary Fund.

Ahmed, Shaghil. (1986) "Temporary and Permanent Government Spending in an Open Economy." *Journal of Monetary Economics*, 17: 197-224.

Al-Hasan, Z. F. (1997). *Export Instability and the Optimum Export Diversification: The Case of Saudi Arabia*. Ph.D. Dissertation, Lincoln, Nebraska: University of Nebraska.

Albazai, Hamad S. (1991). *Econometric Modelling of Consumption Behavior in Saudi Arabia: An Error Correction Approach*. Ph.D. Dissertation, Fort Collins, Colorado: Colorado State University.

Ali, M. Showkat. (1996). *Capital Flows and the Structural Determinants of Current Account Variability in an Open Economy: an Empirical Analysis*. Ph.D. Dissertation, New York, New York: Fordham University.

Alturaigi, A. S. (1997). *Towards Strategic Planning for Indigenizing the Workforce in the Saudi Arabian Private Sector*. Engineering Management. Ph.D. Dissertation, Rolla, Missouri: University of Missouri.

Atesoglu, H. S. and D. H. Dutkowsky (1997). "On the Dynamics of Balance of Payments Constrained Growth." *Applied Economics*, 29: 1343-1351.

Bahmani-Oskooee, M. (1985). "Devaluation of the J-Curve: Some Evidence from LDCs." *The Review of Economics and Statistics*, 67 (3): 500-504.

Bardesi, H. J. (1998). *The Determination of Foreign Direct Investment and its Economic Impacts in Oil Exporting Countries: A Case Study of Saudi Arabia*. Ph.D. Dissertation, Fort Collins, Colorado: Colorado State University.

Campbell, J. Y. (1987). "Does Saving Anticipate Declining Labor Income? An Alternative Test of the Permanent Income Hypothesis." *Econometrica*, 55 (6): 1249-1273.

Campbell, J. Y., and R. J. Shiller. (1987). "Cointegration and Tests of Present Value Models." *Journal of Political Economy*, 95 (5): 1062-1088.

Chinn, M. D.. (1992). "Why Current Account Deficits Still Matter." *World Economy*, 15 (2): 221-230.

Craigwell, R. C., and S. Samaroo. (1997). "Dynamic Modelling of the Current Accounts: Evidence from the Caribbean." *International Economic Journal* 11 (4): 39-50.

Congressional Budget Office. (1989). "Policies for Reducing the Current-Account Deficit." Washington, D.C., Congress of the United States.

Darrat, A. F. (1988). "Have Large Budget Deficits Caused Rising Trade Deficits?" *Southern Economic Journal*, (April): 879-887.

Dell, S. and R. Lawrence (1981). *The Balance of Payments Adjustment Process in Developing Countries*. First Ed. New York, Pergamon Press.

Dluhosch, B., A. Freytag, and M. Kruger. (1996). *International Competitiveness and the Balance of Payments: Do Current Account Deficits Matter?* First Ed. Cheltenham, UK: Edward Elgar Publishing.

Eichengreen, B. (1999). "Toward a New International Financial Architecture: A Practical Post-Asia Agenda." Washington, D.C., Institute for International Economics.

Enders, W., and B. Lee. (1990). "Current Account and Budget Deficits: Twins or Distant Cousins?" *The Review of Economics and Statistics*, 72 (3): 373-381.

Feldstein, M., and C. Horioka. (1980). "Domestic Saving and International Capital Flows." *The Economic Journal* 90 (358): 314-329.

Fry, M. J. (1991). "Long-run and Short-run Behavior of Korea's Current Account." *International Economic Journal*, 5 (4): 93-117.

Genberg, H. and A. K. Swoboda (1989). "Policy and Current Account Determination Under Floating Exchange Rates." *International Monetary Fund Staff Papers*, 36(1): 1-30.

Gillis, M., D. H. Perkins, et al. (1996). *Economics of Development*. Third Ed. New York, W.W. Norton & Company, Inc.

Giraldo, G., and A. J. Mann. (1989). "Latin American External Debt Growth: A Current Account Explanatory Model, 1973-1984." *The Journal of Developing Areas*, 24: 47-58.

Ghosh, A., and Jonathan D. Ostry. (1992). "Macroeconomic Uncertainty, Precautionary Savings and the Current Account." *IMF Working Paper*, WP/92/72, September.

Ghosh, A. R., and Jonathan D. Ostry. (1995). "The Current Account in Developing Countries: A Perspective from the Consumption-Smoothing Approach." *The World Bank Economic Review* 9 (2): 305-333.

Ghosh, A. R. (1995). "International Capital Mobility Amongst the Major Industrialised Countries: Too Little or Too Much?" *The Economic Journal*, (January): 107-128.

Gujarati, D. N. (1995). *Basic Econometrics*. Third Ed. New York, McGraw-Hill, Inc.

Hamam, M. M. (1995). *Budget Deficits and Current Account Balances: a Theoretical and an Empirical Investigation of Their Links in the United States and the United Kingdom*. Ph.D. Dissertation, Washington, D.C.: The American University.

Hooke, G. (1994). "The Exchange Rate, Economic Activity and the Current Account Balance." *Economic Papers (Economic Society of Australia)*, (March 1): 51-67.

Hossain, F. (1995). *Current Account Determination in the Intertemporal Framework: An Empirical Analysis*. Ph.D. Dissertation, Ames, Iowa: Iowa State University.

Howard, D. H. (1989). "Implications of the U.S. Current Account Deficit." *Journal of Economic Perspectives*, 3 (4): 153-165.

International Monetary Fund. (1998). *International Financial Statistics Yearbook*. Washington, D.C.

Johany, A. D., M. Berne, and W. Mixon. (1986). *The Saudi Economy*. Baltimore, Maryland: The Johns Hopkins University Press.

Kearney, C. and M. Monadjemi (1990). "Fiscal Policy and Current Account Performance: International Evidence on the Twin Deficits." *Journal of Macroeconomics*, 12(2): 197-219.

Khan, M. S., and M. D. Knight. (1983). "Determinants of Current Account Balances of Non-Oil Developing Countries in the 1970s." *IMF Staff Papers*, (30), December.

Knight, M., and F. Scacciavillani. (1998). "Current Accounts: What Is Their Relevance for Economic Policymaking?" *IMF Working Paper*, WP/98/71, May.

Krugman, P. R., and M. Obstfeld. (1994). *International Economics: Theory and Policy*. Third Ed. New York: Harper Collins.

Kubursi, A. A. (1984). *Oil, Industrialization & Development in the Arab Gulf States*. First Ed. London, Croom Helm.

Lvssiotou, P. F. (1990). *An Intertemporal Approach to the Current Account: a Theoretical and Empirical Analysis of the Case of Cyprus*. Ph.D. Dissertation, Worcester, Massachusetts, Clark University.

McNees, S. (1986). "Forecasting Accuracy of Alternative Techniques: A Comparison of U.S. Macroeconomic Forecasts." *Journal of Business & Economic Statistics*, 4(1): 5-23.

Miles, M. A. (1979). "The Effects of Devaluation on the Trade Balance and the Balance of Payments: Some New Results." *Journal of Political Economics*, 87 (31): 600-620.

Milesi-Ferretti, G. M., and A. Razin. (1996). "Current Account Sustainability: Selected East Asian and Latin American Experiences." National Bureau of Economic Research, NBER Working Paper (5791), October. Cambridge, Massachusetts.

Murphy, R. G. (1984). "Capital Mobility and the Relationship between Saving and Investment Rates in OECD Countries." *Journal of International Money and Finance*, 3: 327-342.

Obstfeld, M., and K. Rogoff. (1995). "The Intertemporal Approach to the Current Account." In *Handbook of International Economics, vol. III.* Edited by G. Grossman and K. Rogoff. P. 1731-1799. New York: Elsevier.

Obstfeld, M., and K. Rogoff. (1996). *Foundations of International Economics*. First Ed. Cambridge, Massachusetts: The MIT Press.

Ostry, J. D. (1997). "Current Account Imbalances in ASEAN Countries: Are They a Problem?" *IMF Working Paper*, WP/97/51, April.

Otto, G. (1992). "Testing a Present-Value Model of the Current Account: Evidence from US and Canadian Time Series." *Journal of International Money and Finance*, 11: 414-430.

Pastor, M. J. (1989). "Current Account Deficits and Debt Accumulation in Latin America." *Journal of Development Economics*, 31: 77-97.

Pearce, D. W. (1992). *The MIT Dictionary of Modern Economics*. Fourth Ed. Cambridge, Massachusetts, The Macmillan Press.

Pitchford, J. (1995). *The Current Account and Foreign Debt*. First Ed. London: Routledge.

Presley, J. R., and A.J. (1989). Westaway. *A Guide to the Saudi Arabian Economy*. Second Ed. London: MacMillan.

Razin, A. (1993). "The Dynamic-Optimizing Approach to the Current Account: Theory and Evidence." National Bureau of Economic Research, NBER Working Paper (4334), April. Cambridge, Massachusetts.

Roubini, N. (1988). "Current Account and Budget Deficits in an Intertemporal Model of Consumption and Taxation Smoothing. A solution to the "Feldstein-Horioka Puzzle"?" Cambridge, Massachusetts: National Bureau of Economic Research.

Sachs, J. D. (1981). "The Current Account and Macroeconomic Adjustment in the 1970s." *Brookings Papers on Economic Activity*, 1: 201-268.

Sachs, J. (1982). "The Current Account in the Macroeconomic Adjustment Process." *Scandinavian Journal of Economics*, 84 (2): 147-159.

Saudi Arabian Monetary Agency (SAMA). (1998). "Thirty-Fourth Annual Report." Riyadh, Kingdom of Saudi Arabia.

Sheffrin, S. M., and W. T. Woo. (1990) "Present Value Test of an Intertemporal Model of the Current Account." *Journal of International Economics*, 29: 237-253.

Sims, C. (1980). "Macroeconomics and Reality." *Econometrica*, 48(1): 1-48.

Soufi, W. A. and R. T. Mayer (1991). *Saudi Arabian Industrial Investment: An Analysis of Government*. Westport, Quorum Books.

U.S.-Saudi Arabian Business Council. (1999). "The Saudi Arabian Economy." Washington, D.C.

Winner, L.E. (1993). "The Relationship of the Current Account Balance and the Budget Balance." *The American Economist*, 37 (2): 78-84.

World Bank. (1995). "World Tables." Washington, D.C.

World Bank. (1995). *Structural and Sectoral Adjustment. World Bank Experience, 1980-92*. Washington, D.C.

World Bank. (1996). *Fiscal Management in Adjustment Lending*. Washington, D.C.

Zietz, J., and D. K. Pemberton. (1990). "The U.S. Budget and Trade Deficits: A Simultaneous Equation Model." *Southern Economic Journal*, 57 (July): 23-34.