NOTE TO USERS

DISSERTATION

JORDAN'S CURRENT ACCOUNT BEHAVIOR: A STRUCTURAL BREAK APPROACH TO CONSUMPTION-SMOOTHING ANALYSIS

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY KHAWLAH ABDALLA ENTITLED JORDAN'S CURRENT ACCOUNT BEHAVIOR: A STRUCTURAL BREAK APPROACH TO CONSUMPTION-SMOOTHING ANALYSIS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

JORDAN'S CURRENT ACCOUNT BEHAVIOR: A STRUCTURAL BREAK APPROACH TO CONSUMPTION-SMOOTHING ANALYSIS

In recent years the current account behavior has been taken on much concern. The intertemporal approach to the current account is one of the models that tried to explain this behavior and its implications. The imbalances in the current account are interpreted as a sign of disequilibrium in international relations. Jordan as one of the developing countries has suffered from a severe current account imbalances. This study tried to understand the variability of Jordan's current account implying the consumption-smoothing approach with utilizing the structural break model.

Structural change has been one of the major anxieties in economics. Different theories on phases of economic development and growth postulate that an economic relationship changes over time. This dissertation explored the Jordanian current account behavior during the period of 1967-2002.

The intertemporal consumption-smoothing approach to the determination of the current account implies that international capital flows act as a buffer to smooth aggregate consumption in the face of temporary shocks in the economic fundamentals (output, investment, and government spending). The Jordanian current account has been examined empirically using the intertemporal approach to know whether the movement of the current account follows the optimizing behavior.

Using the Gregory and Hansen (1996) residual-based tests for cointegration in models with regime shifts, we get two sub-periods, which represent a potential behavior change between the current account variables. The study evaluated the solvency condition for Jordan's current account, the degree of optimality of the intertemporal consumption-smoothing through current account, and whether its international financial capital flows have been optimal. The study also estimates the optimal consumption-smoothing component for Jordan's current account based on an intertemporal optimization model for the two sub-periods and carries out a hypothesis test to evaluate the performance of the model.

According to the result, the actual consumption-smoothing of Jordan's current account was consistent with optimal smoothing for the later sub-period but not for the earlier one. It also has explained the major structural changes and policies that characterized the period of the study. Moreover, the dissertation tried to suggest policy measures to smooth out the balance of payments disequilibrium.

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To my family:

My supportive husband Mohammed and

My lovely daughters,

Leen and Majd

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CHAPTER ONE

Introduction

The policies toward liberalization of economies affect almost all countries in the world. Moreover, the balance of payments and the current account, as reflective of these policies, determine the degree of a country's integration with the external world. So it is important to study the determination of the external balance, which is usually represented by a country's current account. Current account behavior, thus, is an important topic to explore because it reflects the interdependence between countries. Additionally, it also reflects the government's macroeconomic policies towards imbalances in the external sector. The monetary theory of trade extends the closed economy treatment of traditional questions about the determinants of output, employment and unemployment to an unbalanced trade context (Pitchford, 1995).

Gold Standard Era

The gold standard period (1870-1914) used internal macroeconomic policies to avoid sharp fluctuations in the balance of payments. The balance of payments was viewed not in terms of a current account target, but as a condition in which the central bank maintains its gold stock to support the domestic supply of money. Thus, a deficit or surplus in the balance of payments had to be financed by gold shipments between

countries' central banks. To avoid these large shipments, monetary authorities adopted policies to finance the current and capital accounts together through international lending, thereby minimizing reserve movements.

In the period between World War I and World War II, the gold standard was suspended and war expenditures were financed by printing money, which led to a sharp rise in money supplies and price levels. In 1944, the international community signed the Bretton Woods Agreement. That system called for fixed exchange rates with the U.S. dollar as a reserve asset.

Current account imbalances can be looked at from two points of view, as detrimental or beneficial, depending on the focus of the analysis. If the current account is viewed as a use of net foreign exchange, deficits have often been taken to signal problems for macroeconomic policies. On the other hand, when a perspective recognizing that the current account imbalances allow for differences to exist between national investment and savings is taken, a favorable judgment is often made (Pitchford, 1995).

The current account is one source of the net supply of foreign exchange, as well as, a source of savings, and it generates a net foreign indebtedness. The current account imbalance for any country over time is a change in the value of its net claims on the rest of the world (a change in its net foreign assets). It causes an increase in a country's net stock of foreign assets or liabilities. Unless there are stabilizing instruments that prevent a continued increase in net foreign claims, a financial crisis may occur. It reflects the holding of foreign assets by the residents of the home country and an increase in domestic savings.

In a closed economy, the current account is equal to zero, while income is equal to government expenditures, private consumption, and domestic investment. In an open economy, we add the external balance, which includes exports and imports. From the Keynesian (conventional) point of view, macroeconomic policies have a direct impact on current account imbalances. The conventional approach sees that fiscal and monetary policies have a direct impact on current account imbalances, so the authorities may use these policies to eliminate current account imbalances. On the other hand, neoclassical theory has viewed a current account imbalance as a result of an intertemporal optimization behavior between present and future incomes. Thus, it is called the consumption-smoothing approach through borrowing and lending. One can borrow now against a future higher income, or saving (lending) now against a future lower income.

Jordan's Experience

Jordan's current account has fluctuated over time, witnessing surpluses as well as deficits over 1967-2002. Jordan's economy has always been s subject to external shocks, especially regional ones. Its geographical location in the Middle East and, as an Arab country, made her more vulnerable to shocks that occurred in neighboring countries, especially the rich oil-producing countries. In addition, there have been the continuing political and economic effects of the Arab-Israel conflict. The country has been influenced by sharp oil-price fluctuations, especially the dramatic fall of oil prices in 1985, which have in some way or another impacted its economic standing. Moreover, in 1989, Jordan's economy was hit by a financial crisis, which caused the nominal exchange rate to depreciate by almost 50 percent against the US dollar, causing a severe adverse

impact on the Jordanian living standards, especially the poor. The real GDP contracted by 13 percent and inflation reached its highest level of over 25 percent.

After the financial crisis and external shocks that hit the economy in the late 1980s and early 1990s, the Jordanian monetary authorities, represented by the Central Bank of Jordan (CBJ), adopted macroeconomic policies to restore stability and confidence to the Jordanian Dinar (JD). Following this crisis that adversely affected the Jordanian balance of payments in 1989, the government adopted a fiscal consolidation and tight monetary policy.

Jordan's outstanding external public and publicly guaranteed debt reached $8 billion in 1988. With an economic slowdown and high real interest rates globally, the debt burden reached an unsustainable level. The government is always responsible for covering an unsustainable current account deficit. There are two approaches that the government could use to solve the current account variability. The first approach implies that: "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" (Nassar, 2000). The second approach implies that the authorities should make macroeconomic adjustments, using appropriate fiscal and monetary policies when current account imbalances occur. They might, for example, use government expenditures and taxes as fiscal policy or change the money supply or money demand, which can be used to reduce aggregate demand, as monetary policy to improve the terms of trade by devaluation. Moreover, the government should also constitute unique policies to encourage foreign direct investment and industrial diversification.

Jordan is unlike a typical developing country. "Jordan managed to avoid the worst excesses of central planning and central bank financing of fiscal deficit. The country has managed to avoid run-away inflation of Latin America proportions, and its financial system managed to weather a number of crises and emerged as a mature structure" (Ifram, 1997).

The Objectives of the Research

The objective of this study is to examine, theoretically and empirically, the interrelationships of current account variability, capital flows, and domestic saving and investment in Jordan. This study intends to examine whether the testable propositions generated by the intertemporal model are supported by observed data. Particularly, it will examine whether the behavior of the current account balance of Jordan is consistent with the intertemporal model given actual data on income, domestic investment, and government and private consumption.

Jordan is vulnerable to a number of real and external shocks, including the regional effects of oil prices, regional political developments, and movements in remittances of workers abroad and grants from official resources. Therefore, this study will use a structural break model within the intertemporal consumption-smoothing approach to investigate if there is a structural regime shifts using Gregory and Hansen (1996) regime shift model. Additionally, it will describe structural adjustments that were adopted by Jordanian authorities following a descriptive analysis of the economy and the current account behavior through the period of study. It may not be necessary to find a one-to-one corresponding relationship between the time of the structural change and the

emerging of the breakpoint in the data, because it may appear that the data has its own signals to predict a coming crisis or structural change on the horizon.

The Focus of Research on Jordanian Current Account

This study examines the optimality of international capital flows to Jordan during the period of 1967 to 2002. This period witnessed different events and circumstances in Jordan specifically, and in the world in general. It intends to compare the actual Jordanian current account balance with the benchmark derived from a model of intertemporal consumption smoothing. The intertemporal approach implies that international capital flows act as a buffer to smooth aggregate consumption in the face of temporary shocks to economic fundamentals (output, government expenditures, and domestic investment). The research will examine, using this approach, whether a structural change between the consumption and national cash flows relationship is seen. Our analysis covers the period 1967-2002, which is characterized by relatively a long period of changes and developments in both local and global terms.

Both private and official international transfers have always played an important role in Jordan's economy, specifically in the Jordanian current account balance, as a significant source of foreign assets. These transfers have contributed to economic development in the country and enabled the economy to maintain a higher standard of living that would have otherwise been possible (Ifram, 1997). Jordan's economy depends heavily on foreign grants. These grants include unrequited transfers from other governments and Jordanian workers' remittances from abroad. Workers' remittances became an important source of foreign exchange for the country during the period 1960-1985 and still have this important role.

During the last decade, Jordan has adjusted the structural fiscal policy toward more liberalization to correct the rigidities and imbalances in the fiscal system. The revenue base of the government budget was heavily reliant on trade taxes, whose potential was diminishing with trade liberalization. In this matter, the diversification of the revenue base toward consumption-based taxes instead of trade–related taxes has helped overcome the challenges posed by trade liberalization and other structural reforms.

Statement of the Problem

Since every country is seeking a sustainable current account balance, it is of considerable interest given recent episodes of macroeconomic turbulences in many emerging markets. The current account balance, as a part of the balance of payments, has played a growing role in economic growth. The external balance is considered one of the important factors in stabilizing and energizing the whole economy. In light of world movements toward globalization, developing countries have reached the point of no return in facing international competitiveness, which in one way or another forces them to face their serious balance of payment problems. Current account variability is always at the center of macroeconomic policy concerns, but the lack of studies of developing countries' current account determinants creates more burdens of understanding the external (world) factors that effect current account balances. The imbalances in the current account are interpreted as a sign of disequilibrium in international relations. The balance of payments as a whole is never in disequilibrium, in one sense, when the total receipts of a country equal the total payments of that country, including all the receipts and all the payments of the country.

It is important to know the causes of current account variability and the determinants of the current account balance, especially since the Jordanian authorities have adopted successful demand-management policies, which control the external current and capital account balances at levels consistent with a sustained reduction of external debt during the last decade.

In this study, I want to illuminate the current account behavior from 1967 to 2002. I will try to address the current account imbalance as a means to orient the economy as a whole toward stability and development. There are many approaches to assessing the determinants and interpretation of current account balances, but all approaches are based mainly on two theories: the Neokeynesian and the Neoclassical theories. The Neokeynesian theory is the foundation of the traditional approaches to balance of payments adjustment. Whether they are labeled as the "elasticities approach", the "income multiplier approach", the "absorption approach" or the "internal-external balance approach", they concentrate exclusively on real variables and ignore monetary ones (Arize, 2000). These approaches basically describe the explanatory variables of the current account, such as trade balance, exports, exchange rates, and price effects.

The neoclassical theory is the foundation of the intertemporal approach, which assumes optimizing behavior on the part of individual economic agents, which means that there is temporal and intertemporal budget constraints and forward looking-behavior in savings and investment decisions (the intertemporal decisions between current and future consumption).

Relevance of the Study

This dissertation explores the determinants of Jordan's current account imbalances, interprets and analyzes structural changes that have been taken place and affected the Jordanian current account, and investigates the causes of its variability.

Jordan is a Middle Eastern country that has been affected by many difficult crises and external shocks during the period of study. This is an analysis of a non-oil developing country, situated in the midst of oil abundance, which also survives without any significant natural resources. This study uses Gregory-Hansen (1996) tests to detect any structural break point, and Cashin and McDermott (1998, 2002) approach to obtaining the required tests for the intertemporal approach and the benchmark current account considering the structural break point.

The study considers the intertemporal approach to interpret the current account behavior. Using the intertemporal approach in Jordan's case is useful to examine the behavior of its current account within a dynamic long-run framework, as the neoclassical theory implies. This forward-looking slant gives perspectives on Jordan's current account behavior and the interrelationship of domestic investment and national saving within the consumption-smoothing approach, which also called the present discount value of current account balance. Understanding these relationships permits policymakers and analysts to understand implications of economic conditions, especially as the external sector intersects.

Jordan's economy, through macroeconomic development and related policies of the last decade, has three main areas of concern: first, macroeconomic stabilization and

growth; second, trade liberalization; and third, privatization. All these aspects have been crucial in the transformation process of the Jordanian economy. Jordan is considered an emerging market, seeking a recognizable space on the economic world map, as it has been transformed from an inward-oriented, mostly state-controlled and highly indebted, to an export-oriented economy where the private sector is the primary engine of growth.

Jordan's current account has been persistently in fluctuation. In recent years, the current account witnessed a surplus after severe deficits in the early 1990s. The aim of this study is to establish an illustrative, optimal path for Jordan's current account; to identify the extent to which the actual current account movements have deviated over time from the consumption-smoothing optimal path; whether the international capital flows have been excessively volatile; and to examine the solvency condition using this approach. Furthermore, this research will look into the effects of major structural changes in the Jordanian economy and the role that its policies toward developing and improving the external balance played, which were mainly trade policies, changes in the financial system, political stability, and infrastructure.

The intertemporal optimizing approach to the balance of payment has been discussed by Sachs (1981), Sevensson and Razin (1983), and Obstfeld and Rogoff (1996). They introduce the theoretical framework for the optimizing model of the intertemporal trade approach as a dynamic model for international borrowing and lending through the current account identity, which allows the economy to allocate its consumption over time. It tries to set the optimal pattern of international borrowing over time.

Finally this study tries to answer the following questions:

- Is Jordanian current account satisfying the solvency condition? In other words does solvency as a long-run condition, where present discount value of future balance of trade surplus must equal the present value of net external liabilities, apply in Jordan's case?
- Is the Jordanian current account consistent with the consumption-smoothing model?
- Is there any long-run change in the relationship (break point) between private consumption and national cash flows?
- What is the significance of combining the structural change (break) model with the intertemporal approach?
- Does the actual consumption-smoothing of the current account Granger-cause subsequent movements in national cash flows in Jordan?
- Are the rational expectations of optimal current account of Jordan close to the actual one?

The study is organized as follows: Chapter Two presents a review of the literature concerning the determination of a country's current account behavior, specifically as seen through the intertemporal approach and structural change models. Chapter Three reviews Jordan's economy in a descriptive manner and surveys its main economic sectors with its economic policy implications. Chapter Four presents the empirical results of the consumption-smoothing restrictions, discussing the unit root tests in the presence of structural change, and the cointegration relationship between the main variables of the model. Also, it explains the implication of the long-run relationship after implying the

structural change model with an intercept and slope shifting process. Finally, a summarization of the main conclusions appears in Chapter Five.

CHAPTER TWO

THE LITERATURE REVIEW

Theoretical Analysis

The balance of payments and the balance of the current account are considered topics of international monetary economics. The monetary theory of the current account translates a closed economic treatment of traditional questions about the determinants of output, employment and unemployment into an unbalanced payments context of an open economy. A variety of methods are available for analyzing the behavior and significance of the current account balance (Pitchford, 1995). In a closed economy, the current account balance equals zero (non-existent), as national saving and domestic investment are equal but opposite. In an open economy, the current account is not always zero if countries are prepared to accumulate or to deplete international reserves. The current account balance is referred to as the net of foreign investment. In order to understand this relationship we have to start with the basic national income identity:

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

Where:

Y is income,

I is investment,

G is government expenditure, and

(X-M) is net exports.

This basic identity helps us to analyze savings and investment decisions towards the channels that influence macroeconomic conditions.

In an open economy, national savings equals domestic investment plus current account balance. In this connection, we can ask the question: What is the effect of government saving decisions on the open economy?

$$S_n = S_p + S_g,$$

$$S_g = T - G,$$

$$S_p = Y - T - C,$$

$$S_n = S_p + S_g = I + CA,$$

$$CA = X - M + R.$$

Where:

S_n is national savings,

S_p is private savings,

S_g is government savings,

T is taxes, and

R is net international transfer receipts (net foreign income).

To measures the extent to which the government is borrowing to finance its expenditures, we can rearrange the above identities, and write:

$$S_p = I + CA + (G-T).$$

Where:

(G-T) is the government budget balance.

Private savings (S_P) goes to three channels: the investment, the current account, and the government budget. These linkages make us think about the results of economic policies and detrimental events (shocks).

Hence, we can express the current account balance of a country as:

$$CA = S_p - I + (T - G).$$

This implies that the current account balance is equal to the difference between national savings and investment. Therefore, national savings and investment are the integral parts of any analysis of current account determination.

The balance of payments, as the umbrella of the current account balance, is worthy of attention because of the desire to understand the way macroeconomics works. On one hand, the traditional economic policy analysis is challenged into correcting one-period imbalances, and on the other hand, the economist's traditional tool, in this area, as in much of economics, is comparatively static rather than reflecting intertemporal dynamics (Taylor, 1990).

Regarding the methods of analyzing the behavior of the current account, we can start from the mercantilist approach, which regards a surplus on the balance of trade as a measure of the nation's welfare and advocates running a permanent balance of trade surplus. The Hume price-specie-flow mechanism, however, states that a trade imbalance leads to a change in the money supply (inflow of specie), and hence changes in the relative prices lead automatically to imbalance corrections.

Then, short-run Marginalism emerged, which is an elasticities approach, and it can be seen as a way of looking for sufficient conditions for a balance of payments equilibrium. This approach considers the exchange rate as an exogenous variable. Under

a flexible exchange rate system and international capital mobility, trade deficits have to be matched by private capital inflows. In this respect, it has to be questioned how such 'induced' capital flows come about. Ohr (1985) and Krugman (1993) have shown 'induced' capital flows may be the result of the expected changes in the exchange rate. "Theoretically, if a currency depreciates sharply due to inelasticites, under the assumptions of rational or adaptive expectations, investors will expect an eventual appreciation. Therefore, the expected rate of return rises and capital flows into the country with the depreciating currency thus, financing a trade deficit" (Dluhosch, B., *et al.*, 1996).

The Marshall-Lerner condition, which refers to currency devaluation to improve a country's one-trade balance, requires that the sum of the supply elasticities in both countries (considering a two-country model, and two–good world) to be larger than one. "It is, in fact, sufficient condition for each country's offer a curve to be monotonically decreasing (equivalent to gross substitutability), which entails that any foreign exchange market equilibrium is both unique and stable" (Taylor, 1990, pp. 17).

The conventional approach is a static saving-investment approach where the Keynesian theory base implies that change in income or term of trade (TOT) will change the current account. An increase in income or a decrease in the TOT reduces the current account surplus, while the depreciation of the real exchange rate will improve the current account. Economic shocks on the current account balance may vary according to whether these are country-specific shocks or external (global) ones. The literature shows that global productivity shocks have a smaller impact on the current account deficits than country-specific ones.

Finally, the most recent method is the intertemporal optimizing approach to the balance of payment. Sachs (1981), Sevensson and Razin (1983), and Obstfeld and Rogoff (1996) introduced the theoretical framework for the optimizing model of the intertemporal trade approach. This approach introduces the intertemporal approach as dynamic model for international borrowing and lending through the current account identity, which allows the economy to allocate its consumption over time. It tries to set an optimal pattern of international borrowing over time. This approach believes that consumption-savings and investment are inherently forward-looking and dynamic variables that should be analyzed in a dynamic optimizing framework. Thus, the static Keynesian framework for analyzing consumption-saving decisions of individual economic agents is not enough and sometimes is not appropriate for analyzing this over-time/long-term relationship, especially since the Keynesian approach represents a short-run framework.

Empirical Analysis

International trade and capital flows have increased since the end of World War II at a rate much faster than the average rate of world output. This development was fostered by trade liberalization, which began with the first General Agreement on Tariffs and Trade (GATT) round in 1949. Both gross and net flows increased and current account deficits and surpluses widened (Dluhosch, B., et al., 1996).

The savings-investment correlation has been a subject of intense debate because of the alleged lack of capital mobility, which was implied by the empirical findings of Martin Feldstein and Charles Horioka (1980) (Showkat, 1996). Their findings imply that as much as the country opens its economy to integrate with the external world, it will be

more able to smooth its consumption and adjust savings and investments through international capital flows. Empirical investigations of the saving-investment co-movement and the current account variability are based mainly on two theories: the Neokeynesian theory (the traditional approach to the current account), and the Neoclassical theory (the intertemporal optimization dynamic approach to the current account).

The Neokeynesian viewpoint looks at economy in terms of an aggregate macroeconomic analysis, while the Neoclassical economists realize the importance of the microeconomic analysis, as a foundation of the macroeconomic optimization behavior (current-future intertemporal behavior).

The conventional approach, which has been the Neokeynesian base, implies that a change in income or terms of trade will alter the current account balance. An increase in income or a decrease on the terms of trade (TOT) reduces the current account surplus, while a depreciation of the real exchange rate will improve the current account balance.

Most of the empirical work views the external balance as the current account balance, specifically the trade balance (TB). The traditional approach basically describes the explanatory variables of the current account.

The traditional approach describes the following equation for the TB (Leamer and Stern, 1970):

$$(\Delta TB/TB) = \{ (\Delta X/X) - (\Delta M/M) \}_t =$$

$$b_o + b_1\{(\Delta Yd/Yd) - (\Delta Yw/ Yw)\}_t + b_2$$

$$\{(\Delta Px/Px) - (\Delta Pm/Pm)\}_t + b_3\{ \Delta ER/ER\}_t$$

Where:

Δ is the change operator,

TB is the trade balance,

X is exports,

M is imports,

b_0 is the constant of the regression equation,

b_1, b_2, b_3, are the coefficient of income, price, and exchange rate, respectively.

Yd and Yw are the domestic and world income levels, respectively.

Px and Pm are the price levels of exports and imports, respectively.

ER is the exchange rate between the country's currency and the world currencies.

This posits that the export price level relates negatively to the TB, and the import price level relates positively to it. Nevertheless, if the price levels in a home country rise faster than those in a foreign country, the TB will deteriorate, and the reverse is also true. Consequently, in the first case the terms of trade worsen, and in the second, it improves. The exchange rate reinforces the price effect. If the home's currency appreciates, the trade balance will deteriorate, and if it depreciates, the trade balance will improve.

The second factor in the traditional approach is the income effect. If the income of the home country goes up, absorption does the same, and the trade balance will worsen because of increased demand for imports. However, if world income expands, the home country's trade balance will improve; that happens because the world's demand for the home country's exports increases. Therefore, we can conclude the following factors are what determine the trade balance of any country: first, the price of a country's products

relative to the world prices (the terms of trade); second, the exchange rate; and third, the relative incomes of the home country and foreign economies (Arize, 2000).

There are several empirical models of the Keynesian nature that describe the explanatory variables of the current account: the single equation model, the simulation equations, and the world trade model.

These models try to explain the specifics of the trade and current account balances but suffer from two fundamental problems. First, theoretically, such a model is unable to capture the dynamic saving-investment behavior involved in the determination of trade or current account balance. Moreover, this type of model cannot distinguish between temporary and permanent shocks in income and the terms of trade. Second, from an econometric perspective, as has been demonstrated by numerous studies, some of the variables of the model are non-stationary and the use of estimation methods such as ordinary least square (OLS) with presence of non-stationary variables may have a serious effect on the statistical properties of the estimators. Nevertheless, recent empirical analysis that studied the savings-investment co-movement recognizes the issue of unit roots in the variables and the existence of potential cointegration among them (Hossain, 1995).

The second approach that models the current account balance is the intertemporal approach. Using the consumption-smoothing approach to the determination of the current account implies that international capital flow acts as a buffer to smooth aggregate consumption in the face of temporary shocks to economic fundamentals (output, domestic investment, and government expenditures). One of the reasons that researchers model the economic relationships between variables is to predict what would happen in

the event of a change in one or more variables. Therefore, modeling the current account variability using the structural break makes more sense in understanding the long-run relationships between consumption and the national cash flow in the case of a regime shifts. The possibility of a regime shift is allowed for because policy framework has changed in Jordan since the 1990s. After the JD devaluation, Jordan's economic authorities adopted a tight monetary policy and a fiscal policy of consolidation. Moreover, the shift of the current account from external resources to equity through investment diversification, privatization, specialization in industries for export purposes, and acceleration of trade liberalization by reducing trade barriers and attracting foreign direct investment (FDI) justified the use of a structural model.

Sheffrin and Woo (1990) examined the intertemporal approach of the current account for four countries using data for the period 1955-1985. This study found that Belgium and Denmark were consistent with the consumption-smoothing approach, as the optimal current account matched the actual one, while the actual current account behavior for both the U.K. and Canada is not consistent with the consumption-smoothing approach.

However, Otto (1992), in his study of the present value of the current accounts of the U.S and Canada, rejects the restriction of equalization between the predicted current account (the optimal one) and the actual current account. So, the current account behavior of the U.S. is not consistent with the intertemporal approach, according to this study which used quarterly data for the period of 1950:1-1987:4. He also found virtually no support for a smoothing of consumption in Canada, and he suggested that this may be due

to the effect of temporary changes in resource prices and terms of trade effects on Canada's current account.

Ghosh and Ostry (1995) used the consumption-smoothing approach for 45 developing countries. They examined whether this approach acted as a buffer to smooth consumption in present of economic shocks. They found that for the majority of these developing countries, the hypothesis of full consumption-smoothing was accepted when there was high degree of capital mobility. It found that these countries have fully modified their consumption in the face of economic shocks. Ghosh (1995) also found in another study on major industrialized countries that consumption-smoothing restrictions were rejected in Germany as well as Canada, Japan and the United Kingdom.

Ostry (1997) investigated the current account behavior using the present value approach of the current account for five Asian countries (Indonesia, Malaysia, Thailand, the Philippines, and Singapore) using annual data for the period 1960-1995. He found that the predicted current account balance and the actual current account were consistent, which implies that these countries are fully consumption-smoothing over time.

In a study for Saudi Arabia for the period of 1969-1997, Al-Nassar (2000) found that Saudi Arabian current account behavior is consistent with the consumption-smoothing model to the current account. He supported his result by analyzing the current account behavior during the period of study so, when it had a current account surplus (savings was greater than investment due to the high oil sector revenue) in the 1970s, the national cash flow was expected to decrease in future, which is what really happened in the 1980s, when the oil prices fell sharply.

Kim, Hall and Buckle (2001) studied New Zealand's current account deficit based on the intertemporal optimization approach, using a quarterly, real, seasonally-adjusted data for the period 1982:2-1993. They tried to evaluate New Zealand's external solvency, the degree of optimality of the intertemporal consumption-smoothing through its current account behavior, and whether international capital flows have been used in an optimal (consumption-smoothing) way. They found that New Zealand's current account was consistent with optimal smoothing, concluding that the external solvency condition has been met, and the international financial capital flows has no "excess volatility".

Landeau (2003) investigated the "excessiveness" of Chilean current account imbalances for the period of 1960-1990, using an extended model along the lines of present value tests that allows for interest rate and exchange rate variations. The result of the study was that a forward-looking rational agent is validated.

Bussiere, Fratzcher and Miiller (2004) extended the standard intertemporal model of the current account to include the persistence of current account and the reference of the fiscal policy. The model is estimated for 33 countries (21 countries from OECD, ten EU- acceding, and two accession countries (Bulgaria and Romania)). The study derived the structural (optimal) current account for all these countries. The results were that most of acceding countries have current accounts that are generally in line with their structural (optimal) current account positions.

Cashin and McDermott (1998) examined the optimality of international capital flows to Australia using quarterly real seasonally adjusted data for the period 1984:1-1998:2. This period represents Australia in its post-capital-control period 1984-1998. In their, study they employed an endogenous structural change point within the

cointegration process. They found that a regime shift had occurred in the relationship between consumption and national cash flow in 1990:4. According to their results, over time, Australia's international borrowing decisions increasingly have been determined by changes in their economic fundamentals. This study suggests that international capital flows were larger than optimal during the 1980s, while in the 1990s the international capital flows had been generally consistent with those predicted by the consumption-smoothing approach.

In 2002, Cashin and McDermott reexamined the optimality of international capital flows to Australia for same period, which was described as the post-capital controls period (1984-1999). Using the optimizing model of intertemporal consumption-smoothing, they compared Australian actual current account to the benchmark current account which is derived from the consumption-smoothing model. They found the same result as the earlier study, which suggested that in the early 1990s a structural break had occurred in the relationship between consumption and national cash flows, coincident with a switch from debt-financing to equity-financing of the current account deficit. This empirical study concludes that international capital flows to Australia implied a path for consumption that is consistent with expected-utility maximization under the consumption-smoothing model of the current account. But in this study, Cashin and McDermott used different approaches to estimate the optimal current account and different techniques to obtain the smoothing component of the current account.

Firstly, they used the unrestricted vector-autoregressive (VAR) approach to estimate the optimal current account for Australia in the early study. For the later one, they generated a model-based prediction of the current account using the forward-looking

rational expectation model. They pointed out that, when they used Ghosh's (1995) approach (VAR approach), the joint hypotheses, that smoothing behavior is present and that VAR forecasting rule is valid, are rejected. Secondly, to obtain the smoothing component of the current account, they used an OLS regression in the recent study (2002) to estimate the cointegration relationship between private consumption and national cash flow. In the earlier study (1998), the relationship was estimated using the Phillips-Hansen (1990) Fully Modified (FM) method. They justified the using of the FM method because it yields an asymptotically correct variance-covariance estimator when estimating cointegrating vectors in the presence of serial correlation and endogeneity, which is an important element for the robustness of the subsequent hypothesis.

Actually, conclusions for Australia have varied by study, by sample period and by data resource (Kim, *et al.*, 2001). In 1992, Millbourne and Otto used per capita data for the period 1959:3 to 1989:1. They found that Australia's current account behavior is not consistent with the consumption-smoothing approach either for the full sample period or for the post 1983:4 floating exchange rate period. Guest and McDonald (1998) rejected the consumption-smoothing approach for Australia's current account for the extended data period 1960-61 to 1994-95.

Baharumshah, Lau, and Fountas (2003) investigated the sustainability of the current account for four Asian countries (Indonesia, the Philippines, Malaysia, and Thailand) for the period 1961-1999; they use the intertemporal budget constraint (IBC) model to explore the current account behavior in these countries. In their study, they utilized structural breaks within unit root tests and cointegration relationships. They got different structural change points for each country. The empirical results indicate that for

all countries except Malaysia, the current account deficits were not in the long-run steady in the pre-crisis (1961-1997) era. This suggests that current accounts in these countries were unsustainable, and the technique may have provided an early prediction for the financial crisis that hit these countries in the mid-1997. The study shows evidence for needed action to prevent the large appreciation prior to the 1997 crisis.

Structural Change Implications

Society and its behavior change over time, and an economic policy that was once ineffective may become effective. In the late 1940s, many Keynesian economists emphasized the role of fiscal policy (government expenditures and taxation) as the key to controlling the business cycle, and those who advocated use of fiscal policy tended to ignore the role of money. But, after that followed the classical view that money is the most powerful and useful tool that macroeconomic policy makers have at their disposal (Broemeling and Tsurumi, 1987).

Structural change has been one of the major anxieties in economics. Different theories on phases of economic development and growth postulate that an economic relationship changes over time, but as a matter of fact, these changes have been explained and explored in descriptive ways, without giving the needed statistical attention to test these changes. Actually, economists, especially the econometricians, start to realize the important effect of the existence of structural change on regression, mostly in time series analysis. In the last two decades, the impact of structural changes on the result of statistical tests has been of much concern.

The structural shift (change) can be simply defined, within a regression framework, as a change in one or more of the parameters of the model in question.

Mostly, macroeconomic time series experience structural breaks. These are due to economic crises, such as changes in institutional arrangements, wars, financial crises, etc., which have an important impact on forecasting or analyzing the effect of policy changes in the models with constant coefficients. Rapporot and Reichlin (1987) and Perron's (1989) work opened an important avenue for research by pointing out the critical role of the alternative hypothesis in unit root tests (Noriega-Muro, 1993). These new tests that were started by Perron (1989) included, within the regression of a set of dummy variables, the structural change modeled in the trend function.

Starting with Rao (1952) and Kempthorne (1952) and Chow (1960), an F test for the case where there are two regression regimes and the joint point to separate observations into two sub-samples is known, was proposed.

There are two arguments regarding the modeling of the structural change within statistical regression. The first one is modeling the structural change as a known break point, and the other one is modeling as unknown break points. Each of them has different implications.

Structural Change with Prior Known Break Points (Exogenous Change Point)

The earliest tests for structural breaks in economics literature are Chow's tests (1960) which were designed for a linear model with k variables and two regimes with observations n_1 and n_2, respectively. He derived two tests; the analysis of variance test, which were discussed first by Rao (1952) and Kullback and Rosenblatt (1957), and the second one, a predictive test for the unbiasedness of predictions for the n_2 observations, from a regression estimated with n_1 observations (Maddala and Kim, 1998). Each of these studies, Dufour (1982), Lo and Newey (1985), Andrews and Fair (1988), Park

(1991), Dufour, Glyssels, and Hall (1994), extended one of Chow's tests to different levels of regressions. These tests were for exogenous structural change points (known break points).

Perron (1987, 1989) studied three types of break points in the trend function. Model (A) is the change in the trend 'crash model'; model (B) is the change in the slope of the trend 'breaking trend model'; and the third one is model (C), a combination of models A and B. The essential assumption in Perron's models is that the break points are known *a priori.* This means that the dates of break points are uncorrelated with the data. Rapport and Reichlins (1987, 1989) also use known break points in their structural change models, and they claimed that the choice of the break point does not bias the critical values. When chosen, these approaches questioned the biasedness of the critical values of the simulations that obtained the critical values of the t-statistic for the breaking trend that they used.

Structural Change with Unknown Break Points (Endogenous Break point)

Quandt (1960) argued that testing the null hypothesis of constant coefficients against a more general alternative where the structural change occurs in unknown time and the error variance is allowed to change is preferable. He considered a switching regression, with a simple explanation for his formulation that all observations for certain economic variables up to the unknown time (m) come from one regime, and all the observations after that point come from the other. In order to test the hypothesis, there was no change in regimes against the alternative of just one switch; Quandt used the most likely appropriate ratio λ and estimated the point at which a structural change would occur in a relationship between certain variables. This is when the value of m takes a

point in time, at which λ has minimum value. However, at that time, the implementation of this process was held up by the lack of a distribution theory.

After this, a large number of studies derived asymptotic distributions for the null hypotheses of the structural change tests using different statistical procedures. The most common studies were those, such as Perron (1990), Zivot and Andrews (1990), Banerjee, Lumsdaine and Stock (referred to as BLS) (1990), and Gregory and Hansen (1996). These are all recognized for unknown structural break procedures. Perron (1990) extended the previous three models, but he considered the date of the break as an unknown *a priori,* instead of fixing it ex-post, he determined it endogenously as an outcome of sequential procedure of estimation. The critical values were obtained by simulation experiments.

Zivot and Andrews (1992) used a sequential test and derived the asymptotic distribution of the test statistic, $\min_{\lambda} t(\lambda)$, and tabulated its critical values. In their study, they failed to reject the null hypothesis for four of the ten series in which Perron (1989) rejected the unit root null (real per capita GNP, GNP deflator, money stock, and real wages), using finite sample critical values, obtained by bootstrap methods; they accepted the unit root null for three series (employment, nominal wages, and common stock prices) (Maddala and Kim, 1998).

Moreover, BLS (1992) used a selection of recursive and sequential tests to endogenizing the break point of some international variables. They derived asymptotic distributions of the recursive and sequential test statistics and tabulated the critical values.

This summary indicates that when one exogenizes or endogenizes the break points within the regression, different results will be given. Finally, Lumsdaine and

Papell (1997) followed the BLS method and the drive asymptotic distributions for test statistics using sequential tests and two breaks with unknown break points, employing bootstrap methods, to get finite sample critical values.

Unit Root Tests and Cointegration Relationships under Structural Change

One of the problems taken into account is the presence of the structural breaks. It is known that when dealing with finite samples, especially small numbers of observations, the standard tests for unit root (non-stationarity hypothesis test) are biased toward accepting the null hypothesis of non-stationarity when the true data-generating process (D.G.P.) is in fact stationary and close to having a unit root (weak power of test). So, the finding is that an undetected structural break in the series may lead to under-rejecting of the null hypothesis of unit roots (Harris and Sollis, 2003).

In terms of economic policy, unit roots are associated with the concept of "persistency" of innovations or shocks to the economic system. Policy effects can vary dramatically depending on the nature of the non-stationarity associated with macroeconomic variables, and in terms of econometric modeling, as the theory of cointegration is heavily dependent on the existence of unit roots (Noriega-Muro, 1993).

Unit root tests have taken on importance since mid-1980s. When unit roots are present in the data, estimates of a regression model with non-stationary variables lead to spurious results as they ignore important information about underlying statistical and economic process generating that data. In addition, to the importance of the unit root tests is the fact that it forms the overture of the econometric analysis of (long-run) equilibrium relationships proposed by economic theory. This relationship, known as the cointegration relationship between the economic variables, shapes some economic equilibrium. It is

believed that certain economic variables should not move freely or independently of each other. These connections persuade some econometricians to test for cointegration relationships within unit root tests via unconventional methods.

Dickey and Fuller (1879, 1981), Said and Dickey (1984), Philips (1987), and Phillips and Perron (1988) found empirical evidence for the unit root hypothesis by employing their standard theory of unit root. This standard theory evaluated the potential risk of mis-specifying the alternative hypothesis against which the unit root null was tested. The alternative hypothesis is that there is a stationary fluctuation around a linear time trend. It has been argued that there is a possibility that the null hypothesis of unit root always will be accepted even if the true model is stochastically stationary, in the case of under-parameterization of the alternative hypothesis. As mentioned earlier, Perron (1989) argued that if there is a break in the deterministic trend, then unit root tests will lead to a mistaken conclusion of a unit root existence, when in fact it does not.

Gregory and Hansen (1996) utilized a residual-based test for cointegration in a multivariate time series with regime shifts, proposing the Augments Dickey Fuller (ADF), z_α, *and* z_t type tests, which an intended to test the null hypothesis of no cointegration against the alternative of cointegration in the presence of a possible regime shift.

The most widely applied tests are the residual-based ones in which the null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration in the sense of Engle and Granger (1987). This shows that a linear combination of the integrated variables has a stationary distribution. Rejecting of the null hypothesis of no

cointegration entails strong evidence of a cointegration existence between the variables (Gregory and Hansen, 1996).

Gregory and Hansen used a more general type of cointegration, where the cointegrating relationship is allowed to change at a single unknown time period during a sample period. "Residual based tests rely on the residuals calculated from regression among levels or (log) of economic time series. They are designed to test the null hypothesis of no cointegration by testing the null hypothesis that there is a unit root in the residuals against the alternative that the root is less than unity. If the null hypothesis: has a unit root is rejected, then the null hypothesis of no cointegration also rejected" (Philips and Ouliaris, 1990). This is named the residual based unit root tests (coefficient and variance ratio tests).

The Gregory-Hansen (1996) cointegration test (allowing for a structural break) is a test that examines whether there has been a one time shift in the cointegration relationship. It detects any cointegration in the possible presence of such breaks. Regarding this issue, Gregory and Hansen derived asymptotic distribution of the test statistic which is free of nuisance parameters dependencies, other than the number of stochastic and deterministic regressors. "The distribution theory is more involved than the theory for the conventional cointegration model (Phillips and Oulirias1990), due to the inclusion of dummy variables and the explicit minimization over the set of possible breakpoints" (Gregory and Hansen, 1996).

The Gregory-Hansen test for cointegration is, therefore, best viewed as a pre-test akin to the conventional residual-based cointegration tests. Gregory and Hansen (1996) developed single-equation regression models which allow for cointegration with

structural change. They started with the standard model of cointegration and no structural change.

Model 1: Standard Cointegration

$$y_{1t} = \mu + \alpha^T y_{2t} + e_t, \qquad t = 1,.....n,$$

where,

y_{1t} is I(1) and

e_t, the disturbance term, is I(0).

As described by G-H, in many cases, if the standard cointegration model captures a long-run relationship, it has to consider μ and α as time-invariant. In the G-H applications, they treated the cointegration relationship over some period of time, and then shifting to a new 'long run' relationship by introducing an unknown shifting point reflected in changes in the intercept μ and/or changes to the slope α. They studied these three suggested models of structural change.

Model 2: Level Shift (C)

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \alpha^T y_{2t} + e_t, \qquad t = 1,....,n.$$

The Second model represents a level shift in the cointegration relationship, which can be modeled as a change in the intercept μ_1. This represents the intercept before the shift, and μ_2 represents the change in the intercept at the time of the shift, while α, the slope coefficients, are held constant. This model of structural change reflects the case of parallel shift in the equilibrium equation.

To model the structural change, this is the dummy variable definition:

$$\varphi_{t\tau} = \begin{cases} 0 & if \quad t \le [n\tau], \\ 1 & if \quad t > [n\tau], \end{cases}$$

where:

the unknown parameter $\tau \in (0,1)$ represents the relative timing of the change point and [] denotes integer part.

Model 3: Level Shift with Trend (C/T)

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \beta_t + \alpha^T y_{2t} + e_t, \qquad t = 1,....,n.$$

In model three, it can be introduced, besides change in the intercept μ, a time trend β_t into level shift model.

Model 4: Regime Shift (C/S)

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \alpha_1^T y_{2t} + \alpha_2^T y_{2t} \varphi_{t\tau} + e_t, \qquad t = 1,....n.$$

This model shows a shift in slope vector, which permits the equilibrium relation to rotate as well as a parallel shift. In this model α_1 is the cointegrating slope coefficient before the regime shift, and α_2 is the change in the slope coefficients, so $(\alpha_1 + \alpha_2)$ is the cointegrating slope coefficient after the regime shift.

Usually, econometricians first apply a conventional test for cointegration, such as the ADF test to the first model (the standard one). When one of the structural change models represents the true process of the cointegration relationship, but not model one, then the distribution theory used to assess the significance of the ADF test statistic is not the same. G-H (1996) developed this kind of test showing the null of no cointegration against the alternative in models 2-4. They defined the innovation vector as $u_t = \Delta y_t$, its cumulative process as:

$$S_t = \sum_{i=1}^{t} u_i$$

where:

$y_t = y_t + S_t$ and,

its long run variance $\Omega = \lim_n n^{-1} E S_n S_n^T$.

Ω as in proportion to the spectral density matrix evaluated at the zero frequency when u_t is a covariance-stationary.

Then they computed the cointegration test statistic for each possible regime shift $\tau \in T$, and took the smallest negative value, across all possible break points. Then, a compact subset of (0,1) for the set T must be chosen. Most earlier literature and G-H (1996) suggest the subset of T = (0.15,0.85), and it seems to be a reasonable number of points, since it is small enough that it can leave the sample size large enough from which to calculate the structural tests.

The steps of the Gregory-Hansen (1996) test are as follows:

First:

Computation of the test statistics: Estimate the model by OLS. Yielding the residual $\hat{e}_{i\tau}$. The subscript τ on the residuals denotes the fact that the residual sequence depends on the choice of change point τ.

Second:

From these residual, calculate the first-order serial correlation coefficient.

$$\hat{\rho}_t = \sum_{t=1}^{n-1} \hat{e}_{t\tau}\, \hat{e}_{t+1\tau} / \sum \hat{e}_{t\tau}^2$$

Phillips (1987) test statistics are formed using a bias-corrected version of the first order serial correlation coefficient.

Define the second stage residuals: $\hat{v}_{t\tau} = \hat{e}_{t\tau} - \hat{p}_{\tau}\,\hat{e}_{t-1\tau}$

Estimate of a weighted sum of autocovariances: $\hat{\lambda}_{\tau} = \sum_{j=1}^{m} w(j/m)\,\hat{\gamma}_{\tau}(j)$,

Where: $\hat{\gamma}_{\tau}(j) = \frac{1}{n}\sum_{t=j+1}^{n} \hat{v}_{t-j\tau}\,\hat{v}_{t\tau}$,

and M=M(n) is the bandwidth number selected so that

$M \to \infty$ *and* $M/n^{5} = O(1)$

Gregory and Hansen allowed the kernel weights w(.) to satisfy the standard condition for spectral density estimators. The estimate of the long run variance of $\hat{v}_{t\tau}$, $\hat{\sigma}_{\tau}^{2} = \hat{\gamma}_{\tau}\tau(0) + 2\hat{\lambda}_{\tau}$, is estimated using a prewhitened quadratic spectral kernel with first-order autoregressive for the prewhitening and automatic bandwidth estimator.

The bias-corrected first-order serial correlation coefficient estimate is given by:

$$\hat{\rho}_{\tau}^{*} = \sum_{t=1}^{n-1}(\hat{e}_{t\tau}\,\hat{e}_{t+1\tau} - \hat{\lambda}_{\tau}) / \sum_{t=1}^{n-1}\hat{e}_{t\tau}$$

The Phillips test statistics for unit root tests are:

$$z_{\alpha}(\tau) = n(\hat{\rho}_{\tau}^{*} - 1)$$

$$z_{t}(\tau) = (\hat{\rho}_{\tau}^{*} - 1)/\hat{s}_{\tau}, \qquad \hat{s}_{\tau}^{2} = \hat{\sigma}_{\tau}^{2} / \sum_{1}^{n-1}\hat{e}_{t\tau}^{2}$$

The final statistic G-H (1996) discussed in their paper is the Augmented Dickey-Fuller (ADF) statistic. This is calculated by regressing $\Delta\hat{e}_{t\tau}$ upon $\hat{e}_{t-1\tau}$, and $\Delta\hat{e}_{t-1\tau}$,....., $\Delta\hat{e}_{t-K\tau}$ for some suitably chosen lag truncation K (Gregory and Hansen, 1996). The ADF statistic is the t-statistic for the regressor $\hat{e}_{t-1\tau}$ can be denoted by:

$$ADF(\tau)=t\text{-}stat\ (\hat{e}_{t-1\tau}).$$

This is the smallest value of the above statistics, across all values of $\tau \in T$, Gregory and Hansen examined the smallest values since smallest values of the statistics constitute evidence against the null hypothesis. An asterisk (*) denotes the smallest value of test statistics for all three tests which are:

$$z_{\alpha}^{*}=\inf z_{\alpha}(\tau)$$

$$z_{t}^{*}=\inf z_{t}(\tau)$$

$$ADF^{*}=\inf ADF(\tau)$$

Asymptotic Distribution. Gregory and Hansen (1996) gave asymptotic distributions for the test statistic which is expressed as a function of Brownian motions. The limit distributions are not given in a closed form; however, they use simulation methods to obtain critical values. G-H examined only the z_{α}^{*} and z_{t}^{*} tests. Their statistics, however, are a function of every points test statistic, considered as a function of τ. This requires the distribution result to hold uniformly (the estimated break points).

Engle and Granger (1987) formulated the concept of cointegration as that over the long-run a special time-invariant linear combination of nonstationary variable may be

stationary. Some economists now are more interested in allowing the cointegrating relationships to change over time. "If structural change is to be entertained in cointegrated models, applied economists need appropriate test statistics to determine if there is any evidence for such a model. The standard testing procedure is to set up the null of no cointegration against the alternative of cointegration. Rejecting the null hypothesis considered as evidence in fever of the model" (Gregory and Hansen, 1996). It is important to note that this type of hypothesis test does not provide much evidence concerning the question of whether or not there was a regime shift since the alternative hypothesis contains, as a special case the standard model of cointegration, no regime shift. The standard ADF statistic and G-H ADF* statistics both test the null hypothesis of no cointegration, so rejection by either statistic implies that there is some long-run relationship in the data: (1) If the standard ADF statistic does not reject the null but the ADF* does, this implies that structural change in the cointegrating vector may be important; (2) If both the ADF and ADF* reject the null, no inference that structural change has occurred is warranted from this piece of information alone, since the ADF* statistic is powerful against conventional cointegration. In this event, the tests of Hansen (1990) are useful to determine whether the cointegrating relationship has been subject to a regime shift (G-H, 1996). Model stability is equivalent to parameter stability. Model instability may be caused simply by the omission of an important variable, or due to some kind of regime shift (Hansen, 1992).

The Conceptual Model

The Intertemporal Consumption Approach

In the intertemporal approach, the CA is the outcome of future dynamic savings and investment decisions. This approach is used to evaluate the impact of the business cycle on the CA balance.

The intertemporal approach of the current account is derived from the permanent income theory of consumption and savings. Sachs (1982), Svensson and Razin (1983), and Obstfeld and Rogoff (1996) introduced the theoretical framework for the intertemporal trade approach in the dynamic concept of international borrowing and lending through the current account identity, which allows the economy to allocate its consumption over time. The theory implies that temporary shocks can lead to large fluctuations in national savings and the current accounts. As Sachs (1982) has distinguished between two components of the current account, the current account can be decomposed first to a consumption-tilting motive, where the country shifts its consumption towards the present or the future. Second, the consumption-smoothing motive which smoothes the aggregate consumption in the presence of economic shocks. To drive the consumption–smoothing of the current account, it is considered a small, open economy with a periodic utility function representing the preference structure of the representative agent:

$$u_t = u(C_t), \qquad u' > 0, u'' < 0,$$

$$\lim u'(c) = \infty.^{1}$$

[1] This terms included to insure that individual always desire at least a little consumption in every period, c≥0.

Where:

C_t is the consumption in period t (t = 0, 1, 2, ..., ∞).

The representative consumer maximizing:

$$U_t = E_t \sum_{t=1}^{\infty} \beta^t U(C_t), \qquad 0 < \beta < 1, , \qquad (2.1)$$

Where:

E is the mathematical expectations operator.[2]

Ct is the private consumption at time t.

β is the subjective discount factor that reflects the preference for current consumption over future consumption.

Supposing that the representative consumer faces an exogenous fixed real interest rate r each period, and the riskless bond is the only international traded assets in the model (Cashin and McDermott, 2002).

The consumer budget constraint can be written as:

$$CA_t = B_{t+1} - B_t = (Y_t + rB_t) - C_t - G_t - I_t \qquad (2.2)$$

Where:

B is the net foreign assets,

r is the fixed world interest rate,

Y is output,

C is private consumption,

G is government expenditures, and I is investment.

Rearrange equation (3.2) to get:

[2] A probability weighted average of possible outcomes, these probabilities are conditional on all information available to the decision maker up to and including date t. capturing the rational expectations assumption.

$$\Delta B_{t+1} = rB_t - (Y_t - C_t - G_t - I_t) = - CA \qquad (2.3)$$

$$(\Delta B_{t+1} = Z_t - rB_t - C_t = -CA_t)$$

The interpretation of equation (2.3) is that the change in net external liabilities (ΔB_{t+1}); and therefore, the current account balance is given by the national cash flow ($Z_t = Y_t - I_t - G_t$) less private consumption, and less net foreign investment (rB_t).

The national cash flow ($Z_t = Y_t - I_t - G_t$) is respectively GDP, net domestic investment, and government expenditures. It is the analogue to Campbell's (1987) concept of household labor (cash) income.

The representative consumer maximizes equation (2.1) subject to equation (2.3) the budget constraint. Approximating the instantaneous utility function by the quadratic function:

$$U(C) = C - C_t/2$$

(Requires $C_t < 1$, for the marginal utility of consumption to remain positive).

Imposing the no "Ponzi games" constraint obtains the optimal level of consumption:

$$C^*_t = (r\,\Theta)[- B_t + 1/(1 + r)\, E_t (\sum(1 + r)\, Z_{t+j}] \qquad (2.4)$$

Where:

$\Theta = [\beta(1+r)^2 - 1]/\beta r\,(1+r)$ is the consumption tilting parameter.

The optimal private consumption path depends on net wealth reflected by the present discounted value of the expected future stream of cash flows and the stock of net external liabilities. The symbol Θ is reflecting the consumption-tilting dynamics of consumption that may arise if there is a difference between the world interest rate and the domestic rate of time preference $r \neq 1-\beta/\beta$.

When $\beta<1/\ 1+r$ or $(r<(1-\beta)/\beta$, then (or and), $\Theta < 1$, that means the world capital market gives the country a rate of return that fails to compensate for deferring consumption so that a country will shift consumption to the present and run current account deficit, leading to an increase in the economy's level of net external liabilities and, then, lower the consumption over time. Conversely, $\Theta> 1$, that is when $\beta > 1/\ 1+r$ or $(r > (1-\beta) / \beta)$, the country has an incentive to shift consumption to the future, run a current account surplus and lower the net external liabilities, and then gradually raise consumption over time. The consumption–tilting component of the current account is the current account balance at a permanent level of national cash flow. The current account equals gross national product (GNP) on a national account basis, which equals GDP plus net foreign investment payments ($Y_t + rB_t$), and net of private and public expenditures.

$$CA^*_t = Z_t - \Theta C_t^* - rB_{t,t} \qquad (2.5)$$

The equation above represents the consumption-smoothing component of current account, given that CA =B t+1- B t, the accumulation of net external liabilities.

$$CA_t = B_{t+1} - B_t = (Y_t - EY^\circ_t) - (I_t - EI^\circ_t) - (G_t - EG^\circ_t)$$

As $CA_t = Z_t - E_t Z^\circ$, by rearranging the terms in equation

$$CA^*_t = -\sum (1/1+r)\, E_t \Delta Z_{t+j} \ ,$$

Where:

$$\Delta Z_t = Z_t - Z_{t-1} \qquad (2.6)$$

This is the optimal consumption-smoothing component. This equation shows an important distinction between permanent and temporary shocks. The temporary shocks in output Y will reduce the cash flow and push the current account balance into smaller surplus or larger deficit, as the change in cash flow will occur next period. However,

permanent shocks leave national cash flow unaffected and also leave the current account unaffected. A part of the emphasis of this study is on the current account as buffer for consumption in the case of Jordan, and since the consumption-tilting has implications for the current account that is entirely distinct from consumption-smoothing, it is important to eliminate the nonstationary component of the actual current account to construct the consumption-smoothing part, the stationary component of the current account. So this requires removing the nonstationary component from the actual current account.

$$CA_{sm,t} = Z_t - \theta C_t - rB_t \qquad (2.7)$$

Where:

$CA_{sm,t}$ is the stationary consumption-smoothing component of actual CA, and

θ is the tilting parameter. Given that Z_t - rB_t and C_t are both I (1) variables.

Allowing for Structural Shifts

The estimator θ will reflect a structural change. The possible structural shift for Jordan can be justified because the period of study captured significant changes in the policy framework.

Using the Gregory-Hanson (1996) test for cointegration allows for the timing of any regime shift to be unknown *a priori*. The timing of any regime shift is likely to be unknown, because there is not necessarily a one-to-one correspondence between the potential causes of a regime shift and its occurrence in the data. Using the model where structural change occurs with a shift in the slope coefficient slope vector in the cointegration relationship gives us:

$$Z_t - rB_t = \theta_1 C_t + \theta_2 C_t \varphi_{\tau\pi} + \varepsilon_t \qquad t = 1, 2, \ldots\ldots T, \qquad (2.8)$$

Where:

θ_1 indicates the cointegration slope coefficient before the shift,

θ_2 indicates the change in the slope coefficients.

C_t is the private consumption, and ε_t is the disturbance term.

Using the dummy variable to model the structural change:

Where:

$$\varphi_{t\pi} = \begin{array}{ll} 0 & \text{if} \quad t \leq [T_\pi], \\ 1 & \text{if} \quad t > [T_\pi], \end{array} \qquad (2.9)$$

Where:

the unknown parameter $\pi \in (0, 1)$ indicates the timing of the change point in terms of fraction of the sample and [] indicates integer part.

The timing of shifts T_π in the relationship between a macroeconomic series is unlikely to be known *a priori*. Hence, the Gregory-Hansen test for shifts in cointegration models is useful as it does not require information on the timing of such events (Cashin and McDermott, 2002).

The examination of whether it has been a one-time shift in the cointegration relationship allows for the possibility that the cointegration long-run relationship between private consumption and the national cash flow has shifted at an unknown point in the sample. According to Cashin and McDermott, Gregory and Hanson note that in certain applications it is useful to think of a cointegration relationship as holding over some period of time, and then shifting to a new long-run relationship.

Structural Break and Testing for Units Roots

Testing for stationary variables is equivalent to testing for the existence of unit roots in the autoregressive component of the stochastic variables. The usual cointegration

test statistics are based on the variation of the ADF testing procedure. In the structural break case as Cashin and McDermott (2002) describe, the ADF has to be computed for each possible shift $\pi \in \Pi$, using the residuals from the cointegration regression of equation (2.8) in order to examine the null hypothesis of no cointegration given the equation (2.8). Choosing π, so that ADF(t)* takes the smallest ADF(t) across all possible break points, since the smallest value gives the least favorable result for the null hypothesis.

The ADF test allows for situations where more complicated time series processes underlie the data generating process (d.g.p), with needs to add lagged terms of dependent variables. According to Harris and Sollis, one of the problems that may associate with testing for nonstationary is that a structural break in a series will have serious consequences for the power of the test if it is ignored. After testing for unit roots, it should test for cointegration.

Solvency: Satisfying the Intertemporal Budget Constraint (Cointegration Relationship)

Solvency is a long-run condition where the present discounted value of the future balance of trade surplus must equal the present value of net external liabilities. As equation (2.3) indicates, a current account deficit is formed as the difference between national cash flow net of payments on the outstanding stock of external liabilities (Z_t–rB_t), and private consumption (C_t) which both are I (1) variables, (This means both variables are stationary in the first differences). As indicated in Cashin and McDermott's work, cointegration between Ct and (Z_t-rB_t) is a necessary condition for the country to satisfy its intertemporal budget constraint. If these two variables are cointegrated, then over the long run, consumption cannot depart too far from movements in the available

resources of the economy (as described by (Z_t - rB_t), (Cashin and McDermott, 2002).

Calculating the Optimal Current Account

The equation (5.6) shows that creating the model implied with the consumption-smoothing component of the current account series requires estimating the present value of expected changes in the net output in which the expectation is conditional on the information set used by the representative agent, which implies the rational expectation assumption. (Kim, Hall and Buckle, 2001). This consideration led the recent literature to estimate an unrestricted vector- autoregression (VAR) in ΔZ_t, and CA_{tsm}. The bivariate and multivariate VAR approaches are used commonly to estimate the optimal current account. It is composed of lagged changes in national cash flow and the current account to predict future changes in national cash flows. (Campbell and Shiller (1987), Ghosh, (1995)).

Shiller (1990) and Cashin and McDermott (2002) used different approach to estimate the optimal current account. They generated a model-based prediction of the current account using the forward-looking rational expectations model.

The vector autoregressive approach. By defining a vector Z_t of n potentially endogenous variables, it is possible to specify the flowing data generating process and model Z_t as an unrestricted vector autoregression VAR involving up to k lags of Z_t (Harris and Sollis,2003).

$$Z_t = A_1 Z_{t-1} + \cdots + A_k Z_{t-k} + u_t \qquad u_t \sim IN(0, \sum) \qquad (2.10)$$

Where:

Zt is (n x 1) and

each of the A_i is an (n x n) matrix of parameter.

The system is in a reduced form with each variable in Z_t regress on only lagged values of both itself and all other variables in the system as Harris and Sollis described.

For our model the VAR estimation can be written as:

$$\begin{bmatrix} \Delta Z_{t+j} \\ CA_t^{sm} \end{bmatrix} = \begin{bmatrix} \psi_{11} \psi_{12} \\ \psi_{21} \psi_{22} \end{bmatrix} \begin{bmatrix} \Delta Z_{t+j-1} \\ CA_{t+j-1}^{sm} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t+j} \\ \varepsilon_{2t+j} \end{bmatrix}$$

Where:

ε1 and ε2 are disturbance terms with conditional mean of zero and,

change in Z and CA^{sm} are now expressed as a deviations from unconditional means.

Making use of:

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

and substitute into equation (2.6)

the optimal consumption-smoothing component leads to:

$$CA_t^{sm*} = -\sum_{j=1}^{\infty} \left(\frac{1}{1+r} \right)^j \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} \psi_{11} \psi_{12} \\ \psi_{21} \psi_{22} \end{bmatrix}^j \begin{bmatrix} \Delta Z_t \\ CA_t^{sm} \end{bmatrix}$$

$$= \begin{bmatrix} \Phi_{\Delta Z} \Phi_{CA} \end{bmatrix} \begin{bmatrix} \Delta Z_t \\ CA_t^{sm} \end{bmatrix} \qquad (2.13)$$

The validity of the consumption-smoothing hypothesis can be tested by comparing the estimate of the optimal consumption-smoothing current account, CA_t^{sm*}, derived from equation (2.13) with the estimated actual consumption-smoothing, CA_t^{sm}, which is derived from the residuals when we estimate the equation (2.8).

Hypothesis Tests

After the model implied consumption-smoothing component of current account has been estimated a number of hypothesis tests have to be conducted to evaluate the consumption-smoothing model. According to Cashin and McDermott, three implications are considered. First, the current account should be a good predictor of future changes in national cash flow. Second, the agents' actual external borrowing should move in line with the model's prediction of the current account. And third, the variance of the current account should be smaller than the variance of the present discount value of changes in national cash flow. Also, they considered separately the samples before and after the structural break when they examine the optimality of international capital flows to Australia. Moreover, the equation (2.6) implies that the actual consumption-smoothing current account should Granger-cause subsequent movements in national cash flow.

The estimated CA_t^{sm*} series can be compared through graphics and the correlation coefficient and variance ratio measures with the actual value calculated from the cointegration regression.

CHAPTER THREE

A REVIEW OF JORDAN'S ECONOMY

Introduction

The Statehood of Jordan dates back to 1921, when prince Abdalla bin Al-Hussein was appointed by the occupied military of Great Britain. In 1946, Jordan became fully independent. In 1950, Jordan renamed the state the Hashemite Kingdom of Jordan after the unification with the Palestinian West Bank.

Jordan can be classified as one of the small developing countries in the lower-middle income class, which maintains a relatively open-trade and stable-targeting foreign exchange strategies. It is a non-oil producing country, with a scarcity of natural and capital resources, a small and developing domestic market, and a lack of water which makes the agricultural sector rely on rainfalls and as a result, this makes agriculture risky and unfavorable for investment. Therefore, the government plays an important role to ensure satisfactory social and economical structures, and a rate of capital formation, so as to justify the need for foreign assistance.

I believe that Jordan's attempts toward developing stages followed in some sense what Colin Clark described in his third edition book '*Conditions of Economic Progress*' before more than five decades that "as time goes on and communities become more economically advanced, the numbers engaged in agriculture sector tend to decline relative to the numbers in manufacture, which in their turn decline relative to the numbers engaged in services" (Colin, 1957, pp. 492). Moreover, he added that even the efficiency

of the 'service industry' which represented transport and commerce at that time, in certain stages of a country's economic development, evolve more rapidly than the manufacturing industry. Yet, the demand for such services, at such time, increases more rapidly and so the employment in the services, sector shows a propensity to increase. This structural evolution is what one can detect in this chapter.

Historical Economic Overview

Jordan's economy has faced significant obstacles during its path toward growth and development. Its growth rate of population reached an average of 3.2 percent annually for (1964-95) and an average annual population growth rate of 3.9 percent for (1980-2002). In the years 1998, 2001, and 2002, the growth rate was 3.0 percent, 2.9 percent, and 2.7 percent respectively (World Bank Report, 2004).

In 1967, Jordan witnessed the second inflow of a large number of refugees, about 330,000, from the Palestinian West Bank. The first one was in 1948. Although Jordan had managed the absorption of refugees of 1948 and 1967, the Israel-Jordan conflict contributed to creating a whole series of new economic difficulties, especially when the country lost the west bank of Jordan the River to Israel in 1967, which meant a loss of efficiently farmed agricultural land. Moreover, it lost a large part of an important and growing tourist industry and large sums in foreign exchange received from the people who annually visited the old city of Jerusalem and Bethlehem (Regional Surveys of The World, 2004).

Under these difficult situations, Jordan began to receive immediate aid from Arab countries. After these crises, Jordanians underpinned their economy by foreign aid and remittances from Jordanian workers abroad.

In the mid-1970s, Jordan began to enjoy prosperity and a sustained economic growth, since the country moved closer to Iraq in economic and political sense. Trading between Jordan and Iraq increased, especially during the war between Iraq and Iran in 1980. It strengthened the economic relationship, which led to the signing of a bilateral agreement to confirm their closer economic links. In 1984, Jordanian exports to Iraq reached $186.8 million compared to $ 42.3 million in 1979. Jordan also began a barter system of Oil-For-Goods with Iraq in 1984. The Jordanian exports to Iraq were about $216 million in 1989, due to lower world oil prices and the continuing Iran- Iraq war.

In 1989, Jordan ended the unification with the Palestinian West Bank and was visited by a financial crisis. In 1990, the gulf crisis affected Jordan by a large number of returnees from the Gulf region who worked there, loosing their jobs and their estates. Thus, Jordan's economy had a significant number of unemployed, putting more pressure on the economic infrastructure and loosing significant external workers' remittances. Moreover, it lost the Gulf countries' wide markets. Jordan's economy has always suffered from external shocks, disturbing its plans for development, and leaving the country with a complex situation hard to solve or to ignore.

All these factors did not break Jordan's economy, but in reverse, it made the country more eager to find remedies and solve these problems by adopting new financial and social structures, which now provide significant gains. The country experimented with indicative planning through a succession of public institutions from the Development Board to the Ministry of Planning (Ifram, 1997). The Jordanian economy is based on the free enterprise system, and the government has important roles as regulator, promoter, investor, and planner in economic affairs.

The public sector plays the main role in investing in infrastructure as well as education, health, and welfare. The government also participates directly in financing the main industrial ventures through the provision of equity capital. Moreover, the government founded specialized credit institutions to provide loans to agriculture, industry, local government, and housing. These institutions are:

1. Agricultural Credit Corporation.
2. Industrial Development Bank.
3. Cities and Villages Development Bank
4. The Housing and Urban Development Corporation.
5. Jordan Co-operation Organization.

Furthermore, in order to encourage real and financial investment, the government has instituted tax exemptions for the private sector.

Jordan set different official development plans started with the Seven Years Plan for the period between 1964-1970; the three-year plan of 1973-75; and the five year development plans of (1976-80), (1981-86), (1986-90), and (1993-97) in order to encourage economic growth and development. These plans had to overcome the major obstacles of:

"(1) a high population growth and long-term saving gap,

(2) a rising amount of expenditures for national and domestic security purposes related to the 1967 and 1973 wars with Israel, and

(3) a foreign exchange gap, since Jordan on average imports almost two times more than it exports; this gap needs to be filled by foreign capital"(Husein,1998).

The main components of the Jordanian economy are agriculture including livestock production, industry mining, tourism, trade, transport, financial services, and modern telecommunications. The government has invested in substantial education system, infrastructure as well as an extensive health care network, and welfare targeting. The 1990s witnessed a course of macroeconomic adjustment and recovery from the financial crisis. Jordan succeeded in reducing its debt burden by more than half, over time (IMF working paper, 2003).

The Internal Sectors

The Agricultural Sector

The agriculture sector had been a substantial contributor to the economy at the time of Jordan's independence in the 1950s, and it constituted almost 40 percent of the GDP in the early 1950s. But then specifically after the 1967 war, agriculture suffered a long steady decline. By the mid-1980s, agriculture's share of the GDP was only about 5 percent. Several factors contributed to this downward trend. Jordan lost prime farmland after the Israeli occupation of the West Bank, as this area contains almost half of the country's agriculture land. Before the war with Israel, the West Bank produced 25 percent of Jordan's grain, 40 percent of the vegetables and 70 percent of the fruit production.

Starting in the mid-1970s, Jordanian labor emigration also accelerated the decline of agriculture growth. Many Jordanian peasants had forsaken farming to take more profitable jobs abroad, in different economic sectors, in Saudi Arabia and the Gulf states. Others migrated to cities where labor shortages had led to higher wages for manual

workers. The percentage of the work force employed in agriculture declined from 37 percent in 1965 to 7 percent in 1987.

Abandoned farms were built over as urban areas expanded. As the Jordanian government drove up interest rates to attract remittance income, farm credit tightened, which made it difficult for farmers to buy seed and fertilizer. Only 5 percent of Jordan's remaining land is arable and irrigation is often a problem, as the entire area is dependent on a fluctuating rainfall (Jordan's Home page, 1996).

Although the agricultural sector's share of the GDP declined in a steady rate, it is still an important economic sector, and some of its crops grew in absolute terms, especially in vegetables and fruitful trees production, as it can be noticed in Table 3-1[3].

Even with increased production, the failure of agriculture to keep speed with the growth of the rest of the economy resulted in an insufficient domestic food supply. Jordan thus needed to import such staples as cereals, grains, and meat. Wheat imports averaged about ten to twenty times the amount produced domestically (U.S. Library of Congress).

The total food imports bill averaged about JD171 million per year in the 1980s, while in the 1990s total food imports averaged about JD 474 million. One of the problems that faced agricultural exports in the late 1980s was the wearing away of Jordan's traditional agricultural export market of the wealthy oil-exporting states of the Arabian Peninsula, who were starting to replace imports from Jordan with food produced domestically at costs far higher than world market prices, using expensive desalinated water. Figure 3-1 shows the agricultural sector share of the GDP. It appears that the share

[3] All million JD in Chapter Three's Tables are on current price term.

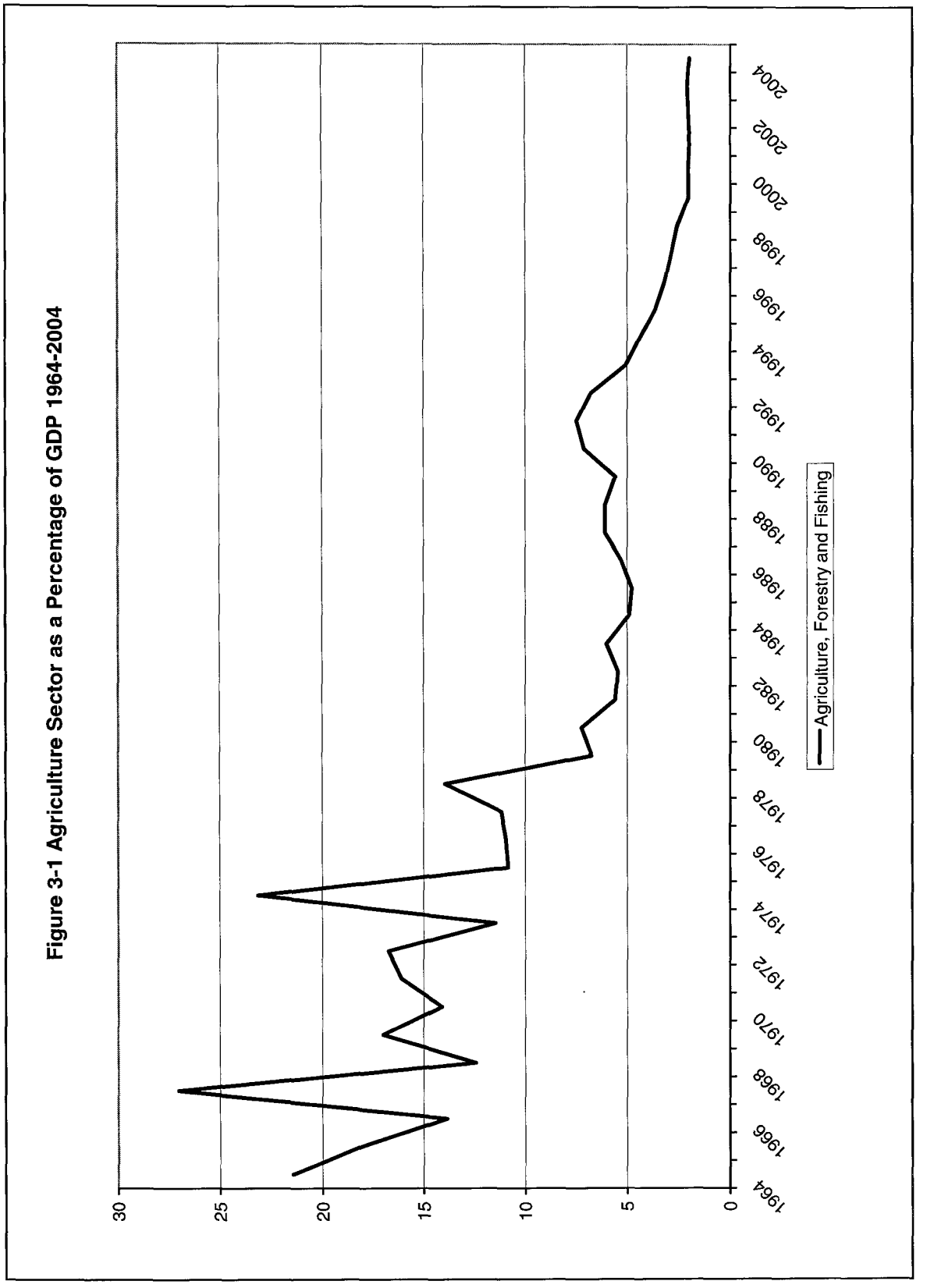
has declined through the period of 1964-2004 and has an average rate of 2 percent of the GDP, starting from the second half of the 1990s.

Table 3-1

Production of Main Agricultural Crops 1964-2003 (Thousand ton)

Year	Field Crops	Vegetables	Fruitful Trees
1964	419.2	493.3	220.5
1965	402.9	457.2	179.0
1966	136.6	316.7	160.3
1967	241.6	355.1	150.0
1968	126.9	192.2	43.3
1969	223.6	236.4	81.6
1970	65.3	186.4	21.4
1971	216.2	218.8	50.3
1972	269.2	265.9	80.8
1973	62.0	164.3	45.1
1974	316.7	229.5	96.3
1975	67.9	256.4	32.9
1976	90.4	166.4	56.8
1977	81.2	152.0	70.5
1978	78.4	343.3	121.7
1979	23.2	262.0	67.8
1980	181.2	295.4	117.9
1981	81.1	357.5	105.8
1982	83.5	346.1	120.1
1983	173.2	362.2	105.1
1984	66.6	326.1	121.2
1985	89.4	414.3	137.6
1986	43.3	402.0	155.8
1987	120.9	451.9	170.2
1988	133.9	446.6	226.9
1989	79.6	414.0	227.6
1990	132.3	571.2	282.4
1991	104.2	487.1	257.9
1992	150.3	664.2	303.8
1993	97.1	475.4	204.1
1994	77.2	656.9	295.9
1995	97.1	697.3	222.3
1996	75.0	515.0	272.7
1997	76.0	549.9	262.5
1998	67.3	552.9	341.2
1999	15.0	547.2	178.5
2000	41.3	594.6	303.6
2001	39.8	510.8	284.6
2002	106.6	647.8	387.3
2003	68.8	701.3	314.7

Source: Central Bank of Jordan, statistical yearly series (1964-2003).



The Industrial Sector

The main sources of the industrial sector are manufacturing, mining and quarrying. Manufacturing contributed about11 percent to 13 percent of the GDP during the period 1964-1999, and up to 14 percent of the GDP for the period 2000-2004. For the mining and quarrying, the percentage is low, about 3 percent of the GDP during the period 1964-1999, and it goes down to 2.7 percent of the GDP for the period 2002-2004. The majority of factories produce food products, clothing or consumer goods, but the major industrial income draws from the three heaviest industries which are phosphate extraction, cement manufacture, and petroleum refining.

Jordan's mineral wealth lies mainly in its phosphate reserves which are estimated at more than 2000, m. metric tons. Thus, Jordan is the sixth largest producer of phosphate rocks and the second largest exporter after Morocco since 1992 (MENA, Regional Surveys of the World, 2004). The Arab Potash Company ltd. (APC) was founded in 1956 as one of the earliest Arab joint ventures. The expansion of the phosphate industry has been a major element in consecutive development plans.

In 2001, Jordanian authorities removed the 50 percent limit on foreign ownership of Jordanian mining companies through its orientation toward privatization in the mid-1990s. Jordan depends mostly on imports of crude petroleum for its energy needs, besides using it as an input for petroleum products. Moreover, it relies now on Egyptian natural gas after it depleted its reserves of natural gas in 2000, which were discovered in north east Jordan in 1987. Figure 3-2 illustrates the mining and quarrying share of the GDP.

The manufacturing sector in Jordan has two levels. The first level represents the large scale, wholly or partially state-owned industrial establishment producing chemicals, petrochemicals, fertilizers, and mineral products, about 70 percent of the total manufacturing output linked to mining and extractive sectors. The second rank includes the small or median-sized light manufacturing entities; many are consider small, privately-owned businesses.

The Construction Sector

This sector is an important growing business in Jordan; it grew about 105 percent between 1964 and 2004. The highest construction share of the GDP was in the 1970s and the first half of the1980s, about 9 percent on average. It is described as the prosperity period, where workers' remittance abroad and foreign grants were high. In the second half of 1980s and the early 1990s, its share of the GDP started to decline; it was about 4.8 percent of the GDP. The construction sector in 1993 started to recover after the influx of returnees from Kuwait, who stimulated the construction sector by establishing new building projects, and it constituted about 7 percent of GDP in 1993 and 6 percent of the GDP for 1994 and 1995. The construction sector in period 1996-2004 did not go above 4 percent of the GDP. Figure 3-3 illustrates the developing of the construction sector as a percentage of the GDP.

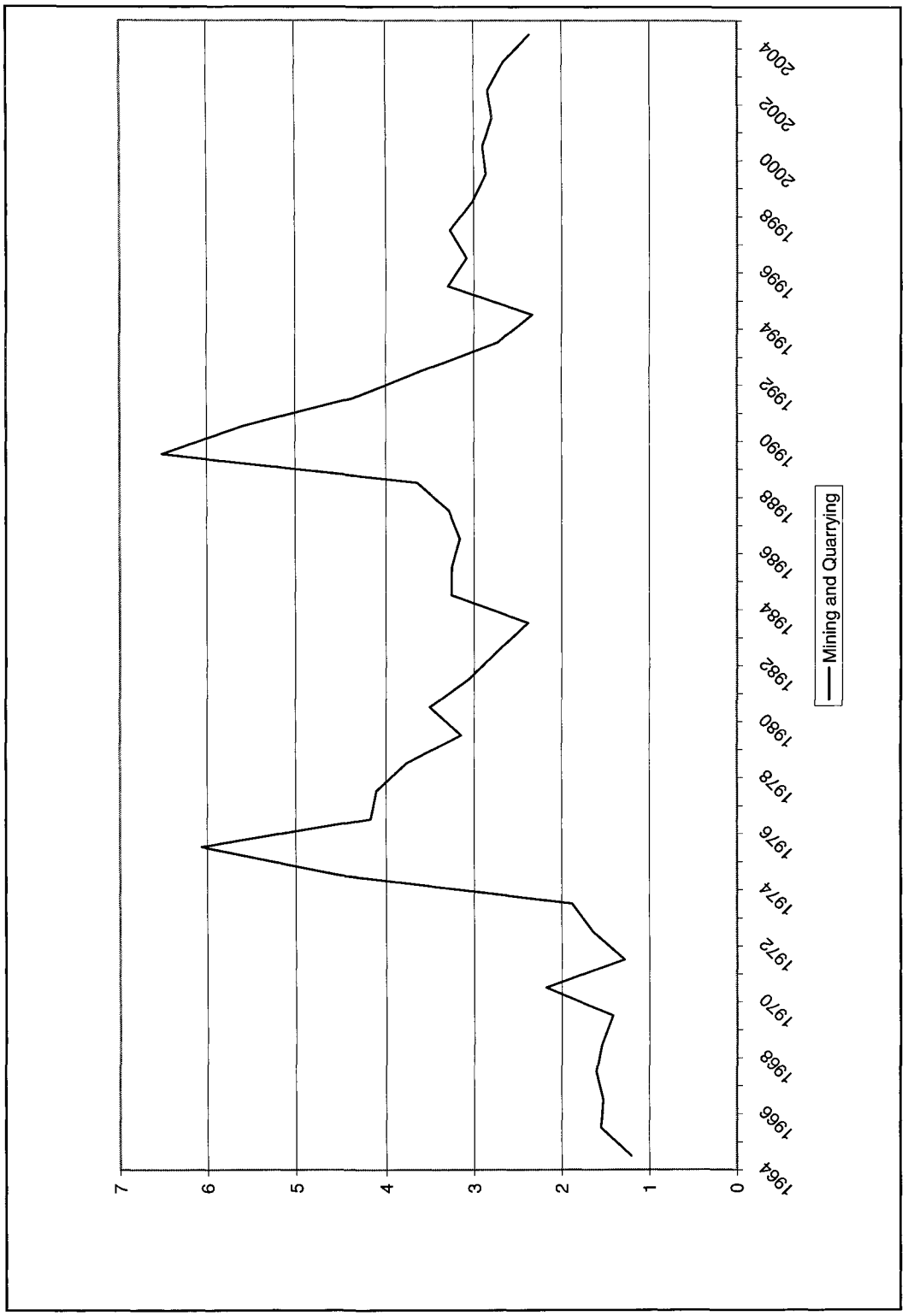
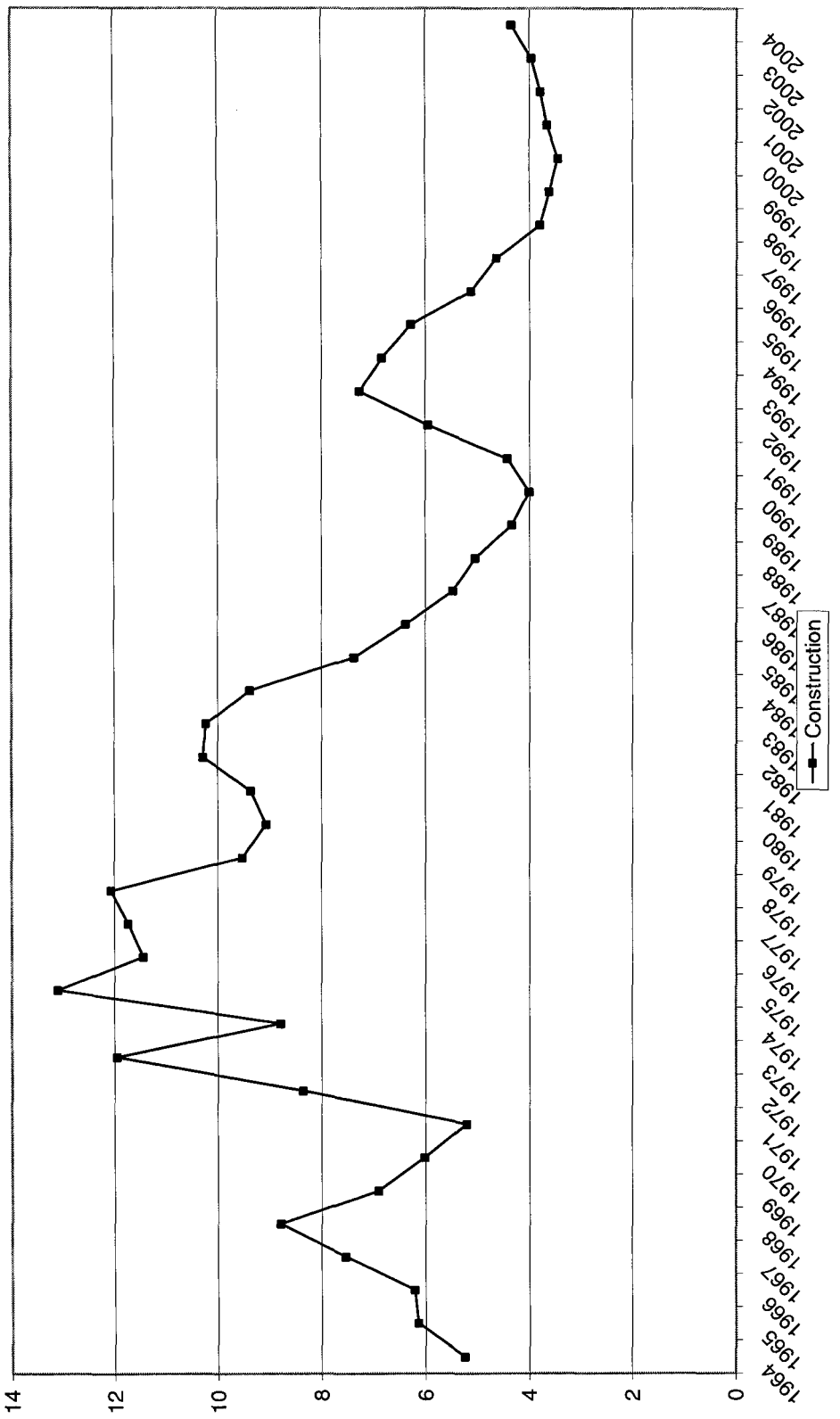


Figure 3.2 Mining and quarrying sector as a percentage of GDP 1964-2004

Figure 3-3 Construction Sector as a percentage of GDP 1964-2004



Government Budget Balance

The Jordanian government depends on tax and nontax revenues to finance its expenditures as domestic resources, and as it cannot cover its entire expenditures, it sought external resources (external aids and loans). During the 1970s and 1980s, most of the domestic revenues came from the indirect taxes as custom duties and imports licenses, in addition to direct taxes on income and profits. After the 1980s and with the government intention to more liberalized polices, it changed the taxation system by reducing the taxes on foreign trade and widening the consumption taxes by introducing the general sales tax (GST) and special sales tax (SST) law in 1994. Moreover, it widened the nontax revenues through privatization and opening the market for foreign investments and lightening the restrictions on capital flows.

During part of the 1960s through the 1970s, there are some years where the external receipt which included; external aids, loans repaid, external loans, and domestic loans, exceeded the domestic revenues. Then, in the 1980s, the external resources started to grow slower than domestic revenues. After that time, specifically after 1991, Central Bank of Jordan (CBJ) excluded the other external receipt and considered just the external aids in the external receipt side, as it appears in Table 3-2.

To get a clear idea about the external loans after the 1991, Table 3-3 indicates the outstanding balance of external government debt. The domestic revenues increased from 19 percent of the GDP in 1967 to 27 percent of the GDP in 2004, while the external receipt includes the domestic loans went down from 34 percent of the GDP in 1967 to 23 percent of the GDP in 1991, as the calculation of external receipt differed after 1991

which includes just external aids but this still gives an indication of the declining share rate of external receipts of the GDP.

Government expenditures are dispersed between current and capital expenditures, such as general administration, defense, security and internal order, finance administration, social services and economic development services. The expenditures share of the GDP was 52 percent in 1967, dropping to 37 percent of the GDP in 2004.

In the second half of 1980s, the foreign aids and workers' remittances from abroad started to decline, on aftermath of world oil price deterioration. Jordan started to draw down its foreign reserves, so its international reserves, including gold and hard currency, declined from $ 1.74 billion in 1980 to $ 854 million in 1986 (ITA, 1989). CBJ held about $ 130 million, and the rest was held by Jordan's private commercial banks. After that, the Jordanian government resorted to borrowing from foreign commercial banks in the world financial market to compensate the shortfall of outside income. The external debt reached $ 4.13 billion in 1986, compared to just $ 120 million in the 1970. Also, the accumulation of the external debt made the country suffer from an unsustainable government budget balance in the late 1980s and 1990s.

Table 3-2

Jordan's Central Government Budget 1967-2004

JD Million

Year	Revenues and Receipts		Expenditures	
	Domestic Revenue	[1]External Receipts	Current	Capital
1967	25.3	44.9	44.7	23.5
1968	26.3	44.7	57.2	23.3
1969	32.5	52	65.2	23.2
1970	30.3	42.5	59	21.7
1971	35.8	55.4	60.7	22.5
1972	42.6	58.1	70.5	31
1973	46.2	67.8	78.6	40.9
1974	65.8	83.1	103.6	43
1975	82.6	129.9	125.7	79.2
1976	107.6	99.1	185.9	76.6
1977	142.3	195.7	195.6	142.3
1978	158.5	188.4	212.9	148.6
1979	187.9	280.3	321.3	194.3
1980	226.1	298.9	336.1	227.1
1981	309.2	307.9	391.5	255.6
1982	362.2	293	443	250.6
1983	400.6	304.9	453.7	251.6
1984	415	263.4	488.1	232.7
1985	440.8	404	542.5	263.2
1986	514.4	391	570.5	410.8
1987	531.5	338.5	602.7	363.2
1988	544.4	409.4	669.6	384.4
1989	565.4	518.1	749.7	352.6
1990	744	425.7	841.4	278.7
1991	828.8	622.2	904	330.3
[2]1992	1221.2	[2]137.4	1019.8	352.7
1993	1208.6	197.7	1119.4	292.2
1994	1296.1	241.2	1211.6	376.2
1995	1404.3	215.7	1309.5	384.4
1996	1431.9	316.9	1379.3	410.3
1997	1378.3	242.5	1524.8	427.2
1998	1474.5	257.6	1644.6	443.1
1999	1497.1	318.8	1643.1	396.4
2000	1592.1	391.2	1851.3	335.8
2001	1658.6	433.4	1912.5	403.8
2002	1644.1	418.7	1899.9	438.8
2003	1675.6	776.5	2163.7	467
2004	2138.9	666.7	2326.5	603.9

Source: Central Bank of Jordan, yearly statistical series 1967-2004. (1): It includes external aids, Loans repaid, external loans, and domestic loans for the period of 1967- 1991. (2): Starting 1992 CPJ just includes External aids in the revenue side.

Table 3-3

Outstanding Balance of External Public Debt

JD Million

Lending source	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1) Long term loans:	4503	4500	4178	3753	4005	4150	4404	4276	4699	2868	4669	4635	5033	5311	5309
(A) Arab Governments	281	285	278.2	281	250	254	252	251	252	218	217	266	266	291	305
(B) Industrial Countries	2243	2278	2451	2640	2839	2784	2813	2640	2868	2938	2792	2670	2925	3229	3343
(C) Other Governments	401	416	71	31	24	26	26	23	23	24	28	28	31	31	32
(D) Foreign banks and Companies	996.5	928.9	800.5	183.4	157.1	135.3	102.9	73.4	49.6	42.5	35.5	28.4	24.9	17.8	10.1
(E) Multilateral Insts.	581.5	593.3	577.6	616.5	734.3	950.8	1210.0	1289.0	1506.6	1646.2	1597.0	1643.1	1785.8	1742.2	1619.2
2) Short Term Loans	26.6	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3) Bonds	169.9	163.6	152.6	174.6	127.3	141.9	158.6	175.2	193.8	214.5	37.4	36.5	35.5	34.5	33.2
4) Leasing contracts	364.4	284.0	246.8	302.3	206.8	174.0	160.0	129.3	117.2	103.5	88.3	71.4	55.2	46.8	6.9
Outstanding external debt	5064.3	4958.7	4577.6	4229.6	4338.8	4465.9	4722.9	4580.6	5009.8	5186.2	4794.7	4742.8	5123.4	5391.8	5348.8

Source: Central Bank of Jordan, Yearly statistical series 1990-2004.

The External Sector

The importance of the external sector is latent in the interrelationship with the external world. Jordan has its interdependence with other worlds. The Current and capital accounts have always played a significant role in the economic development. The trade balance has always been in deficit during the period of study.

In the period between 1960 and 1973, the currency system was under the Bretton Woods Fixed-Rate System, where the JD had a fixed exchange rate against the US dollar, $ 2.80 per JD, and the Jordanian currency has been covered 100 percent by pound sterling. In that period, the Jordanian current account (JCA) balance averaged about 8.17 percent of the GDP. In 1973, the original IMF system collapsed, so Jordan's financial institution adopted a managed floating exchange rate system.

Jordan's current account surplus was 0.75 percent of the GDP in 1974, and then became 5.35 percent of the GDP as a deficit in 1987. Jordan's economy was hit by a financial crisis in 1989, which led to currency devaluation against the US dollar. The JCA deficit became 4.6 percent of the GDP in that year.

The highest current account deficit as a percentage of the GDP during the whole period was about 16.3 percent in 1992. Then, in 1995, the financial authorities pegged the Jordanian dinar against the US dollar. So, the exchange rate has since remained at 0.708 (buy) and 0.710 (sell) dinar to dollar, and from that time, the financial system in Jordan has run a fixed exchange rate regime. The current account had a positive ratio of the GDP for 2002 and 2003; it was about 5 percent and 10.9 percent, respectively.

On the other hand, the country has always suffered from a large trade deficit. While exports increased from JD 3.95 million in 1960 to JD 24.1 million in 1973, at the

annual growth rate of 2.78 percent, imports increased from JD 41.2 million to JD 107.8 million in the same period by the annual growth rate of 90.6 percent. These trade deficits diminished somewhat if we add the services balance due to foreign exchange earnings from tourism in a part of this period before the 1967 war.

In the period of 1975-1987, the annual growth rate of exports was 23.65 percent, while the imports annual growth rate was 18.58 percent. After JD devaluation (1989-2002), the exports growth rate decreased and became 13.88 percent but still exceeded the imports growth rate of 10.18 percent. This may be due to the new policies that had been adopted by the economic authorities in the early 1990s towards more export-led economy, and attracting more foreign investment.

The exports share of the GDP went from 7.6 percent in 1967 to 29.5 percent of the GDP in 2002. In 1967, food and live animals accounted for 46.5 percent of Jordan's export earnings. And crude materials, specifically phosphate and potash, accounted for 37.2 percent of export earnings in the same year. Now this percentage declined and other sectors appeared to have a major contribution in Jordan's exports. So, food and live animals accounted for just 9 percent of total exports, and phosphate and potash for 16.2 percent of total exports, while chemicals and cloths and plastic products account for 25.5 percent and 26.5 percent, respectively. Table 3-4 provides the percentage share of the most important exports of the total Jordanian exports during the period 1964-2002.

Regards the growth rate of export, it appears that in earlier period the annual growth rate of exports is larger than the later one, although the exports share of the GDP was larger in the later period and the volume of exports increased during the entire period. This may be due to the depreciation of the Jordanian currency over 1989-2002.

Phosphate exports have dominated Jordanian foreign trade. Jordan is very rich in its phosphate deposits. It is the largest and most important item of all Jordanian exports. Potash has been the second most important mineral commodity on the export list. Furthermore, fertilizers have also become substantially important export commodities in the chemical sector. As we can notice from Table 3-4, the share of the crude materials which include phosphate and potash have declined as a percentage of total exports in the 1990s and the early 2000s, while the exports of cloths and plastic products in the miscellaneous manufactured articles have significantly increased in the early 2000s up to 26.5 percent of total exports in 2002.

Although, in some years, specifically recent years the phosphate exports share decreased, its revenues increased. For example phosphate export revenues increased from 90.9 million dinars in 2001 to 96.6 million dinars in 2002, whereas, the share of phosphate exports from total exports decreased from 6.6 percent in 2001 to 6.2 in 2002. One can explain this by the higher growth of total export revenues than the growth of the phosphate exports revenues in that period. In addition, these fluctuations are also due to changes in phosphate prices in the international markets.

Furthermore, the noticeable expansion of other export items in the trade balance sheet reduce the phosphate share of the total export revenues such as cloths and plastic and chemicals products, as a result of a diversified production process that Jordan adopted in the 1990s. The diversification and faster expansion of items of exports other than phosphate has resulted in higher growth of total exports revenues than the growth observed in phosphate exports revenues (Azhar, 2000).

It can be said that, in recent years, the Jordan exports sector has grown significantly in terms of production and of geographical distribution of its exports. The U.S.A. has been the most important market for Jordanian exports in recent years. Jordan's exports to the U.S.A. was an average of 27 percent of total exports for the years 2002, 2003, 2004, which overtook the Iraqi market as the largest market for Jordanian exports for past decades. Jordan's policies of diversifying its production and its geographical destination for its exports help economic development schemes by transgressing the regional and political impacts on the economic progress. Table 3-5 shows Jordan's main trade partners in terms of the Jordanian export markets more than Jordanian import markets.

On the other hand, Jordan's imports accounted for 41.9 percent of the GDP in 1967 and 54.2 percent of the GDP in 2002. Jordan imports almost everything, especially food and machinery and transport equipment from different countries of the world. In the 1990s, Jordan's authorities adopted liberalization policies by opening its market to foreign imports from the entire world, and above all, demonstrated its integration with other worlds by signing the World Trade Organization (WTO) Agreement in 2000.

International transfers, both private and official, have always played an important role in Jordan's economy, specifically in current account balance, as a significant source of foreign assets. These transfers have contributed to economic development in the country and enabled the economy to maintain a higher standard of living that would have otherwise been impossible (Ifram, 1997). Jordan's economy depends heavily on foreign grants. These grants include unrequited transfers from other governments and Jordanian workers' remittances from abroad. The net unrequited transfers were JD 26.03 million in

1959 went up to JD 64.6 million in 1973, and JD 351.2 million in 2002. Workers' remittances from abroad have become an important source of foreign exchange for the country during the period 1960-1985. Table 3-6 provides the Jordanian balance of payments for selected years.

In the last decade, Jordan has adjusted the structural fiscal policy toward more liberalization to correct the rigidities and imbalances in the structures of the fiscal system. The revenue base of the government budget was heavily reliant on trade taxes, whose potential was diminishing with trade liberalization. In this matter, the diversification of the revenue base toward the consumption-based taxes instead of trade–related taxes has helped overcome the challenges posed by trade liberalization and other structural reforms.

In that sense, as will be noticed in the coming section of this study, Jordan authorities adopted these liberalization polices to overcome the impact of external shocks that struck the economy in the second period of the 1980s and early 1990s. The government movement towards globalization in the 1990s and 2000s, especially with its membership in the World Trade Organization (WTO) since 2000 (even if it is in the recent past), opens a new chapter of world interdependency and a new targeting behavior towards dealing with economic events, which may lead to reducing the distortions between internal and external sectors by adopting more market-oriented policies.

Table 3-4

Some of Domestic Exports by Commodity According to S.I.T.C.* As a Percentage of Total Exports

Year	Food and Live Animals	Crude Materials, Inedible, Except Fuels (1)	Misc. Manufactured Articles (2)	Manufactured Goods (3)	Chemicals (4)
1967	46.5	37.2	1.9	1.5	0.40
1968	45.7	36.7	2.3	5.4	0.70
1969	46.1	32.3	1.8	7.7	1.6
1970	50.0	26.3	2.0	8.0	2.8
1971	41.8	26.6	2.2	12.2	4.3
1972	37.9	29.5	1.4	19.2	2.5
1973	33.2	32.5	2.1	15.8	4.6
1974	24.3	50.8	1.7	1.5	3.2
1975	25.4	50.1	4.0	10.2	4.8
1976	33.1	40.5	4.7	7.9	7.2
1977	34.2	31.3	6.0	15.7	8.7
1978	25.5	32.3	8.4	18.6	9.8
1979	25.7	33.4	7.8	17.1	8.7
1980	19.6	41.0	7.2	15.6	9.1
1981	19.5	33.5	8.7	20.5	10.6
1982	21.1	33.1	10.8	17.5	12.5
1983	22.7	32.9	5.8	11.2	23.0
1984	16.0	33.4	9.0	12.9	25.9
1985	17.1	38.6	7.3	15.6	20.0
1986	18.6	43.4	3.2	8.7	24.1
1987	13.6	36.8	4.0	15.0	28.1
1988	9.2	45.1	4.2	10.9	28.1
1989	9.1	42.1	4.6	11.9	29.2
1990	9.8	38.4	5.1	12.7	30.9
1991	14.4	38.1	4.4	10.6	29.6
1992	14.5	34.4	6.5	10.6	31.1
1993	20.3	27.9	7.6	11.8	28.3
1994	11.5	26.2	5.1	10.8	33.0
1995	9.9	25.9	4.8	9.6	30.1
1996	15.4	27.4	4.9	11.4	31.8
1997	17.0	24.2	5.3	10.3	31.4
1998	15.8	25.7	7.5	9.6	30.9
1999	12.1	25.2	7.4	10.3	33.5
2000	10.8	23.1	12.2	10.5	32.1
2001	10.0	18.5	19.5	12.5	25.5
2002	9.1	16.2	26.5	10.3	25.1

Source: CBJ, and the calculation of the author. * Statistical International Trade Codes. (1): Includes basically phosphate and potash. (2): Includes basically cloths and plastic products. (3): Such as wood, paper, textile yarn, fabric, and cement. (4): Includes basically paints, medicaments, and fertilizers.

Table 3-5

Some of Geographical Destination of Jordanian Foreign Trade for Selected Years

JD Million

	Iraq		Saudi Arabia		European Union Countries		U.S.A.		India	
	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.
1980	28.3	....	19.7	114.1	2.1	303.2	-	61.6	8.0	1.9
1985	65.9	....	39.1	159.1	11.4	341.3	-	128.0	45.3	1.8
1990	122.6	....	59.5	124.4	22.3	531.4	3.5	299.5	129.1	22.1
1995	190.8	316.3	70.3	91.4	63.0	859.3	14.7	240.5	114.1	48.7
2000	100.1	483.9	92.0	106.2	35.5	1,074.2	44.8	322.0	172.2	45.6
2001	299.3	485.6	95.6	111.0	49.8	1,089.5	164.6	280.7	145.3	52.1
2002	311.8	532.4	105.3	102.5	44.9	1,030.6	304.4	278.6	159.7	58.3
2003	224.0	265.6	109.4	459.4	57.1	1,023.2	468.6	276.2	141.0	60.3
2004	361.9	45.6	138.3	1,146.7	66.5	1,296.1	722.2	393.9	178.4	103.2

Source: CBJ, different issues.

Table 3-6
Balance Of Payments for Selected Years

JD Million

	1965	1970	1975	1980	1985	1990	1995	2000	2003
(1)Current Account	2.6	-5.9	21.5	111.6	-99.9	-272.8	-179.8	42.1	682.7
a. Trade Balance	-45.9	-53.4	-184.1	-543.3	-761.6	-1008.6	-1347.1	-1898.6	-1860.3
b. Services balance, of which:	19.1	6.8	65.8	256.2	346.7	326.4	952.0	1446.0	1624.6
Workers' Remittances	9.1	5.5	53.3	190.7	309.9	285.0	796.7	1168.2	1424.3
Investment Income	n.a.	6.1	8.2	14.2	-35.0	-267.2	-195.1	-18.8	-53.2
c. Unrequited Transfers	29.4	40.7	139.8	398.8	315.0	409.4	215.3	494.7	918.4
(2) Capital Account:	2.6	0.2	44.1	32.1	115.0	-45.0	151.2	407.8	-238.8
Public Sector	2.4	1.6	37.8	22.8	105.4	-165.2	-15.3	-219.7	-511.5
Private sector	0.2	-1.4	6.3	9.3	9.6	120.2	166.5	627.5	272.7
Net Errors & Omissions	1.0	3.2	-18.9	-33.7	-19.2	63.0	-165.4	223.4	380.1
Overall Balance	6.2	-2.5	46.7	110.0	-4.1	-254.8	-194.0	673.3	824.0
Financial Account	-6.2	2.5	-46.7	-110.0	4.1	254.8	194.0	-673.3	-824.0
Rescheduled and Deferred Interests	0.0	0.0	0.0	0.0	0.0	n.a	98.4	84.0	99.6
Rescheduled and Deferred Amortizations	0.0	0.0	0.0	0.0	0.0	n.a	204.1	57.6	94.7
Change in Net Foreign Assets (Inc.-)	-6.2	2.5	-46.7	-110.0	-18.5	-268.7	-196.1	-840.7	-1009.5

Source: CBJ, Different issues.

CHAPTER FOUR

THE INTERTEMPORAL APPROACH TO JORDANIAN CURRENT ACCOUNT: THE MODEL AND ITS SPECIFICATIONS AND EMPIRICAL ESTIMATION

Introduction

This study examines the degree to which the consumption-smoothing component of the current account, as influenced by forward-looking and rational agents, can explain the actual time series behavior of an economy's current account. The equivalent to a current account deficit is an imbalance of national savings and domestic investment. "The consumption-smoothing model is a version of the rational expectations of permanent–income hypothesis of private consumption behavior, which is extended to an open economy and used to predict the behavior of forward-looking national agent who can borrow and lend at constant world interest rate" (Otto, 1992, p.414). The importance of the consumption-smoothing model, as mentioned earlier, is its ability to distinguish between the effects of permanent and temporary shocks.

This chapter explores the Jordanian current account behavior during the period 1967-2002. This time series path presents a relatively long history of the Jordanian current account, which witnessed significant fluctuations and events that affected seriously the Jordanian economy, in general, and its current account specifically.

The Jordanian current account will be examined empirically using the intertemporal approach to determine whether the movement of the current account

follows the optimizing behavior. The intertemporal consumption-smoothing approach to the determination of the current account implies that international capital flows act as a buffer to smooth aggregate consumption in the face of temporary shocks in the economic fundamentals (changes in the level of output, investment, or government spending).

This analysis covers the period of 1967-2002. Jordan was vulnerable to a number of real and external shocks during the period of study, including the regional effects of oil price shocks, regional political developments and movement in labor remittances, and grants from official donors over time.

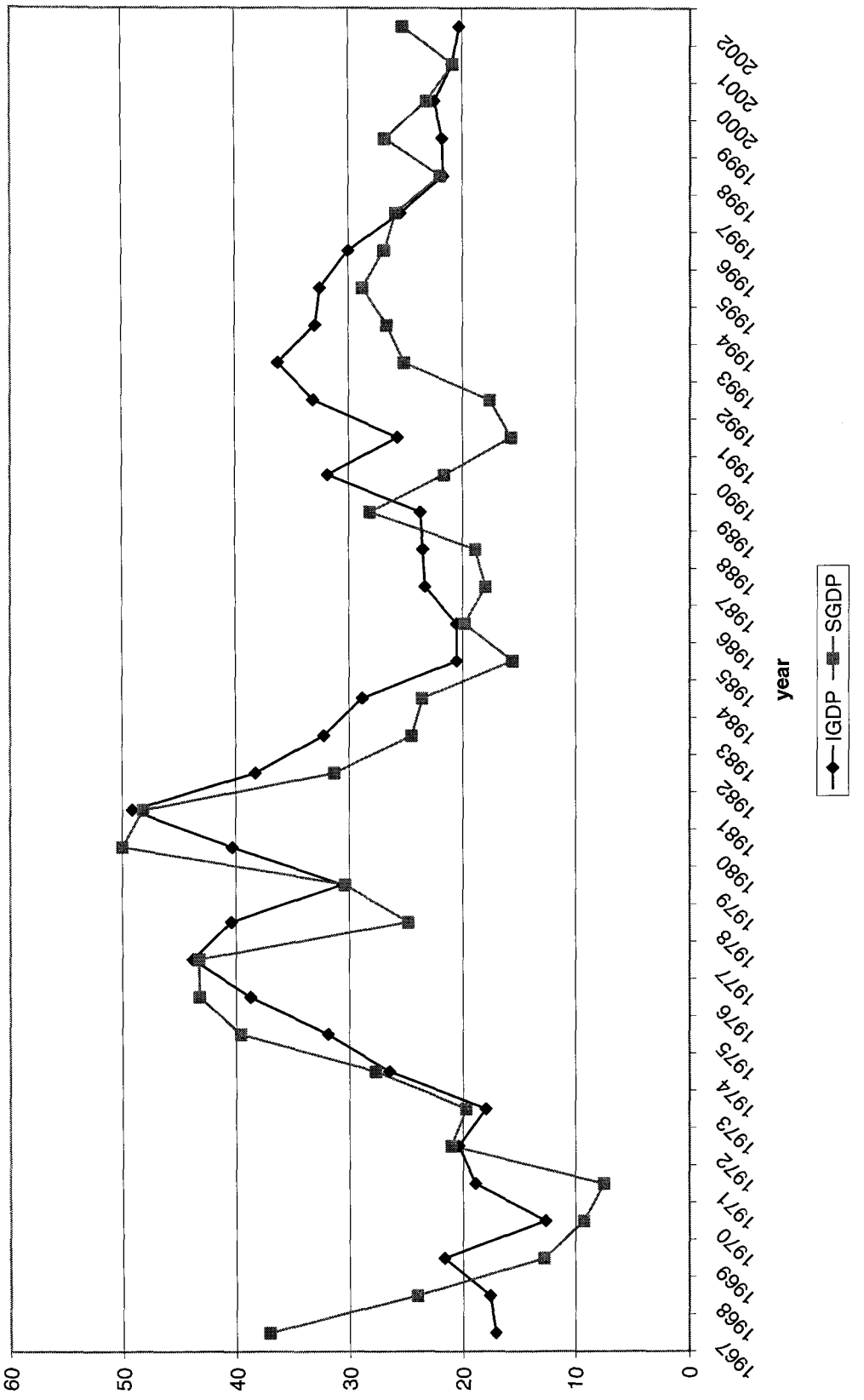
As an equivalent to the current account balances in the open market model, national savings and domestic investment provide an idea about the Jordanian current account as it appears in Figure 4-1. This figure illustrates Jordan's national savings and domestic investment as a percentage of GDP and, as we know the difference between them is the current account. The national domestic investment represented about 21 percent or less as a percentage of the GDP for the period 1967-1973. After that period, the domestic investment started to increase, until it reached its highest percentage during the period of 1974-1981, which was about 49 percent in 1981. This large amount of investment was due to extensive investment in building the country's infrastructure and settling the refugees after the Arab-Israeli war in 1967. After that, domestic investment decreased and reached its lowest level in the period of 1982-1990 at about 20 percent in 1985 and 1986, due to the oil price shock which reduced the amount of capital inflows into Jordanian investments markets. "As the regional economies entered into a recessionary period in a wake of falling oil prices by the mid-1980's, Jordan's underlying financial imbalances (government budget and trade balances) came to the forefront so, by

1987-88 these imbalances had become unsustainable and led to a severe crisis in the balance of payments that seriously undermined the economy's growth prospects" (Ifram, 1997, p.18).

At beginning of the period of study, Jordan had a savings ratio larger than domestic investment. Later savings ratio was always less than domestic investment, except for some points, like the mid-1970's and the end of the period of study, when Jordan started to accumulate a significant amount of official reserves by saving more than it invested.

To capture the structural change that occurred in the Jordanian economy through a current account analysis, the structural change model has been used to investigate whether there is a change in the long run relationship between private consumption and the economic fundamentals (output, domestic investment, and government spending).

Figure 4-1 Saving and Investment as Percentage of the GDP 1967-2002



The Model

As mentioned earlier, the intertemporal approach of the current account is derived from the permanent income theory of consumption and savings, and in this context, current account movements can smooth consumption over time. Sachs (1982) breaks down the movement in the current account into two components:

(1) The consumption-tilting motive, which is driven by the difference between the domestic discount rate and the world real interest rate.

(2) The consumption-smoothing motive, which smoothes aggregate consumption in the presence of shocks to output, investment, or government spending.

Following Sachs (1982), implying the infinite time horizons case, where the economy starts on period t but ends on period t+T, T>0, and considering a small open economy composed of a representative rational consumer who maximizes the utility function of:

$$U_t = E_t \sum_{t=1}^{\infty} \beta^t U(C_t), \qquad 0 < \beta < 1, \tag{4.1}$$

where, E is the mathematical expectations operator, C_t is the private consumption at time t and β is the subjective discount factor that reflects the preference for current consumption over future consumption. The constraint that exists is:

$$\Delta b_{t+1} = r b_t - (y_t - c_t - i_t - g_t) = -CA_t \tag{4.2}$$

where b is net foreign assets, r is the fixed world interest rate, y is output, c is private consumption, g is government expenditures, and i is investment.

We can rewrite the previous constraint as follows:

$$CA_t = b_{t+1} - b_t = y_t + rb_t - c_t - g_t - i_t , \tag{4.2.a}$$

then we rearrange this term we get:

$$(1+r)b_t = b_{t+1} - y_t + c_t + g_t + i_t \qquad (4.2.b)$$

The production function is $y_t = A_t F(k_t)$, where k is the capital factor.

To eliminate the all forward b factor from Equation 4.2.a we do iterative substitution method. The Change in net external liabilities (Δb_{t+1}), and thus the CA balance –CA, is given by "national cash flow" ($z_t = y_t - i_t - g_t$), less private consumption minus net foreign investment payment (rb_t).

If we rearrange Equation 4.2.b in terms of consumption we obtain:

$$C_t = (1+r)b_t - b_{t+1} + A_t F(k_t) - (k_{t+1} - k_t) - g_t \qquad (4.2.c)$$

where, $i_t = (k_{t+1} - k_t)$. we can express the utility function as follows:

$$U_t = \sum_{t=1}^{T} b\, U[(1+r)b_t + b_{t+1} + A_t F(k_t) - (k_{t+1} - k_t) - g_t] \qquad (4.2.d)$$

To find the necessary first-order condition for the problem, we maximize U_t with respect to b_{t+1} and k_{t+1}, we get the Euler consumption equation and the equality between the marginal production and the world interest rate.

The Optimal level of consumption C_t^* is:

$$C_t^* = r\theta[-b_t + (1+r)^{-1} E_t(\sum (1+r)Z_t)] \qquad (4.3),$$

where, $\theta = [\beta(1+r)^2 - 1]/[\beta r(1+r)]$ is the consumption-tilting parameter. "Along the optimal path, private consumption depends on net wealth (the present discount value of the expected future stream of cash flows) and the existing stock of net external liabilities. Consumption tilting results in a bias towards either current account deficits or current account surpluses, where these imbalances are created in a manner consistent with intertemporal solvency" (Cashin and McDermott, 2002).

The consumption–tilting parameter, θ, reflects the consumption-tilting dynamics of consumption that may arise if there is a difference between the world interest rate and the domestic rate of time reference ($r \neq (1+\beta)/\beta$) as mentioned in Chapter Two. Again, if $\theta < 1$, the country chooses to have a high level of consumption in the current period (it runs a current account deficit), and then reduces the consumption in future and winding back its accumulating stock of external liabilities. And when $\theta > 1$, the country lowers its net external liabilities (it runs current account surplus) by reducing current consumption, and then gradually raises consumption in future (run current account deficit). That implies that, if there is no tilting consumption component of current account, $\theta = 1$, then there is no motive for a country to consume more or less than the rest of the world, which means that there are no distortions between domestic economy and the world's interest rate and prices.

The optimal consumption-smoothing component of the current account is given by:

$$CA_t^* = -E[\sum^{\infty}(1+r)^{-j}\Delta Z_{t+j}] \qquad (4.4)$$

Consumption-smoothing component of the current account is the current account that occurs if a country was neither more or less eager to consume than the rest of world, its ($r = (1+\beta)/\beta$) which means there is no consumption tilting component, as $\theta = 1$. This study, as other studies, will consider only the consumption-smoothing component of current account since the consumption-tilting has implications for the current account that are entirely distinct from the consumption-smoothing component of the current account, which is the only component that can be used as a buffer. So, it is important to make sure

that we compare the optimal current account which derived from Equation 4.4 to consumption-smoothing part, and not to all actual current account, which includes the tilting component of the current account.

$$CA_t^{sm} = z_t - \theta c_t - rb_t \qquad (4.5)$$

Filtering the consumption tilting from the actual current account according to equation (4.5), where CA_t^{sm} is the stationary consumption-smoothing component of the actual current account, is important for two reasons according to Ghosh (1990). First, it is simple to model the consumption-smoothing component of the current account and, therefore, the optimal current account movement is only the consumption-smoothing motive, not include the tilting component which is difficult to identify. Second, the consumption-tilting component of the current account will be nonstationary as it is not affected by the temporary shocks, while the consumption-smoothing component is usually stationary and therefore more conducive to econometric analysis. So, if $\theta < 1$, the consumption-smoothing current account deficit will be smaller than the measured current account position, since the incentive is for economy to bring consumption into the present, means that the current account is more tilting-consumption oriented and the current account balance will not act as a buffer against any economic shocks. If c_t and $(z_t - rb_t)$ are both I(1) variables, then the estimated θ is the cointegrating parameter from regression of $(z_t - rb_t)$ on c_t.

Data and Estimation Method

The data used to estimate the parameters of the model are annual national accounts for the period 1967-2002, expressed in millions of J.D.(JD1= $ 1.40), obtained from the IMF's IFS yearbooks. All data are converted into real terms by dividing by the Consumer Price Index (CPI). I used, in the first place, the Gross Domestic Product (GDP) deflator but because there is a longer time series for (CPI), I ended up using the latter one.

The first step is to examine the stationarity of the variables used in the model, which are; Gross Domestic Product (GDP): private consumption, national cash flows (GDP minus government expenditures G minus domestic investment I); and the current account. Stationarity was tested by examining the null hypothesis of the unit roots test using Philips (1987) test for the unit root test. Then, it employed the unknown structural change test for single break point, the Gregory and Hansen (G-H) test (1996), to assess where a shift in 'long run' relationship occurred between private consumption and national cash flows. Using the residual-based test for the cointegration relationship in a model with regime shift (Model four), a customized Gauss program by G-H (1996), we obtained the break point. Two sub-periods are identified: one is before the structural point and the other sub-period is after the structural break. The second step is to test for stationarity of the variables within each sub-period. This is important as each of the sub-periods will be used in an estimation process to obtain the optimal current account for each sub-period. Using the cointegration relationship between the variables is useful, as it tests for solvency conditions, as will be explained later. Then, comes the prediction process, which involves the calculation of the benchmark (optimal) current account for

Jordan, and detects whether its current account behaves optimally (its actual current account matches the predicted current account) which implies that, Jordan's current account behavior is consistent with the consumption-smoothing model. This required also doing hypothesis tests to investigate the degree of consistency between the two series.

Following a customized econometrics method by Gregory and Hansen (1996) for testing the structural change and Cashin and McDermott[4] (1998,20 02) for intertemporal (consumption-smoothing) approach, I obtained the unit root tests for main variables, and the structural change test to get the break point. Moreover, I determined the actual and optimal current account for both sub-period, and finally implemented the hypothesis tests.

Unit Root Tests

Using the Phillips (1987) unit root test to examine the stationarity of the variables indicates that all variables are stationary in first differences as the test statistics for each variable exceeded the critical value at 5 percent in absolute terms. The result is in Table 4.1.

Table 4-1 ***Unit Root Tests***

The variables	**Levels**	**First Difference**	**Critical Value at 5%**
National Cash Flow(z)	0.112	-4.544	-2.94
Cash Flow (z-rb)	0.17	-5.050	-2.94
Consumption	0.35	-4.892	-2.94
Current Account	-2.048	-6.540	-2.94

[4] I want to thank Paul Cashin and John McDermott for providing me the procedure for the analysis of intertemporal capital flows.

Allowing for Regime Shift

The use of Gregory-Hansen (1996) test for cointegration is helpful since it allows for the timing of a regime shift to be unknown a *priori.*

First, G-H (1996) started with the standard model for cointegration in the presence of no structural change:

$$(z_t - rb_t) = \theta c_t + \varepsilon_t \quad \ldots\ldots t = 1,\ldots T \quad \ldots\ldots (4.6),$$

where, $(z_t - rb_t)$ is I(1) and ε_t, the disturbance term, is I(0). In this typical application, the parameter θ is time invariant. G-Hansen (1996) note that under certain applications, it is useful to think of a cointegrated relationship holding over some period of time, and then shifting to a new "long run" relationship. The structural change would be reflected in the change in θ, which is the consumption-tilting parameter in our application.

G-H (1996) use four models to reflect different possibilities of structural change.

-Model (1) is the standard model represented in equation (4.6).

-Model (2) Level shift in constant term:

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \alpha^T y_{2t} + e_t, \qquad t = 1,\ldots,n \qquad (4.6.a)$$

-Model (3) C/T Level shift in constant with trend:

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \beta_t + \alpha^T y_{2t} + e_t, \qquad t = 1,\ldots,n \qquad (4.6.b)$$

In model three a time trend β_t can be introduced, into level shift model.

-Model (4) C/S Regime shift:

$$(z_t - rb_t) = \mu_1 + \mu_2 \varphi_{t\tau} + \theta_1 c_t + \theta_2 c_t \varphi_{t\tau} + e_t, \qquad t = 1,\ldots,T, \qquad (4.7)$$

Here, both the intercept and the slope relationship for c_t change.

This study uses model 4 (C/S), since the two others did not give sensible results for break points. The model where structural change occurs with level shift (intercept) and /or with a shift in the slope vector in the cointegrating relationship was used, where μ_1 represents the intercept prior to the shift, μ_2 represents the change in the intercept at the time of the shift, θ_1 denotes the cointegrating slope coefficient before the shift, θ_2 denotes the change in the slope coefficient, and c_t and $(z_t - rb_t)$ are I(1), and e_t is I(0). Using dummy variables as follows:

$$\varphi_{t\tau} = \begin{cases} 0 & if \quad t \le [n\tau], \\ 1 & if \quad t > [n\tau], \end{cases} \tag{4.8}$$

where, the unknown parameter $\tau \in (0,1)$ represents the relative timing of the change point and [] denotes integer part.

The Gregory and Hansen test for shifts in cointegrated models is useful as it does not require information on the timing of such events. I tested the null hypothesis of no cointegration against the alternative hypothesis given by Equation 4.7. The standard cointegration test ADF(t) and Philips (z) tests are computed for each possible shift $\tau \in T$, using the residual from the cointegrating regression of Equation 4.7. The result is as follows:

Table 4-2

Test results based on the Structural Point of 1984

ADF(t)*	-5.39 (0.50)
Z(t)*	-5.75 (0.47)
Z(a)*	-35.19 (0.47)

The τ is chosen so that ADF(t), Z(t) and Z(a), take the smallest values across all possible break points, where τ is any compact subset of (0,1). The smallest statistical tests gives the least favorable result for the null hypothesis. The G-H (1996) cointegration test (allowing for structural break) is run to examine whether there has been a one-time shift in the cointegrating relationship, and the Phillips (1987) unit root test statistic shows that both c_t and $(z_t - rb_t)$ are I(1), and the residual from the cointegrating regression of Equation 4.7 is I(0), indicating that c_t and $(z_t - rb_t)$ are cointegrated. The OLS regression results are shown in Equation 4.9 as follows:

$$(z_t - rb_t) = 2.91 - 13.77\varphi_{t\tau} + 0.38c_t + 0.56c_t\varphi_{t\tau} + \hat{e}_t \qquad (4.9)$$
$$se \qquad (1.00) \quad (2.57) \quad (0.05) \quad (0.08)$$

The hypothesis of no cointegration is rejected at (5 percent level) by both the ADF(t)* and Z(t) tests, and is accepted in the Z(a) test, since the minimum value of ADF(t)*, and Z(t) is -5.39 and -5.36 respectively, which exceed the 5 percent critical value of -4.95. This indicates that the hypothesis of a common tilting parameter in both sub-samples is rejected at the 5 percent level and that c_t and $(z_t - rb_t)$ are cointegrated conditional on a structural break in their relationship at 1984. It is important to know that

if the conventional cointegration test (such as standard ADF or Philips-Ouliaris tests) does not reject the null hypothesis of no cointegration, but the G-H test does, then there is strong evidence of a structural shift in the cointegration relationship (G-H, (1996)).

The Phillips-Oulirias cointegration test reveals that there is no cointegration between c_t and $(z_t - rb_t)$. This is the conventional test. The null hypothesis of no cointegration could not be rejected at the 5 percent level of significance from that the test statistic was -2.12 and the critical value of (Phillips- Oulirias, 1990) is -2.76, which is higher than the statistical value. This result is for the standard regression without a structural break. The null hypothesis of the Gregory-Hansen model of no-cointegration between national cash flow and consumption is rejected in favor of an alternative hypothesis of a one-time break in the cointegrating relationship (change in cointegrating level and/ or on slope coefficients).

Equation 4.9 shows that the tilting parameter is less than unity before the structural break, implying that Jordan is consuming more than its permanent cash flow and must be running down its stock of external assets or increasing its external liabilities. The tilting parameter for the earlier period (1970-1984) is 0.38, before the structural break, which means that Jordan ran a large current account deficit. The later period (1985-2002), the tilting parameter is 0.56 larger than before the structural break, so that the tilting parameter after the structural break is 0.94. This means that Jordan should have diminished preference for current consumption over future consumption in the later period (1985-2002). Of course, it happened gradually, and this number is the average of the later period. The tilting parameter of the first period can be considered as a clue for the financial crisis that hit Jordan's economy in 1987.

We can explain the structural break point after 1984 by the second oil-price shocks that occurred in 1985. which reduced prices of oil. Even though Jordan is a non-oil producing country, it has a strong relationship with the Gulf countries through aids and loans.

Solvency Condition

This condition states that the present discounted value of the future balance of trade surplus must equal the present level of net external liabilities. The current account deficit is formed as the difference between national cash flow net of payments on the outstanding stock of external liabilities, $(z_t - \boldsymbol{rb}_t)$, and private consumption, $\boldsymbol{c}_t$. Both $\boldsymbol{c}_t$ and $(z_t - \boldsymbol{rb}_t)$ are I(1) variables. Cointegration between $\boldsymbol{c}_t$ and $(z_t - \boldsymbol{rb}_t)$ is a necessary condition for the country to satisfy its intertemporal budget constraint over a long run relationship. The cointegration result set out in Equation 4.9 implies that capital inflows to Jordan were not a breach of the solvency condition over the full period, which means over the long-run, consumption cannot depart too far from movement in available resources of the economy conditional on the structural break point. The residual from the regression of Equation 4.9 is I(0), the ADF t-statistic for the residual, which represents the current account is -5.09, so that $\boldsymbol{c}_t$ and $(z_t - \boldsymbol{rb}_t)$ are cointegrated.

Calculating the Optimal Current Account

The next step in this model is to calculate the optimal consumption-smoothing component of the current account, which needs to estimate the expected values in Equation 4.4. The derivation of the optimal (consumption-smoothing) current account requires a measure of anticipated future changes in national cash flows. Using a biavariate VAR is commonly employed to estimate the optimal current account. To

capture the additional information from consumers, we must have them base their forecasts on the current and lagged current account, in addition to current and lagged net output changes. That is, $-CA_t^{sm}$ should be the best forecast of the present discounted value of future changes in national cash flows. Taking into account these considerations, one must assume that the consumer's forecast of Δz is based on the first order unrestricted vector autoregression (VAR) of the form of:

$$\begin{bmatrix} \Delta z_t \\ CA_t \end{bmatrix} = \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix} \begin{bmatrix} \Delta z_t \\ CA_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{4.10}$$

An estimate of the optimal consumption-smoothing component of the current account was computed as:

$$\hat{CA}_t^* = \begin{bmatrix} -1 & 0 \end{bmatrix} \begin{bmatrix} (1+r)^{-1} & \hat{A} \end{bmatrix} \begin{bmatrix} I_2 - (1+r)^{-1} \hat{A} \end{bmatrix}^{-1} W_t = \hat{\Gamma} W_t \tag{4.11}$$

assuming $W_t = AW_{t-1} + \varepsilon_t$, where $W_t = (\Delta z_t \quad \hat{CA}_t^{sm})'$, ε_t is 1×2 vector of disturbance terms, and A is 2×2 matrix of coefficients, with the estimate of A from the VAR and using the fact that $E_t[W_{t+j}] = A^j W_t$, an estimate of the optimal consumption-smoothing component of the current account was computed as in the equation (4.11), where I_2 is the 2×2 identity matrix and Γ is a 1×2 matrix of coefficients.

First, the parameters need to be estimated from Equation 4.10. To implement the VAR system, all variables must be stationary. To ensure this we have to examine the stationarity of the national cash flow and the current account variables; z_t is I(1), and the

first difference of z_t is stationary (Δz_t is I(0)), and the CA_t^{sm} component is stationary conditional on a structural break, so the residual from the regression of Equation 4.9 is stationary.

Then the VAR system is estimated in terms of Δz_t and CA_t including a constant term:

$$\begin{bmatrix} \Delta z_t \\ CA_t \end{bmatrix} = \begin{bmatrix} 0.015 & -.306 \\ 0.396 & 0.784 \end{bmatrix} \begin{bmatrix} \Delta z_{t-1} \\ CA_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{4.12}$$

The parameter from Equation 4.12 and the real interest rate of r =0.04 are used to calculate the 1X2 matrix $\hat{\Gamma} = [\varphi_{\Delta z} \quad \varphi_{CA}]$ in Equation 4.11. This is for the full period. Figure 4-2 shows the actual and predicted current account balances for Jordan. The consumption-smoothing hypothesis can be tested by comparing the estimate of the optimal consumption–smoothing hypothesis, derived from Equation 4.11, with the estimated actual consumption-smoothing current account, which derived from the residuals of Equation 4.9.

Using the traditional variance approximations for nonlinear functions such as $\hat{CA}_t^*$, may be imprecise. Follow Cashin and McDermott (1998) simulation method to estimate the confidence bands and median estimate of $\hat{CA}_t^*$ may be useful to get more precise results.

Testing the Model (Hypothesis Tests)

The final step is to conduct a number of hypotheses to test the model's performance. First, one testable implication of the intertemporal model is that the current

account should Granger-cause subsequent in national cash flows. The actual smoothed current account should "Granger-cause" (help predict) changes in national cash flows.

The second test is to examine whether the VAR parameters in Equation 4.11 conform to the nonlinear restrictions. This test implies that movements of the actual smoothed current account reflect the optimal smoothed component of the current account; failure of this test indicates that the country is not optimally smoothing its consumption path. This can be examined two ways: first, by inspection of a plot of the respective series of optimal and actual consumption-smoothing current accounts, and second, by an estimation of equation 4.11. The optimal consumption-smoothing implies the joint parameter restrictions $\Gamma = [0 \quad 1]$, and nonrejection of the joint restriction implies that movements in $\hat{CA}_t^*$ are smoothed.

The third test that can be used to evaluate the performance of the consumption-smoothing model is to compare the correlation of the actual $\hat{CA}_t^{sm}$ and optimal $\hat{CA}_t^*$ smoothed current accounts, which is shown in Table 4-3.

Table 4-3

Jordan: Tests of the Consumption-Smoothing Model

Sample	Granger-Causality		Nonlinear Restriction		Corr $(\hat{CA}_t^{sm}, \hat{CA}_t^*)$
	F	ρ-value	Wald	ρ-value	
1967-2002	6.461	0.017	48.293	0.000	-0.706
1967-1984	3.626	0.079	70.471	0.000	-0.662
1985-2002	4.307	0.065	2.101	0.350	0.865

Granger causality test. The Granger Causality Test is a F-statistic test used to determine if the actual smoothed component of the current account, $\hat{CA}_t^{sm}$, causes changes in national cash flows Δz_t. If agents have more information about the evaluation of national cash flows than is contained in its own past values, then the current account ought to Granger-cause changes in cash flows (Ghosh and Ostry, 1992).

According to the consumption-smoothing hypothesis, the actual smoothed current account should "Granger-cause" (help predict) changes in national cash flows (Campbell, 1987). This statement will be true whenever economic agents have better information about the future path of national cash flows (through news of political, institutional or other events) than is contained in past values of changes in national cash flows (Cashin and McDermott, 2002).

The agents are assumed to behave in light of information they receive (rational expectations) hypothesis. This test indicates the importance of the relationship (the causality relationship) between the current account behavior and change in national cash flows, implying that if a country experienced a current account deficit now, that means it consumed more, and thus the external liabilities are growing. So, under the intertemporal approach, one can predict that the country will run a current account surplus in the future and shrink its external liabilities (increasing national cash inflows) as the country smoothes its consumption over time. Thus, an actual consumption-smoothing current account surplus (deficit) today should signal an expected decrease (increase) in future national cash flows.

Table 4-3 shows the results of the Granger-Causality Tests. The standard F-statistic for the absence of "Granger-causality" from the current account to national cash

flows is rejected at the one percent level of confidence for the full period. For the two sub-periods, 1967-1984 and 1985-2002, the null hypothesis of no Granger causality from the current account to national cash flows has been rejected at the 5 percent level of confidence.

These results imply that the current account weakly (informally) Granger-causes future changes in national cash flows (NCF), which gives evidence in favor of the intertemporal optimization approach to the current account in Jordan. So, in both sub-periods, the results are consistent with the consumption-smoothing model.

Nonlinear restrictions test of the model. The Wald Test is a more formal test of the parameters' restrictions on the consumption-smoothing model. The linear restriction test is a Wald test, which determines whether the rational expectations of the optimal current account are close to the actual one or not. The way to detect this restriction is to examine whether the coefficients on the first differences of NCF $\varphi_{\Delta z}$ are equal to zero, and the coefficients on the actual current account φ_{CA} are equal one. So, the actual current account will be equal to the predicted current account if the parameters' restrictions $\varphi_{\Delta z} = 0$, $\varphi_{CA} = 1$ are satisfied.

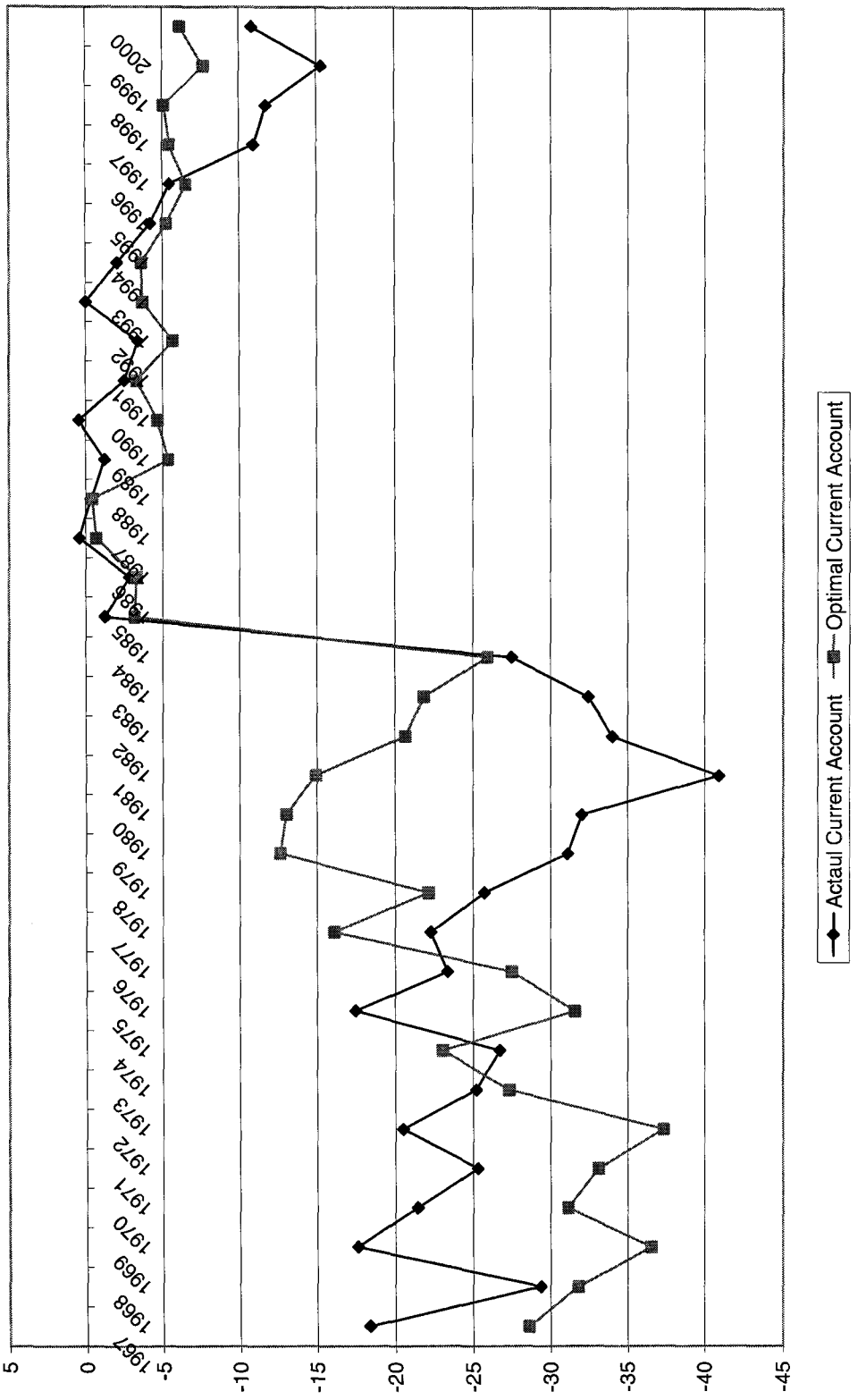
The null hypothesis of the Wald Test is that the estimated VAR coefficients satisfy the restriction of the consumption-smoothing model that $\hat{\Gamma} = [0 \quad 1]$ in Equation 4.11. Rejecting the null hypothesis of these nonlinear restrictions indicates that the movement of the actual smoothed current account does not reflect those of the optimal smoothed current account. Testing the restriction of the coefficients $\varphi_{\Delta z} = 0$, $\varphi_{CA} = 1$ jointly requires a calculation of χ^2 statistic for the hypothesis of $\hat{\Gamma} = [0 \quad 1]$. The nonlinear

restriction on the VAR parameters of Equation 4.11 was clearly rejected in the early sub-period (1967-1984) and full period, and it is accepted at the 5 percent level of significance in the later period (1985-2002).

The consumption-smoothing model is clearly much more successful in explaining the behavior of international capital flows to Jordan in the later period than in the earlier sub-period. A rejection of the restrictions in the early subsample implies that the difference between the actual and the optimal consumption-smoothing component of current accounts may represent more than merely a random sampling error.

The correlation between actual and optimal current account. Overall, a simple method of evaluating the consumption-smoothing model is to compare the correlation between the actual and the optimal smoothed current accounts. In the early subsample (1967-1984), before the oil price shock, the Corr $(\hat{CA}_t^{sm}, \hat{CA}_t^{*})$ was - 0.662, negative correlation, which indicates that the capital flows to Jordan were not consistent with optimizing behavior, as predicted by the consumption-smoothing model. However, in the later period (1985-2002) after the oil price shocks, the Corr $(\hat{CA}_t^{sm}, \hat{CA}_t^{*})$ rose dramatically to 0.865 reflecting high consistency with the optimizing behavior.

Figure 4-2 Actual and Optimal Current Account of Jordan 1967-2002



Jordanian Economic Policy Implications

As this is the first empirical study for the country of Jordan that examines the intertemporal approach of the Jordanian current account within the structural break model, it is important to analyze the behavior of the government and its economic implications during the period of study.

This study finds that during the period of 1967-2002, Jordan's economy and society passed through a great deal of changes and circumstances. Using Gregory-Hansen's (1996) residual-based test for cointegration in the presence of a regime shift, and the Phillips-Ouliaris (1990) residual-base unit root tests for cointegration, it is found that a structural break occurred in 1984.

Why the Year of 1984 could be a Structural Break Point?

The structural change analysis of Jordanian time series variables gives us a structural break point in 1984. The regime shift model, the fourth model of G-H (1996), considers the time of the break point to be included in the first sub-period (1967-1984) which in our case is 1984, where the unit root test results associated with the parameter describing the change in the intercept and slope is the minimum value. Therefore, the time of the break point (τ=1984) has the most rejected unit root test.

In Jordan's case the break point in 1984 can be justified by the oil-price shock in 1985, as this year is the starting year for the second sub-period. This implies that the Jordanian economy had been affected by this external shock that influenced the two important external resources of government revenues and receipts which are the workers' remittances and foreign aid, especially Arab aid.

Current Account Analysis before Structural Break (1967-1984)

During the period of 1967-1984 before the second oil price shock (1985), the pattern of Jordan's external borrowing was not consistent with maximizing utility in response to shocks to national cash flows. In the second half of the 1980s, a structural break occurred in the relationship between consumption and national cash flow. This means that the Jordanians became more willing to substitute future consumption for current consumption. Throughout the period of 1985-2002, after the structural break occurred, the current account behavior became more consistent with the prediction of the consumption-smoothing model.

Figure 4-2 presents the actual and the predicted current account of Jordan. It appears in the first period that the actual and predicted current accounts are not matched, and as the formal test assured by the Wald test result, the nonlinear condition is not met. In the early period, Jordan's economy depended basically on foreign aid as a major source for the government's expenditures and workers' remittances. Figure 4-3 presents the net workers' remittances and unrequited transfers as a percentage of the GDP for the period of 1967-2002. The international transfer payments have always played a significant role in Jordan's economy. During the period of 1967-1973, the transfer grants from other governments and remittances from Jordanians working abroad were sufficient to cover the deficit in the trade balance except for the years of 1969,1970, and 1971, because the United States' aid dropped in that period. "The foreign direct investments (FDI), and short-term capital inflows were negligible during this period" (Ifram, 1997, p.15). Unfortunately, there is no statistical information about the FDI for the whole period of the study.

The government budget of Jordan was mostly dependent on foreign aid in the form of grants, loans, and technical assistant. This situation was the result of insufficient domestic revenues that could not cover the costs of maintaining a relatively large military establishment due to unsecured, and war time with Israelis, as well as undertaking impressive development programs.

In the 1970s and through the mid-1980s, the domestic prices were generally stable, reflecting a tight monetary policy. In this period, Jordan also enjoyed the regional boom of the 1970s, as an exporter of human capital, as well as goods and services for the oil rich Arab States' available markets. As a result, Jordan had a substantial increase in the flow of foreign financial resources, which averaged during 1972-1979 about 22 as a percentage of GDP above the average for 1970-1975. The workers' remittances were one of the main resources of the private sector's external financial inflows. However, the public sector's foreign borrowing and grants started to increase earlier. The external financial inflows to both private and public sectors have a direct impact on investments in Jordan. It can be noticed from Figure 4-4 the strong association between the increases in financial inflows and increases in domestic investment in the first period before the structural break point occurred. In that period, the fiscal revenues were highly dependent on proceeds from import taxes and tariffs, rather than income and property taxes. It appears that Jordan's economy depended more on external resources than on its internal resources to finance its expenditures and domestic investments. Between the late 1960s and mid 1980s, government policies can be characterized by:

1. Expansion of the public sector:

Jordanian government's expenditures on infrastructures, social services, and job-creation, can be called a pseudo-welfare state. The public sector was the engine of economic growth and the main employer and provider of social services. The successive government aimed at achieving social solidity and improvement the standard of living through distribution mechanisms rather than enhancement of productivity capacity (Khouri, 2000). Besides, the government provided various services to the nation at the minimum affordable cost. The average of the government expenditures during the period 1967-1984 was about 49 percent of GDP, and it reached its highest percentage in 1975 at about 74 percent of GDP. The unsustainable path of growth in the past that has been followed relates to the dominance of the public sector in economic activities.

2. Intensive government subsidies:

Public services subsidies had been taken for granted by the population which had been reflected in their irrational consumption that led to waste. The result of such policies has been a high level of consumption. These policies deficiencies misguided the efforts to fight inflation by introducing a system of price controls and subsidies.

3. Inefficient tax system and trade regime:

The tax revenue was limited and the trade regime was controlled with quantitative barriers to imports (significant tariff and non-tariff barriers imports). The tax system had a narrow tax-base and granted numerous exemptions. The direct tax on income had made only small contributions to government revenue. Customs revenues from tariffs and a 15% across-the board import surcharge have been the largest source of domestically generated revenue.

For all the reasons of external and internal shocks that the Jordanian current account deteriorated and was associated with an increase in net external liabilities, one may argue about whether the major causes and consequences of these imbalances are a result of market failure (distortions and externalities affecting private savings and domestic investments) or a result of optimizing behavior by forward looking agents and individuals, with no need for corrective policy measures. Actually, in the first period as explained earlier, the role of government in controlling the economic activities was clear. One can argue, however, that the current account deficits (imbalances) cannot be attributed to the difference between private savings and domestic investment alone. The government's role was not just a little intervention to restrain the creation of private liabilities, by altering the dynamic path of domestic investments and private consumption. Its role was larger and led to a rising stock of external debt which reached in the second half of the1980s unsustainable levels. This conventional view of analyzing the current account imbalances in the period of 1967-1984 required tight monetary and fiscal policies to hold down aggregate demand to bridle the current account deficit.

Using the Mundell-Fleming framework with limited international capital mobility, the conventional case for macroeconomic action on the current account rests on the existence of externalities in the borrowing process and distortions affecting private saving and investment behavior, neither of which is amenable to resolution at the source of their incidence (Cashin and McDermott, 1998). In Jordan's case, one can argue that, in the first period, the current account deficits and associated mounting of external debt were matters of public concern, as saving and investment decisions were distorted by such market failures, and this situation can induce unsafe private borrowing, which favors

debt over equity financing, or suboptimal private saving due to unemployment and the health benefits as Cashin and McDermott suggested in Australia's case. In Jordan, health care is virtually free, which may lower the need for private saving in this area and favor current over future consumption. Even if the components of the current account are based on undistorted private sector decisions, if public and private borrowers create externalities for one another (country risk) because this additional risk is not wholly internalized by individual borrowers, then the size of the current account as a whole may affect foreigners' willingness to lend (Corden, 1997).

During the period of 1972-1982, the inflation rate was 11.6 percent and saving and investment were at their highest level of 48 percent and 49 percent of the GDP, respectively in 1981. They started to decline in 1982 until they reached their lowest rate in 1985, at 15 percent of the GDP for national saving and 20 percent of the GDP for domestic investment. In the period of 1983-1987, the average rate of inflation declined to 2.3 percent. The problem of the disinflation was complex and not readily apparent to the average consumer. The deflation had warning implications for an economic downturn. Although the growth in domestic demand had contributed about 60 percent of manufacturing growth, business and industry suffered. Companies that had incurred Dinar-denominated debts at high interest rates expecting to repay their loans with inflated currency were expected to suffer more. So, the low interest rate that disinflation implied could spark even greater capital flight and lower remittances. Increased government spending would reinforce aggregate demand, but entail more external borrowing (ITA, 1989). Figure 4-5 illustrates the current account balance and the government budget as a percentage of the GDP for the period of 1967-2002.

Current Account Analysis after the Structural Break (1985-2002)

In the mid-1980s, regional economies entered into a recessionary period in the wake of falling oil prices. Even though Jordan is not, of course, itself a Gulf state, its interests are very much influenced by events there. Lacking oil and valuable natural resources itself, the trade and aid involving Gulf States are vital for Jordan's economy. As part of the Arab world and Middle East, Jordan also has a special interest in events in that sub-region. Eight percent of its area is desert and other portion arid mountains that contain no oil. Among its population of 5.7 million people, almost 35 percent are less than 15 years of age, and Jordan requires an inflow of capital to provide jobs and services (Swaidan and Nica, 2002). As a result, the flow of foreign grants from regional sources (Saudi Arabia, United Arab Emirates, Qatar, Bahrain, and Kuwait) and workers' remittances inflows started to decline. Investment in the aftermath of this situation dropped from the highest percentage in 1981, about 49 percent of the GDP and an average of 33 percent for the period of 1982-1984 to 20 percent of GDP in 1985 and to an average of 23 percent for the period 1986-1989. The decline in investment led to a deteriorating economy. In order to adjust to this deterioration (the declining of foreign inflows and past policy deficiencies), the government adopted short-term stop gap measures to finance budgetary deficits, and took advantage of its excellent reputation in international credit-markets and borrowed commercially on top of domestic commercial borrowing. This action led to a rapid acceleration of the external debt service burden, which in turn led to the appearance of serious domestic financial imbalances.

So, in the second period, after the structural break, the situation became unsustainable as the fiscal deficit reached 24 percent of the GDP, and the international

reserves at the Central Bank of Jordan were exhausted. Under these circumstances, the exchange rate came under strong pressure and depreciated by over 50 percent in real terms between 1987 and 1989. This led to increased capital outflows, the inflation rate started to accelerate, and the access to external borrowing almost ceased by 1988. Jordanian authorities started to initiate corrective macroeconomic policies, and started by a large devaluation of the Jordanian Dinar. By that time the real GDP growth was -13.4 percent, the inflation rate was about 25.7 percent, external debt was 190 percent of the GDP, and the growing budget deficit reached 20.8 percent of the GDP without grants and 9 percent of the GDP after grants.

The second half of the 1980s was the period that exploded the necessity for structural change and the need for persuading economic stabilization. The Gregory-Hansen structural break test allows for the structural point to be an unknown *priori.* As a result of this test, choosing 1984 to be the structural break point suggests that one can predict that, in the case of Jordan, economic policies that had been followed in the first period were unsustainable and it can be assumed that the period of 1985-1990 was the period of transformation from a controlled market to an open market. The crisis that hit Jordan's economy in 1985, 1989, and 1991 forced it to adopt new structural adjustments to achieve economic stability. Jordan's economy has been transferred from an inward-oriented, mostly controlled, and highly indebted country to an export-oriented economy, where the private sector is the primary engine of growth.

The period that has been tested provides a very severe test of the empirical consumption-smoothing model and suggests that there is a possibility of a regime shift in behavior as the private sector adapts to a new economic environment. Using the structural

break model allows investigating the shifting time, as the timing of any such regime shift is likely to be unknown. This can be justified by un-necessity of one-to-one correspondence between potential causes of a regime shift and its occurrence in the data. So, it appears from the results that the year 1984 is reasonable as a structural break point, since from 1985 to 1991 Jordan witnessed the most severe shocks that forced it to start its structural changes. In the 1990s, the structural transformation of the Jordanian economy was clear and it was supported by the IMF arrangement programs. The Jordan's economy can be characterized after the structural break as follows:

a. Macroeconomic Stabilization policies (Monetary policy, Fiscal Policy)

b. Trade Liberalization

c. Privatization

The economy in the 1990s has made substantial progress in macro stabilization, strengthening of the balance of payments, debt reduction, prices deregulation, fiscal consolidation and the development of social institutions.

Macroeconomic Polices of Stabilization and Growth

1. Monetary policy

There is a broad agreement in the economic literature that macroeconomic stabilization is crucial for sustainable and evenhanded growth, and the empirical literature has persuasively shown that high inflation has had a damaging impact on growth and development of the financial sector. For example, in the late 1980s, the exchange rate crisis of the 1989 had severe adverse impact on the Jordanian living standards, particularly the poor. In addition, it created a high two digit inflation rate, which jumped to about 25 percent.

After the drop in aid and the fall in remittances for reasons mentioned earlier, and for a small country like Jordan, integration and openness into the world market could offer the best prospect to conquer the limited scale of the domestic economy and help increase productivity specialization during the 1990s. In the late 1980s, specifically in 1988, with large currency outflows, the problem of erosion in foreign exchange reserves became very serious, so the authorities put the Jordanian Dinar on a managed float-devaluing the unit and restricting capital outflows. Then, in the 1990s, the exchange rate system was replaced by an effective rate, which was officially linked to the Special Drawing Right (SDR) on a trade-weighted basis, from that date until the present, Jordan upholds a unitary exchange rate structure and the dinar is officially pegged to the U.S. dollar since 1995, and the exchange rate remains at 0.708 (buy), and 0.710 (sell) dinar to dollar.

In a study for the IMF about exchange rate regime considerations for Jordan and Lebanon, it was found that over the past years, the exchange rate peg has helped to maintain stability in Jordan and Lebanon in the face of nominal shocks and to withstand several shifts in domestic money demand. In the case of Jordan, there were uncertainties regarding the holding of dinars by Palestinians on the West Bank and Gaza, with spillover effects on Jordan proper, associated with the possible introduction of a Palestinian currency (IMF, 2003). In Jordan, empirical evidence provides some suggestions that during the recent past 50 percent of output fluctuations have been mainly monetary in origin, and has been shown some support for the claim that exports, at least nontraditional exports, are price sensitive. The empirical study suggest that it might make sense to continue with the current fixed exchange rate system for the time being until the

macroeconomic situation become more clear and more stable, and confidence in the Jordanian dinar is restored to higher levels. The official reserves of the Central Bank of Jordan (CBJ) have increased ninefold since the switch of the peg to the U.S. dollar and reached $4.7 billion at the end of 2003.

Regarding the high inflation rate, CBJ adopted the IMF arrangements framework in 1989 and through the 1990s and, thus, brought the inflation rate under control rapidly. Furthermore, CBJ kept monetary expansion broadly in line with macroeconomic developments, thus, holdings a tight control on excess liquidity (IMF, 2004). In 1993, the CBJ altered the direct control of monetary policy by demanding high reserve requirements to indirect controls of monetary policy by introducing the certificates of deposits (CDs) and a gradual reduction of reserve requirements and, overall, it liberalized the current and capital account transactions.

2. Trade Liberalization

One of the important aspects of world economy integration is trade liberalization. Jordan's economy in the last decade opened to world markets, by consecutive rounds of liberalization and eliminated the quantitative barriers to imports and reduced tariffs on a multilateral or regional basis.

The rapid growth in merchandise exports over the last decade, especially the last four years, produced the most apparent evidence of structural change in Jordan's economy. The authorities pursued bilateral free trade agreements, especially with the United States and The European Union (EU) that provide the exports sector with a wide superior opportunity to the largest markets in the world. One of the aspects of trade liberalization in the period after the structural break was the government giving up the

high and complex tariff structure, with a maximum tariff rate of 318 percent and an average weighted tariff rate of 19 percent. Additionally, 40 percent of imports were subject to quantitative restrictions and passed through a simple imports tariff structure with an average weighted imports tariff rate of 13 percent, and maximum tariff rate of 30 percent. The exemption from import duties was reduced to less than 15 percent of total imports. The series of bilateral trade agreements intended increasing market access for Jordanian exports as a complementary role for the multilateral liberalization. The multilateral liberalization is represented by:

a. A series of bilateral trade agreements intended for increasing markets access for Jordanian goods.
b. Establishing the Qualified Industrial Zones (QIZs) in 1996, in the north of the country, which gives the goods, produced in designated zones a special duty- and quota- free access offered by the United States government with specified minimum Jordanian, Palestinian, and Israel contents.
c. Member of the Arab Free Trade Agreements (AFTA) since 1998.
d. Member of WTO since 2000.
e. Establishing the free trade agreement with the Untied State in 2001, and an association agreement with the EU in 2002.
f. Bilateral free trade agreements with most countries of the Middle-East and North African (MENA), and some European countries that are not yet members of the EU.

g. Launching the Aqaba Special Economic Zone (ASEZ) in 2001, in south of the country, aimed at providing a free trade zone and aerodynamic administration with significant tax and infrastructure inducements.

These policies that transferred Jordanian economy to a more export-led economy have increased the share of merchandise exports in the economy from 22 percent of the GDP in 1992 to about 30 percent in 2002, and made Jordan an attractive channel for duty-and free-quota- free to major world markets depending on diversifying the manufacturing goods and economic activities as Jordan's reputation for foreign direct investments (FDI) improves, and investors realize the potential in the areas of manufacturing (IMF, 2004).

3. Privatization:

Privatization has been the key of Jordan's structural adjustment strategy since 1996; the program is increasingly transforming ownership of virtually all commercial public enterprise to the private sector. The program primarily covers the Jordanian state-owned enterprise, which are concentrated mainly on the infrastructural sectors (transport, electricity, water, and telecommunication) and investment by the Jordanian Investment Corporation (JIC). The privatization program has been accomplished within the second period by the following: (i) a 33 percent sale of the Jordanian Cement Factories; (ii) the granting of four bus concessions in the greater Amman area; (iii) the granting of a concession for the Ma'in Spa; (iv) a 49 percent sale of the Jordanian Telecommunications Corporation (JTC); (v) a water management contract for the greater Amman area (Water Authority of Jordan ; and (vi) the divestiture of government shares in approximately 44 companies at about U.S. $137 million, total proceeds are in excess of U.S. $900 million

(www.Epc.gov.jo). The government has passed legislation for the public dept and privatization in the last two years to accomplish the following objectives:

a. Eradicate remaining controls on the foreign ownership of property and land.

b. Reinforce the judiciary system and regulatory agencies.

c. Support and regulate leasing activities, electronic commerce, and e-government.

d. Streamline the efficiency of government agencies.

e. Strengthen companies' disclosure requirements.

The legislative reforms have made opportunity for a more dynamic private sector. Table 4-4 summarizes various indicators of country ranking of attractiveness for FDI.

4. Fiscal Consolidation

Over the 1990s, the fiscal deficit (including grants) is, on average, at a sustainable level and the debt burden is declining, publicly, toward sustainable levels. During the Gulf War (1990-1991), a severe interruption of the adjustment efforts of the fiscal system for the period 1985-1989 occurred highlighting the weakness in the system. As it has been mentioned earlier, the nature of government fiscal policy in the past still has some effect during recent times and makes the government revenue base still reliant on trade related taxes and non-tax revenue sources (grants and workers' remittances) than other countries, leaving its fiscal system less buoyant and more vulnerable to external shocks.

Jordan's authorities succeeded in controlling the debt burden, specifically after the Gulf war in 1991. Fiscal policy experienced a large adjustment starting in 1992, which led to a substantial reduction in the debt burden. Budgetary revenue reached a high level of 34 percent of the GDP in 1992 as a result of an import surge in the post Gulf War construction boom, and temporary taxes were imposed on returning migrants workers.

The expenditures eased as growth increased with a reduction of the debt burden, which brought extra relief through lower interest payments and for first time the government balance moved to a slight surplus balance.

Jordan's fiscal policy has been tightened to reach sustainable levels, and it appears that Jordan's efforts to restrain the debt burden has begun to achieve positive results, and run higher primary and current balances by achieving a higher level of government savings, going from an average of -4.8 percent of the GDP in period 1990-91 to 4.8 percent of the GDP in period 1992-1995, and about 1.8 during the whole period of 1990-2001. The government was able to protect and tighten capital spending during the last decade and still proceed with its fiscal consolidation and regardless of the rapid growth in pension expenditures, its efforts and prowess appeared in reducing the debt service costs. Table 4-5 summarizes some fiscal policy indicators for Jordan.

As most government's revenues came from the trade restrictions and tariff and non-tariff barriers in the 1980s, trade liberalization and privatization placed considerable pressures on domestic revenue. After the government adopted a steady program of trade liberalization starting from the early 1990s in order to restore its loss from trade tariff reductions and lightening the non-tariff imports restrictions, the government introduced a general sales tax (GST) and special sales tax (SST) law in 1994. The GST includes many of the basic features of value-added tax, while SST is effectively a form of excise tax. The revenue from GST and SST has increased from 3.3 percent of the GDP in 1990 to 8.5 percent of GDP in 2001.

On the other hand, expenditure policy experienced a dramatic consolidation and change in composition. Wise debt management policy generates substantial reduction in

the foreign interest burden, and subsidies were gradually eliminated over the 1990s starting with the elimination of the net fuel subsidy and maize subsidy in 1992 (IMF, 2004).

Jordan, through the end of the 1980s and 1990, adopted domestic demand management policies carried by fiscal adjustment and tightened the monetary policy stance to reduce the external current account balance to a level consistent with a longer-reduction of external debt. The United States granted Jordan about $700 million in debt forgiveness. Debt for equity and debt for development barters have also become one of the tools used in recent years (IMF, 2004).

The balance of payments plays an important role in changing the debt profile besides the fiscal policy, as debt- reducing factors instead of debt-creating ones. IMF country reports of Jordan indicated that the noninterest current account has been improved, especially the sizable growth rate in the exports sector as mentioned earlier, with a contribution to the debt reduction process. In addition, the continuous grant inflows on average of 4.4 percent of the GDP in the 1990s and the steady rate of increase in inward remittances help the current account maintaining a sustainable level of balances. Also, the private capital account which includes FDI and portfolio flows and private capital transfers have also played a significant role as a debt-reduction factor.

The structural adjustments that Jordan's government has adopted which are: controlled monetary policy, fiscal consolidation, trade liberalization, and privatization, have been designed to improve public saving and contribute to greater national savings. All these structural adjustments that started in just the last decade have considerably increased the likelihood that saving and investment decisions behind current account deficits are, in their

way, to be well based, distinct deficits in the first period were subject to few policy-induced distortions.

From the results of this study, one can suggest that Jordan tried to reduce the causes of suboptimal intertemporal consumption smoothing by adopting effective structural change schemes, and made more suitable use of external capital flows.

It found that Jordan's intertemporal budget constraint was satisfied over the full period conditional in the structural break point, and the level of international capital flows implied that the consumption path was not consistent with a path that would maximize expected utility in the first sub-period (1967-1984), while the international capital flows in the second sub-period (1985-2002) implied that the consumption path was consistent with maximum expected utility.

The most notable evidence of structural transformation in the Jordanian economy comes from the rapid growth in merchandise exports over the last two and half years. This rapid growth is associated with the duty-and quota–free access to the U.S. markets from the Qualified Industrial Zones (QIZs). The exports to the U.S. market increased tenfold over a span of four years. The export boom has come despite the deterioration in the terms of trade in 2001-02 (Mansur, 2004). The QIZs legal provisions were established in 1996 when the United States offered special duty-and quota-free access to goods produced in designated zones with specified minimum Jordanian, Israeli, and Palestinian contents. These zones have helped to diversify exports and have contributed to export growth. There are now 12 QIZs until 2003. Official data indicates that the exports from the seven largest QIZs rose from $ 2.4 million in 1999 to $382 million in 2002. On the other hand, the U.S.-Jordan Free Trade Agreement (FTA) has substantial differences in

the market access granted under the QIZs scheme. The FTA is a staged arrangement, with duties on a number of products eliminated only after 10 years, while the products exported from the QIZs have immediate duty and quota free access, besides other implications (for more details see, Jordan: Selected Issues and Statistical Appendix, IMF 2004).

Table 4-4

Country Ranking of Selected Indicators of Attractiveness for Foreign Direct Investment
(Percent share of countries with lower score, latest available information)

Country	WB Regulatory Quality 3/	WB Gov. Effectiveness 3/	WB Rule of Law 3/	WB Corruption 3/	IEF Economic Freedom 4/	ICRG Country Risk 5/	EIU Country Risk 6/	GCR Competitiveness 7/	WB Business Environ. 8/
Jordan	80	67	73	59	60	54	72	41	79
Egypt	50	62	61	53	33	46	50	...	...
Lebanon	62	51	55	31	40	13	15	...	...
West Bank an Gaza	69	64	64	76	...	...	...	...	70
Syria	20	23	37	22	8	55	23	...	...
Mashreq (average)	56	53	58	48	35	42	40	41	...
Tunisia	82	88	77	79	56	59	63	58	...
Morocco	71	54	68	70	56	61	67	31	69
Algeria	16	23	14	32	40	29	54	...	...
Maghreb 1/(average)	56	55	53	60	51	50	61	44	...
Central Europe 2/(average)	74	68	73	70	69	72	79	50	71
Malaysia	56	69	64	61	54	74	79	66	91
Korea	62	68	70	69	67	78	90	74	...
Singapore	99	99	98	98	99	98	100	95	...

Sources: International Monetary Fund (2003), p. 11.
1/ Includes Morocco, Tunisia and Algeria.
2/ Includes Czech Republic, Hungary, and Poland.
3/ Aggregate indicators of governance developed in Kaufmann, D. et al., Governance Matters, Policy Research Paper No. 2196, World Bank, 1999; and database available at http://www.worldbank.org/wbi/governance/gov_data.htm, and http://www.worldbank.org/wbi/governance/datasets.htm.
4/ Index of Economic Freedom published by the Heritage Foundation and The Wall Street Journal, 2002. http://www.heritage.org/index/
5/ Composite risk ratings by International Country Risk Guide, October 2002.
6/ Aggregate scores of business environment in the Economist Intelligence Unit's Country Forecast, September 2002.
7/ Growth Competitiveness index published in Competitiveness Report by World Economic Forum, 2002. http://www.weforum.org
8/ Based on results of survey used for the World Bank's World Development Report 1997 as presented by Brunetti, A. et al., in Institutional Obstacles for Doing Business, Policy Research Paper No. 1759, World Bank, 1997; and database available at http:\\www.worldbank.org\wbi\governance\wdr97data.htm

Table 4-5

Some Fiscal Policy Indicators of Jordan (In percent of GDP) For the Period of 1990-2001

Periods	Overall Balance	Primary Balance	Current Balance	Gov. Saving	Total Debt	Real GDP Growth
1990-2001						
Period average	-4.1	2.1	1.7	1.8	130.1	4.7
Average annual change	0.2	-0.3	0.2	0.2	-10.1	-
1990-1991						
Period average	-10.3	-0.2	-5.1	-4.8	202.8	9.6
Average annual change	-3.4	-3.0	-5.6	-5.1	-21.0	-
1992-1995						
Period average	-1.4	5.1	4.6	4.8	131.5	8.2
Average annual change	2.6	1.4	3.2	3.1	-21.1	-
1996-2001						
Period average	-3.9	0.9	2.0	2.1	105.0	3.3
Average annual change	0.0	-0.1	-0.3	-0.2	-2.7	-

Source: IMF, 2004.

Figure 4-3 Workers' Remittances (WR) and Net Unrequited Transfers (NUT) as a Percentage of GDP 1967-2002

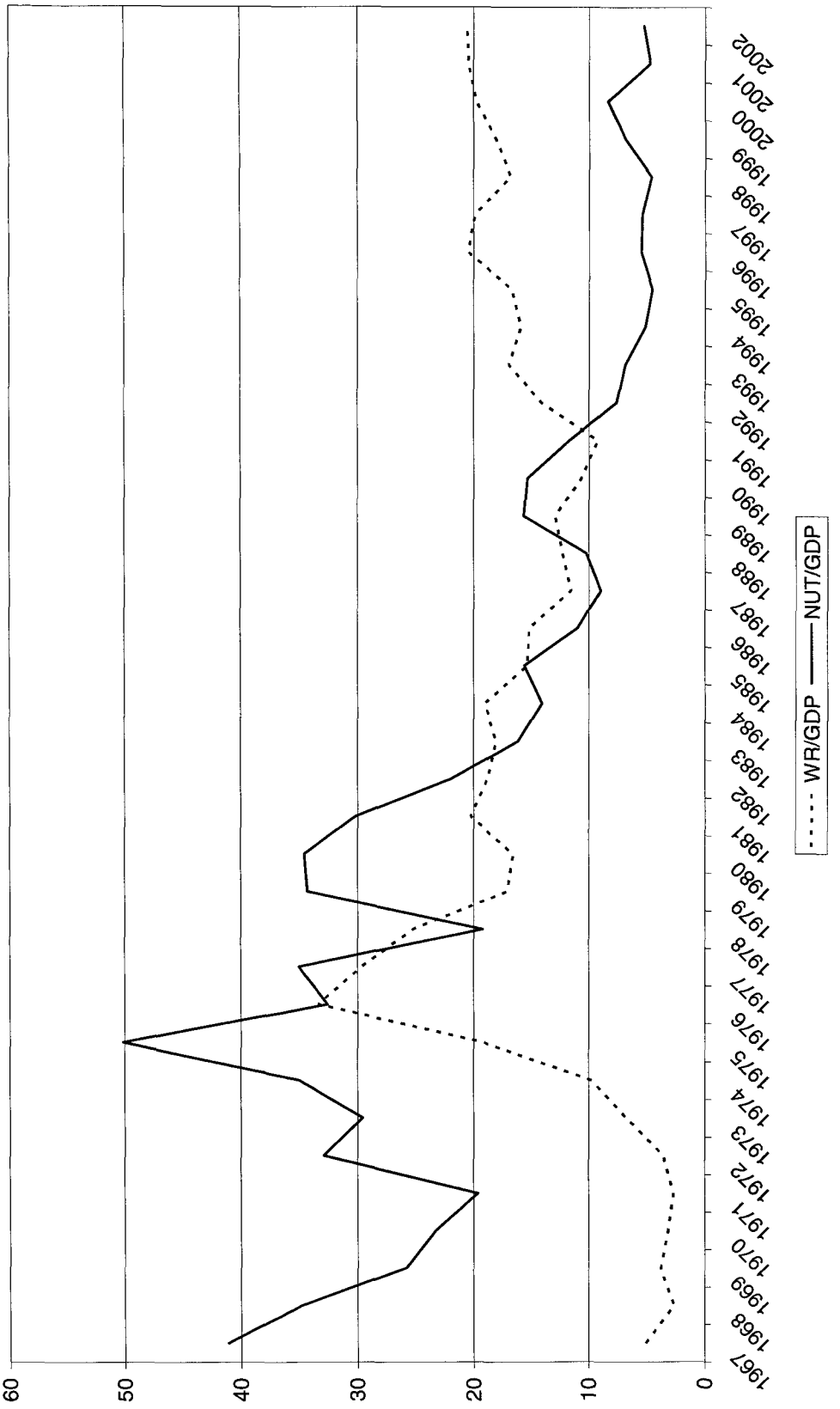


Figure 4-4 Investment, Workers' Remittances, and Unrequited Transfers as a Percentage of GDP 1967-2002

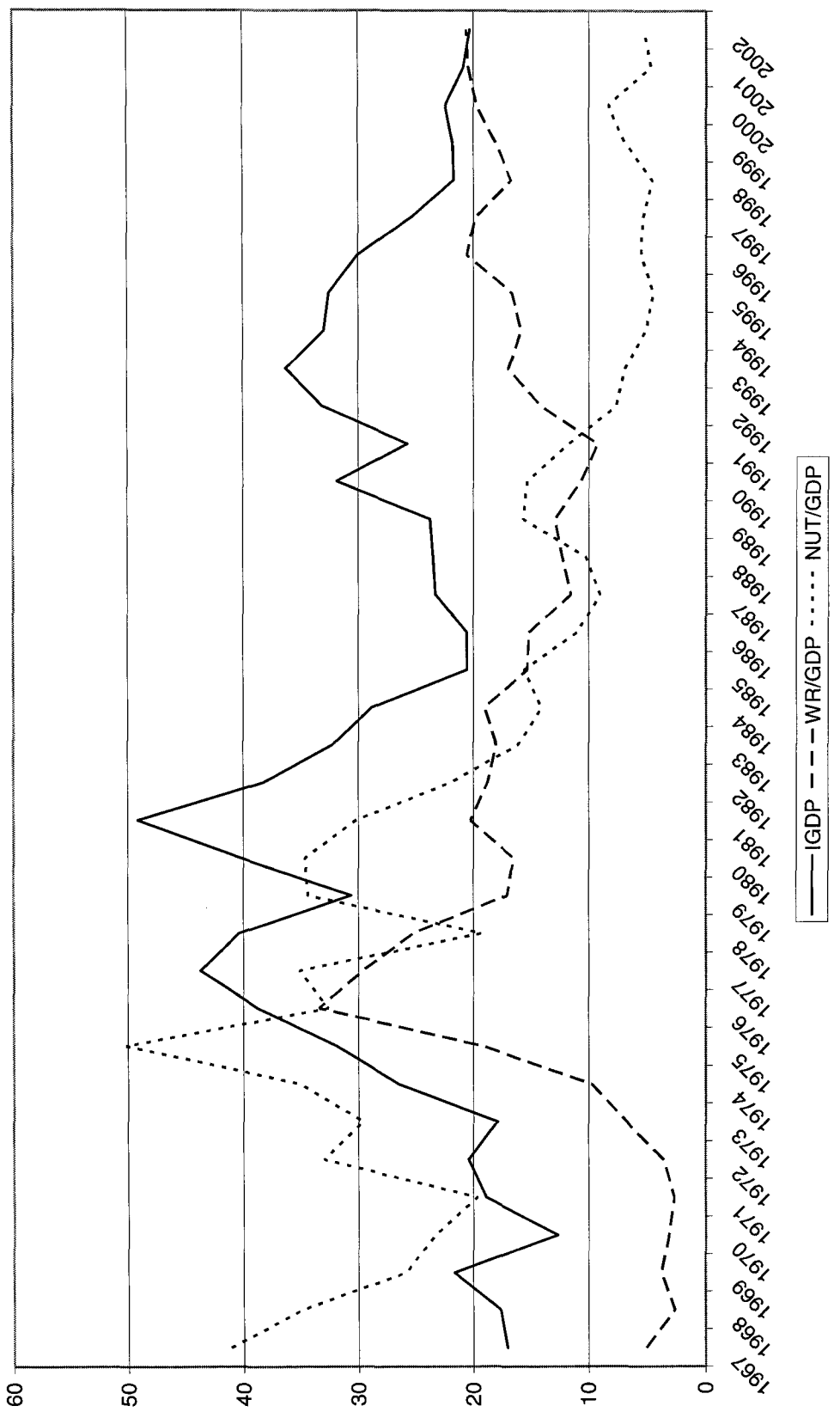
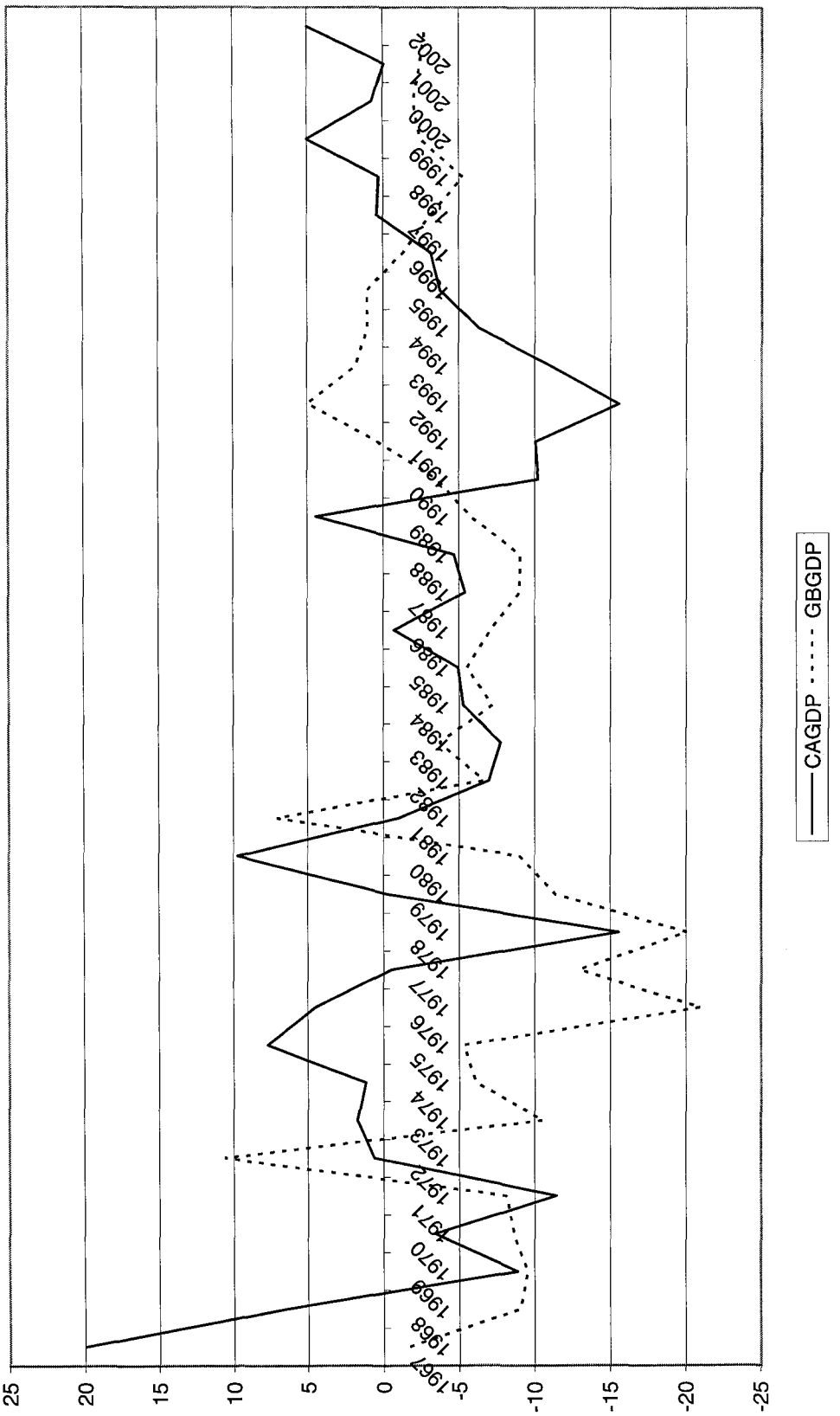


Figure 4-5 Current Account Balances and Government Budget as a Pecentage of GDP 1967-2002



CHAPTER FIVE

SUMMARY AND CONCLUSION

Summary

How the current account behaves is still a debated issue in international economics. The two main theories that try to analyze its behavior are traditional opponents in economic analysis: the neokeynesian versus neoclassical schools. The first one views the current account in terms of aggregate macroeconomic analysis within a static short-run framework. It describes the explanatory variables of the current account, while the neoclassical school realizes the importance of microeconomic analysis as the foundation of the macroeconomic optimizing dynamics approach to the current account. This approach introduces the intertemporal approach as a dynamic model for international borrowing and lending through basic identity of the current account which allows the economy to assign its consumption over time.

This study tried to analyze the Jordanian current account behavior using the intertemporal-optimizing model. The consumption-smoothing model and the present value of the current account approach are different names for the same model. Not ignoring the importance of the neokeynesian framework of current account, this study aimed to understand the long-run dynamic behavior of Jordan's current account and national capital flows into Jordan. The country is a small developing country in the

lower-middle income class. This dissertation covers the period of 1967-2002 for both descriptive and econometric analyses of Jordan's current account.

Use of the intertemporal consumption-smoothing approach with a structural-change model puts us at a different level of analysis. It was found that a structural break existed in the relationship between private consumption and national cash flows in Jordan over time, and this structural break point occurred in1984. That year is considered as the end of the first sub-period before the price of oil crashed in 1985, the event that affected the external, as well as internal, sectors of Jordan.

The period before the break, from 1967 to 1984, has been described as a government-controlled period where Jordan depended heavily on foreign aid, especially from the Arab Gulf countries, and workers' remittances from abroad. In this period, the current account behavior was not consistent with the consumption-smoothing approach and the actual current account did not match the optimal one. This suggested that Jordan's consumption was not smoothed during that period, and that the government overconsumed the capital inflows in that period. It seems that national saving was not on the same level of these inflows. With a weak taxation system and restricted trade policies, the market mechanism did not play any effective role thereby making the country more vulnerable to external shocks, especially because of its large dependence on external resources. After 1984, the dramatic fall of oil world prices affected Jordan's economy and its current account, which caused the authorities to resort to borrowing on the world market. This action led to a rapid acceleration of Jordan's external debt service burden, which in turn led to the appearance of serious domestic financial imbalances and eventually, to financial crisis in 1989.

The second period (1985-2002), after the structural break point, witnessed wide structural changes as a result of adopting the IMF policies to restore a sustainable level of fiscal deficits. Moreover, Jordan liberalized the trade and financial sectors, and adopted an efficient tax system, as well as going on the path of privatization by giving a greater role to the private sector as a copartner in its economic development process. Overall, Jordan's economy has become more market-oriented with new economic opportunities.

The results of current account Granger-cause changes in cash flows imply that the current account weakly Granger-causes future changes in national cash flows (NCF), which gives evidence in favor of the intertemporal-optimization approach to the current account in Jordan. So, for both the sub-periods, the results are consistent with the consumption-smoothing model. However, according to the non-linear parameters restriction, a second hypothesis test, the consumption-smoothing model is clearly much more successful in explaining the behavior of international capital flows to Jordan in the later sub-period than in the early sub-period. A rejection of the restrictions in the early subsample suggests that the difference between the actual and optimal consumption-smoothing component of the current account may represent more than a mere random sampling error.

It also appears that the Jordanian current account has met the solvency condition at the structural change point. This condition states that the present discounted value of a future balance of trade surplus must equal the present level of net external liabilities over the long-run, and that consumption cannot depart too far from movements in the available resources of the economy. This was conditional on using the regime shift model, as using the standard one (the model without structural change) will not satisfy this condition.

This gives a strong clue about the existence of structural break point between the studied variables (consumption and national cash flows).

Conclusions

One can argue about the usefulness of this model after we discussed many empirical studies for different kind of countries, and each of these studies gave different results depending on each country's situation. I think the usefulness of the consumption-smoothing approach to current account imbalances is its ability to use a long-run dynamic framework. Although the intertemporal consumption-smoothing approach to the current account seeks equilibrium in the long-run (the future will bring about a balance to everything), through forward-looking agents with a rational expectations mechanism, international capital flows act as a buffer to smooth aggregate consumption in the face of temporary shocks in the economic fundamentals. The fact that national cash flows are consistent with consumption-smoothing in the later period but not in the earlier one attests to a more rational behavior that Jordan has adopted in light of all these shocks. It is clear that the economic policies the government adopted in the early period made the country more vulnerable to externalities. The tilting parameter was small enough to imply that the country overconsumed in the early period, with distortions between the domestic economy's prices and interest rates, and world prices and the interest rate, caused the country to go through a number of crises. The second half of the 1980s is the transformation period from over consumption policies to more rational and smoothed consumption-oriented polices. In the second period, the government made important structural changes, especially in the private sector. The liberalization and privatization (market-oriented policies) policies adopted by Jordan's government attracted foreign

investment, which made Jordan one of the more accessible emerging markets. Moreover, the country now maintains sustainable fiscal deficits by adopting a tight fiscal policy and adopting a more efficient taxation system.

Actually, in this respect, it is worth exploring other explanatory variables that may have affected Jordan's current account, through either the conventional model or the intertemporal model, such as the real exchange rate, terms of trade, and regional and global factors. On the other hand, I realize the importance of investigation for any structural break points which may occur and affect the power of the unit root, and cointegration tests. Thus, in the light of Jordan's economy circumstances, one can consider seeking for two or multiple breaks points instead of a single break point which a useful suggestion especially if one can use quarterly data when it is available. This may provides more observations and give different results.

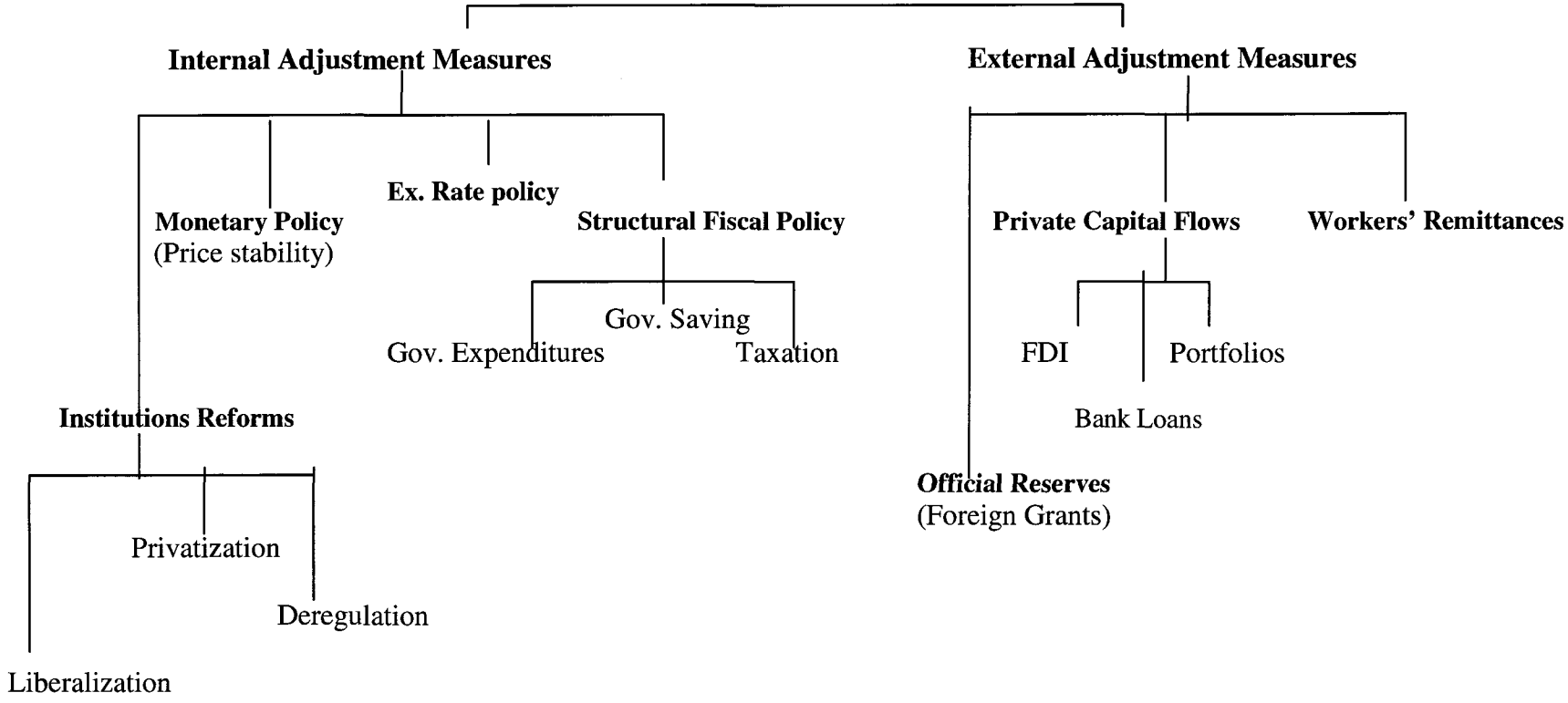
Finally, the results suggest that, in the later sub-period, the rational expectations that predict the optimal current account of Jordan was close to the actual one. This indicates that the government started to act rationally towards the savings and investments decisions.

Chart 5.1 gives a summary of policy measures used to smooth out Jordan's balance of payments disequilibrium. On one hand, the internal adjustment measures can be represented by institutional reforms, monetary policy, exchange rate policy or structural fiscal policy. These measures have been adopted by Jordanian authorities. The trade liberalization, privatization, and deregulation, supported by a stabilizing monetary policy and fixed exchange rates, helped Jordan's economy rebuild a new interrelationship with the external world. Moreover, the structural fiscal policy that targeted the

government budget balances strengthened the domestic revenues resources by improving the taxation system, induced government saving, and shrinking the government expenditures by expanding the private sector as a main partner in the developing process.

On the other hand, the external adjustment measures also have their respective significant roles in smoothing out the balance of payments disequilibrium. The accumulation of the official reserves and the favorable environment for the private capital flows represented by FDI, bank loans, and portfolio investment, make the country a wider market. These can attract foreign investment and private capital inflows. Furthermore, workers' remittances and the foreign aid are still major contributors of capital inflows that hold up the financial and investments sectors.

Figure 5-1. Policy Measurements to smooth out Balance of Payments Disequilibrium



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APPENDICES

APPENDIX A

This is Gregory-Hansen (1996) Residual-Based test procedures to get the structural break points using the three unit root tests Z_t , Z_a, and ADF. This was found in Hansen webpage with a little adjustment to fit our model.

```
/*** Load data ***/
library pgraph coint;
format /rd 5,2;
format /rd 5,2;
n1 = 36; /* 1967-2002 */
load xxa[n1,4] =c:\dissertation\updatedata\IFS.data; /* [c, ncf, dcf, gdp]*/
output file=c:\dissertation\updatedata\IFSG-H.out reset;
" ";@ ----- Set Sample: 1967- 2002---- @

c =   xxa[.,1];
ncf= xxa[.,2];
cf = xxa[.,3];
gdp= xxa[.,4];

count=seqa(1,1,36);
xy(count,c~ncf~cf);
cad1=ncf-c;
wait;
m1=cf;
obs = rows(m1) ;

n = obs ;


y=ncf;
x=c;
cont1=seqa(1967,1,36);
cagdp=cad1./gdp*100;
xy(cont1,cagdp);
```

```
wait;
call main(y,x,4,2,1);
end;


/*************************************************************************
**
----proc MAIN
----FORMAT: call  main(y,x,model,choice,k)
----INPUT:     y - depend variable
      x - data matrix for independent variables (first row is
first observation)
            model - choice for model       =2  C
                  =3  C/T
                  =4  C/S
      choice - only in ADF test,  =1  pre-specified AR lag
                  =2  AIC-chosen AR lag
                  =3  BIC-chosen AR lag
                  =4  downward-t-chosen AR lag
      k - maximum lag for ADF test
----OUTPUT: print automatically Za*, breakpoint for Za*, Zt*, breakpoint for Zt*
, ADF*,                 breakpoint for ADF* and AR lag chosen for ADF*
----GLOBAL VARIABLES: none
----external PROCEDURES: adf,  phillips
----NB: Constant included in regression
*************************************************************************
/

/*
**************** Main procedure ******************
*/


proc(0)=main(y,x,model,choice,k);
  local t,n,final,begin,tstat,x1,lag,j,dummy,temp1,temp2,temp3,temp4;
  local breakpt1,breakpt2,breakpta,za,zt;
  n=rows(y);
  begin=round(0.15*n);
  final=round(0.85*n);
  temp1=zeros(final-begin+1,1);
  temp2=temp1;
  temp3=temp1;
  temp4=temp1;
  t=begin;
print "n    "    n;
        " ";
```

```
print "begin   "   begin;
" ";
print "final   "   final;
" ";


  do while t<=final;
   dummy=zeros(t,1)|ones(n-t,1);

   @ adjust regressors for different models @
   if model==3;
     x1=ones(n,1)~dummy~seqa(1,1,n)~x;
   elseif model==4;
     x1=ones(n,1)~dummy~x~dummy.*x;
   elseif model==2;
     x1=ones(n,1)~dummy~x;

   endif;

   @ computer ADF for each t  @
   {temp1[t-begin+1],temp2[t-begin+1]}=adf(y,x1,k,choice);

   @ compute Za or Zt for each t  @
   {temp3[t-begin+1],temp4[t-begin+1]}=phillips(y,x1);
   t=t+1;

  endo;

  @  ADF test @
  tstat=minc(temp1);
  lag=minindc(temp1);
  breakpta=(lag+begin-1)/n;
  lag=temp2[lag];
  print "******** ADF Test ***********";
  print "t-statistic = " tstat;
  print "AR lag = " lag;
  print "break point(ADF) = " breakpta;
  print " ";


  @  Phillips test @
  za=minc(temp3);
  breakpt1=(minindc(temp3)+begin-1)/n;
  zt=minc(temp4);
  breakpt2=(minindc(temp4)+begin-1)/n;
  print "******** Phillips Test ********";
```

```
  print "Zt =            " zt;
  print "breakpoint(Zt) =  " breakpt2;
  print "Za =            " za;
  print "breakpoint(Za) =  " breakpt1;
  print " ";
retp;
endp;
@ ---------------------------------------------------------- @


/********************** PROC ADF ****************************
**  FORMAT
**        { stat,lag } = adf(y,x)
**  INPUT
**       y - dependent variable
**       x - independent variables
**  OUTPUT
**  stata - ADF statistic
**  lag - the lag length
**  GLOBAL VARIABLES: none
**  external PROCEDURES: estimate
*****************************************************************/

/*
*************** ADF for each breakpoint ********************
*/
proc(2) = adf(y,x,kmax,choice);
  local b,m,e,e1,n,n1,sig2,se,xe,yde,j,tstat,de,temp1,temp2;
  local lag,k,ic,aic,bic;
  @ compute ADF  @
  n=rows(y);
  {b,e,sig2,se}=estimate(y,x);
 de=e[2:n]-e[1:n-1]; @ difference of residuals @


  ic=0;
  k=kmax;
  temp1=zeros(kmax+1,1);
          temp2=zeros(kmax+1,1);
  do while k>=0;
    yde=de[1+k:n-1];
    n1=rows(yde);
    @  set up matrix for independent variable(lagged residuals)  @
    xe=e[k+1:n-1];
    j=1;
    do while j <= k;
```

```
      xe=xe~de[k+1-j:n-1-j];
      j=j+1;


    endo;
    {b,e1,sig2,se}=estimate(yde,xe);


    if choice==1;  @ K is pre-specified @
       temp1[k+1]=-1000;   @ set an random negative constant @
       temp2[k+1]=b[1]/se[1];
       break;


    elseif choice==2;  @ K is determined by AIC @
      aic=ln(e1'e1/n1)+2*(k+2)/n1;
      ic=aic;
    elseif choice==3;  @ K is determined by BIC @
      bic=ln(e1'e1/n1)+(k+2)*ln(n1)/n1;
      ic=bic;
    elseif choice==4; @K is determined by downward t @
      if abs(b[k+1]/se[k+1]) >= 1.96 or k==0;
     temp1[k+1]=-1000;    @ set an random negative constant @
        temp2[k+1]=b[1]/se[1];
        break

 endif;
    endif;
    temp1[k+1]=ic;
    temp2[k+1]=b[1]/se[1];
    k=k-1;

  endo;

  lag=minindc(temp1);
  tstat=temp2[lag];
print "tstat"  tstat;
  retp(tstat,lag-1);




endp;
@ ------------------------------------------------------------ @

print;
```

```
/********************** PROC PHILLIPS ****************************
**  FORMAT
** { za,zt } = phillips(y,x)
**  INPUT
** y  - dependent variable
** x - independent variables
**  OUTPUT
** za - the Phillips test statistic
** zt -  the Phillips test statistic
**  GLOBAL VARIABLES: none
*************************************************************************/

/*
*************** Za or Zt for each breakpoint ********************
*/
proc(2)=phillips(y,x);
  local n,b,e,be,ue,nu,bu,uu,su,a2,bandwidth,m,j;
  local c,lemda,gama,w,p,sigma2,s,za,zt;
  n=rows(y);

  @  OLS regression  @
  b=y/x;
  e=y-x*b;

  @  OLS regression on residuals @
  be=e[2:n]/e[1:n-1];
  ue=e[2:n]-e[1:n-1]*be;

  @ calculate bandwidth number @
  nu=rows(ue);
  bu=ue[2:nu]/ue[1:nu-1];
  uu=ue[2:nu]-ue[1:nu-1]*bu;
  su=meanc(uu.^2);
  a2=(4*bu^2*su/(1-bu)^8)/(su/(1-bu)^4);
  bandwidth=1.3221*((a2*nu)^0.2);

  m=bandwidth;



  j=1;
  lemda=0;
  do while j<=m;
    gama=ue[1:nu-j]'ue[j+1:nu]/nu;
```

```
    c=j/m;
    w=(75/(6*pi*c)^2)*(sin(1.2*pi*c)/(1.2*pi*c)-cos(1.2*pi*c));
    lemda=lemda+w*gama;
    j=j+1;
  endo;

  @ calculate Za and Zt for each t @
  p=sumc(e[1:n-1].*e[2:n]-lemda)/sumc(e[1:n-1].^2);
  za=n*(p-1);
  sigma2=2*lemda+ue'ue/nu;
  s=sigma2/(e[1:n-1]'e[1:n-1]);
  zt=(p-1)/sqrt(s);
  retp(za,zt);
endp;
@ ---------------------------------------------------------- @


/********************** PROC ESTIMATE ****************************
**  FORMAT
**        { b,e,sig2,se } = estimate(y,x)
**  INPUT
**       y  - dependent variable
**       x - independent variables
**  OUTPUT
**  b - OLS estimates
**  e - residuals
**  sig2 - variance
**  se - standard error for coefficients
**  GLOBAL VARIABLES: none
*************************************************************************/
/* *****  ols regression ******  */
proc(4) = estimate(y,x);
  local m, b, e, sig2, se;
  m=invpd(moment(x,0));
  b=m*(x'y);
  e=y-x*b;
  sig2=(e'e)/(rows(y)-cols(x));
  se=sqrt(diag(m)*sig2);
  retp(b,e,sig2,se);
endp;
/*********************************************************/
```

APPENDIX B

Some Selected Definitions:

Overall Balance: Domestic revenues and grants minus total expenditures and net lending.

Primary Balance: Domestic revenues minus total expenditures and net lending.

Current Balance: Domestic revenues minus current expenditures.

Outstanding Contracted Debt: Equals outstanding external debt plus undisbursed balance of contracted loans.

Outstanding External Debt: Equals total disbursements of external loans minus repayments.

Current Account: Represents the sum of the trade balance, the services balance and net current account transfers.