DETERMINANTS OF CURRENT ACCOUNT:

AN INTERTEMPORAL APPROACH

A THESIS SUBMITTED TO

THE GRADUATE SCHOOL OF SOCIAL SCIENCES

OF

IZMIR UNIVERSITY OF ECONOMICS

BY

BARIŞ SERKAN KOPURLU

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

OF

MASTER OF ART/MASTER OF SCIENCE/DOCTOR OF PHILOSOPHY

IN

THE GRADUATE SCHOOL OF SOCIAL SCIENCES

NOVEMBER 2006

Approval of the Graduate School of Social Sciences

_____

(Title and Name)
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science/Doctor of Philosophy.

_____

(Title and Name)
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science/Doctor of Philosophy.

_____

(Title and Name)   (Title and Name)

Co-Supervisor   Supervisor

Examining Committee Members

(Title and Name in alphabetical
     order of last name)

....   _____

....   _____

....   _____

....   _____

....   _____

ABSTRACT

DETERMINANTS OF CURRENT ACCOUNT:
AN INTERTEMPORAL APPROACH

Kopurlu, Barış Serkan

Master of Arts in Financial Economics, Graduate School of Social Sciences

Supervisor: Prof. Dr. İsmail Bulmuş

November 2006, 85 pages

This thesis analyzes the concepts and theories related to the determinants of current account. The theories of the various approaches to current account balance, the historical background of approaches to current account balance and a literature review is presented. An econometric research to assess the effectiveness of intertemporal approach to current account balance is conducted. The current account balance and the gross domestic saving variables are regressed separately against several independent variables enforced by the intertemporal approach. According to the results, gross domestic product and the share of middle aged people in the total population have negative effects on current account balance and gross domestic savings; whereas the gross fixed capital formation and the gross enrollment rate have positive effects. The results showed that the intertemporal approach is effective in explaining countries' current account balances and gross domestic savings levels' but not through the way stated by the theory. Also there is not a significant relationship between current account and gross domestic savings.

Keywords: balance of payments, current account balance, discount rate, intertemporal approach

ÖZET

CARİ İŞLEMLER HESABININ BELİRLEYİCİLERİ: DÖNEMLERARASI BİR YAKLAŞIM

Kopurlu, Barış Serkan

Finans Ekonomisi Yüksek Lisansı, Sosyal Bilimler Enstitüsü

Tez Yöneticisi: Prof. Dr. İsmail Bulmuş

Kasım 2006, 85 sayfa

Bu çalışma, cari işlemler hesabının belirleyicilerini ve teorilerini analiz etmektedir. Çalışmada, cari işlemler hesabına yönelik çeşitli yaklaşımlar, bu yaklaşımların tarihsel altyapıları ve bu yaklaşımlara ilişkin literatür taraması sunulmaktadır. Cari işlemler hesabını açıklamaya çalışan yaklaşımlardan biri olan "dönemlerarası yaklaşım"ın etkinliği ekonometrik bir çalışmayla ölçülmeye çalışılmıştır. Cari işlemler hesabı ve gayri safi yurtiçi tasarruflar, dönemlerarası yaklaşımının dayattığı bir takım bağımsız değişkenlerle ayrı ayrı ekonometrik analize tabi tutulmuştur. Ekonometrik analiz sonucunda, gayri safi yurtiçi hasılanın ve orta yaşlı nüfusun toplam nüfus içerisindeki payının, cari işlemler hesabı ve gayri safi yurtiçi tasarruflar üzerinde negatif etkisi olduğu; okullaşma oranının ve gayri safi sabit sermaye oluşumunun ise pozitif etkisi olduğu görülmüştür. Sonuçlar, dönemlerarası yaklaşımın, cari işlemler hesabını ve gayri safi yurt içi tasarrufları açıklamada başarılı olduğunu; fakat uyarlama sürecinin teorinin öne sürdüğü gibi olmadığını göstermektedir. Ayrıca, teorinin temel varsayımlarının aksine, cari işlemler hesabı ve gayri safi yurt içi tasarruflar arasında anlamlı bir istatistiksel ilişki bulunamamıştır.

Anahtar Kelimeler: ödemeler dengesi, cari işlemler hesabı, dönemlerarası yaklaşım

To My Dearest Friend
Fatma Bitiş Beşinci….

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The *"Balance of Payments"* can be formally defined as the statistical record of a country's international transactions, over a certain period of time in the form of a double entry book – keeping.[1]

Generally, a country's transactions with the rest of the world are presented in three main groups:

- Current Account

- Capital Account

- Official Reserve Account

The current account includes export and import of goods and services, whereas capital account includes purchases and sales of stocks, bonds, bank accounts, real estate, and business. The official reserve account covers all purchases and sales of international reserve assets such as foreign exchange, Special Drawing Rights, gold and other precious metals.

The current account is an important fundamental macroeconomic variable because it is an indicator of a country's economic performance. The deficits provide a signal of disequilibrium, calling for devaluation and/or tighter macroeconomic policies. Large external imbalances are often assumed to play an important role in the financial crises.

---

[1] Eun, Cheol S. and Resnick, Bruce G 2001. *International Financial Management p:* 59

Current account deficits influence and are influenced by other macroeconomic fundamentals like GDP, employment, interest rates etc…It is an indicator of pressure on a country's currency.

Because of the vital position of the current account on a country's macroeconomic performance, economists tried to understand the factors underlying a country's current account balance. Theoretically there are two approaches aiming to explain the determinants of current account balance: competitiveness approach and intertemporal approach.

According to the competitiveness approach, the competitiveness of an economy as a whole results in a current account surplus whereas the low competitiveness is a cause for current account deficits.

The intertemporal approach, views the current account balance as the outcome of forward looking dynamic saving and investment decisions. [2]

The past decade has seen a strong increase in theoretical and empirical work on the determinants and dynamics of the current account. Much of the rise of this literature has come from the conceptual progress made in open economy macroeconomics, and in particular on the intertemporal approach to the current account that was initially proposed by Sachs (1981) and thoroughly extended by Obstfeld and Rogoff (1995, 1996).

This thesis consists of four chapters. The first section gives brief information about the balance of payments, balance of payments accounting and the historical evaluation of the approaches to balance of payments. Understanding the basic

---

[2] Obstfeld, Maurice and Rogoff, Kenneth 1994

concepts of balance of payments is crucial for evaluating the current account balance. The first section of chapter one clarifies the concept of current account and its sub-categories.

The second chapter presents a theoretical framework for the competitive approach, which is critical for understanding the link between international competitiveness and current account balance. The first section clarifies the "ability to sell" concept and deals not only with the link between competitiveness and ability to sell but also with the link between competitiveness and the current account balance. The second section deals with the basic features of the Keynesian balance of payments model, whereas the third section deals with the monetary approach. The fourth section is devoted to the exchange rate and competitiveness relations. Purchasing power parity, elasticites approach, the J-curve effect, asset market approach are some of the topics analyzed in this section.

The third chapter is about the intertemporal approach to current account balance. It explains the historical evaluation of intertemporal approach and the pros and cons about the power of the approach to explain the current account balance. The first section deals with the individual intertemporal utility maximization calculus and the second section is about the aggregating the individual balances to the national level. The third section explains the absorption approach. The fourth section clarifies the adjustment process of current account to capital inflows and outflows under fixed and flexible exchange rate regimes.

The fourth section is an econometric analysis about the intertemporal approach. In this analysis, I have used the data for *"current account balance", "gross domestic savings", "gross domestic product", "gross fixed capital formation", "the*

percentage of middle aged people (from 40 to 65 year old) in the total population", and the *" combined gross enrollment ratio for primary, secondary and tertiary schools"* for 101 countries for the year 2003. The data is gathered from *"Human Development Report 2005", "World Development Indicators"* and the *"United Nations Statistics Division Demographic Yearbook 2003".*

In the first analysis, the current account balance is regressed on the *"gross domestic product", "gross fixed capital formation", "the percentage of middle aged people (from 40 to 65 year old) in the total population",* and the *" combined gross enrollment ratio for primary, secondary and tertiary schools"* by using OLS technique.

The independent variables used in this analysis are in fact the determinants of the discount rate of a country which is directly related with savings. To see whether they are better at explaining savings than current account balance in the second analysis the *"gross domestic savings"* is regressed against the same independent variables by using OLS technique. The data for gross domestic savings is taken from World Bank's *"World Development Indicators"* database for the year 2003 for the same 101 countries.

The most important assumption of intertemporal approach is that there is a direct relationship between savings and current account.

In order to test this hypothesis for my own data set, I have regressed the current account balance on gross domestic savings.

CHAPTER I

1. BALANCE OF PAYMENTS ACCOUNTING

The *"Balance of Payments"* can be formally defined as the statistical record of a country's international transactions, over a certain period of time in the form of a double entry book – keeping.[3]

An *"international transaction"* refers to the exchange of a good, service or asset between the residents of one country and the residents of other countries. The question of who is a resident of the country requires some clarification. Diplomats, military personnel, tourists and workers who temporarily migrate are residents of the country in which they hold citizenship. A corporation is the resident of the country in which it is incorporated, but its foreign branches and subsidiaries are not.[4]

Because it is prepared in the form of a double entry book – keeping, any transaction that results in a receipt from foreigners will be recorded as a credit, with a positive sign; and any transaction that results in a payment to a foreigner will be recorded as a debit, with a negative sign. Credit entries increase the demand for the country's currency, whereas debit entries increase the supply of the country's currency in foreign exchange markets. Every credit in the account is balanced with a matching debit and vice versa.

Balance of payments data is important to business managers, investors, consumers, and government officials because the data influences and is influenced by other key

---

[3] Eun, Cheol S. and Resnick, Bruce G 2001. *International Financial Management* , p: 59
[4] Salvatore, Dominick 1998. *International Economics, Sixth Edition*, p: 398

macroeconomic fundamentals such as GDP, employment, price levels, exchange rates, and interest rates.

The balance of payments also helps to forecast a country's market potential, especially in the short run. A country experiencing a serious balance of payments deficit is not likely to expand imports as much as it would if it were running a surplus.

Balance of payments is an important indicator of pressure on a country's foreign exchange rate, and thus it is a signal of the potential for a firm trading with or investing in that country to experience foreign exchange gains and losses.

Changes in a country's balance of payments may also signal the imposition or removal of controls over payment of dividends and interest, license fees, royalty fees or other cash disbursements to foreign firms or investors.

The main purpose of the balance of payments is to inform the government about the international position of the country and guide it for formulation of monetary, fiscal and trade policies.

Edwards stated that for the 32 year period (1970 – 2001) more than one half of the countries had current account deficits in excess of % 3.1. He analyzed the current account balance adjustment in the world economy for the period of 1970 – 2001. He reported that:[5]

- Reversals on current account balance are associated with the sudden stops of capital flows. But he also reported that, the relationship between sudden

---

[5] Edwards 2004

stops of capital flows and current account reversals are not one-to-one; historically there have been many major current account reversals which are not related to sudden stops of capital flows and there have been sudden stops which are not associated to reversals.

- The probability of a country to face a current account reversal is mainly determined by the current account to GDP ratio, external debt to GDP ratio, the level of international reserves, domestic credit creation and debt services.

- Current account reversals have negative effects on real growth rates. The magnitude of this negative effect depends on the country's degree of openness. More open countries will suffer less and vice versa.

- There is no supporting evidence for the relationship between dollarization and current account reversals.

- Flexible exchange rate regimes are able to absorb the reversal shocks better than the fixed exchange rate regimes.

Fischer argued that, large current account deficits are a sign of clear danger and stated that the primary indicator of a crisis is the current account deficit; whereas Frankel and Rose found that significant deficits do not increase the probability of a crisis.[6]

Sachs emphasized the intertemporal nature of the current account. He argued that, to the extend higher current account deficits reflected new investment opportunities; there is no reason to be concerned about them.[7]

---

[6] Frankel and Rose 1996
[7] Sachs 1981

Corden argued that, an increase in the current account deficit that results from a shift in private sector behavior, - a rise in investment or a fall in savings-, should not be a matter of concern at all.[8]

Generally, a country's transactions with the rest of the world are presented in three main groups:

- Current Account
- Capital Account
- Official Reserve Account

The current account includes export and import of goods and services, whereas capital account includes purchases and sales of stocks, bonds, bank accounts, real estate, and business. The official reserve account covers all purchases and sales of international reserve assets such as foreign exchanges, Special Drawing Rights gold and other precious metals.

1.1. The Current Account Balance

The current account is a section in a country's balance of payments (BOP) that records a country's current transactions. A current account deficit occurs when a country has an excess of one or more of the four factors making up the account. When a current account is in deficit, it usually means that a country is investing more abroad than it is saving at home. A current account deficit implies that a country's economy is functioning on borrowing. In other words, other countries are essentially financing the economy, and hence sustaining the deficit. When determining the economic health of a nation, it is important to understand where the

---

[8] Corden 1994

deficit stems from, how it's being financed, and what possible solutions exist for its alleviation.[9]

Since a country must finance its current account balance either by borrowing from foreigners or by drawing down on its previously accumulated foreign wealth, a current account deficit represents a reduction in a country's net foreign wealth.

The current account is divided into four finer categories:

- Merchandise Trade
- Services
- Factor Income
- Unilateral Transfers

Merchandise trade represents exports and imports of tangible goods. The term *"trade balance"* represents net merchandise exports.

Services include payments and receipts for legal, consulting and engineering services, royalties for patents and intellectual properties, insurance premiums, shipping fees, and tourist expenditures. These trades in services are sometimes called invisible trade.

The third category, factor income consist largely payments and receipts of interest payments, dividends, and other income on foreign investments that were previously made. For example, if a country's investors receive interest on their holdings of foreign assets, it will be recorded as a credit in the balance of payments, similarly interest payments to the foreign creditors will be recorded as a debit.

---

[9] Reem Heakal (Investopedia.com)January 28th, 2003

Unilateral transfers include *"unrequited"* payments such as foreign aid, reparations, official and private grants and gifts. Unlike other accounts, unilateral transfers have only one directional flow, without offsetting flows. For the purpose of double entry bookkeeping, unilateral transfers are regarded as an act of buying goodwill from the recipients.

When the balance of payments is recorded correctly, the combined balance of the current account, capital account and the reserves account must be zero. That is:

$BCA + BKA + BRA = 0$ **Equation 1**

where, BCA is balance on current account, BKA is balance on capital account and BRA is balance on official reserves.

The Equation 1 is the *"Balance of Payments Identity"* that must necessarily hold. This identity indicates that a country can run a balance of payments surplus or deficit by changing official reserves that allow them to have balance of payments disequilibrium. Under a fixed exchange rate regime, the combined balance on the current and capital accounts will be equal in size but opposite in sign to the change in official reserves. That is,

$BCA + BKA = -BRA$ **Equation 2**

Theoretically there are two approaches aiming to explain the determinants of current account balance: competitiveness approach and intertemporal approach. Theoretical strengths and weaknesses of both approaches are discussed.

CHAPTER II

2. INTERNATIONAL COMPETITIVENESS AND THE BALANCE OF PAYMENTS

International trade and capital flows have increased since World War II at a rate much higher than the average rate of output. Although the proposition that the liberalization of capital improved international allocation of capital is usually accepted in principle, one of its implications, larger balances on current account is more controversial. These imbalances are treated as disequilibrium, which should be carefully monitored. Also, especially trade deficits are accepted as a sign of low competitiveness or as an indicator that trade policies include "unfair" barriers. [10]

2.1. The Competitiveness Approach: The Ability To Sell

According to the competitiveness approach, the competitiveness of an economy as a whole results in a current account surplus whereas the low competitiveness is a cause for current account deficits. This approach mainly bases on two notions:

- The competitiveness of a whole economy can be interpreted as the ability of local enterprises to sell their goods in world markets. Therefore competitiveness is interpreted as the "*ability to sell*".[11]

- A rise in the overall competitiveness leads *ceteris paribus* directly to a surplus on current account because of local goods attracting a larger share of

---

[10] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 3*
[11] Balassa 1964

world demand. This suggests a quite robust relationship between competitiveness and the current account.[12]

In the literature, two different types of competitiveness are distinguished: price and non-price competitiveness. Price competitiveness depends on the price of the local goods and the exchange rate. Non-price competitiveness depends on the quality, service, timely delivery etc… Nevertheless, these two concepts are not independent of each other. As it is obvious, measuring changes in non-price competitiveness is very difficult, therefore distinguishing price and non-price competitiveness is not an easy task. For example, an increase in the price of local goods or an appreciation of the exchange rate may be the result of an increase in the quality. For this reason the interest of economists mainly focuses on overall competitiveness of the economy instead of trying to measure the changes in price and non-price competitiveness.

On the other hand, the relationship between competitiveness and the current account is vulnerable.

First, *"the ability to sell"* concept is not a good indicator of competitiveness, not only for an economy, but also for a firm. A firm may lower its price in order to be "*able to sell*" its product. But as the microeconomic theory explains, a firm should set its price above the minimum value of the average variable cost; otherwise it could not be able to pay the prices of factors and the mobile factors of production (such as labor) will move to other firms or sectors. In short, the *"ability to sell"* is not a sufficient condition for survival.

---

[12] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 3*

Second, the "ability to sell" approach indicates that the balance on current account is derived from bilateral or sectoral balances which are simply added up. The assumption that the competitiveness of a nation is simply the aggregation of the competitiveness of single firms is not realistic. In an accounting sense this logic would work, but not for an economist things are not that simple. To add-up the competitiveness of local firms or sectors, the competitiveness of each firm or sector should be independent of the others. But of course, this is not always the case. For instance, if a firm increases its competitiveness and expands its production, it will need more factors of production and that's why will pay marginally higher factor prices to attract more factors. (Assuming all factors of production is fully employed.) In this case, other firms also have to pay more factor prices in order not to lose factors of production and decrease production. That is, if factors of production are mobile between firms or sectors and there is full employment, the competitiveness of one firm or sector is not independent of the others. The international economics theory suggests that capital is internationally mobile whereas labor is not. That is, the international competitiveness for factors is restricted to capital. But on the national level, firms also compete for labor. So the competitiveness of a firm or sector is not only adversely affected when foreign firms offer better or cheaper products, but also when other local firms or sectors increase their competitiveness and offer higher wages. Since the adverse effects of a wage increase of local firms is restricted to the home country and the foreign competitors are not affected, their competitive position is improved.[13]

---

[13] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 4*

The matter becomes more complex once traded and non-traded goods are introduced. If a number of local firms import capital, part of the imported capital will be used on non-traded goods which in turn, will cause a rise in the overall demand for non-traded goods. Consequently, the relative price of the non-tradable will rise and producers of these goods will be able to offer higher wages. The resulting wage increase reduces the competitiveness of firms which produce traded goods.

Another reason for the vulnerability of the analogy between an economy and a firm is the bankruptcy situation. A firm, which loses its competitive position, goes bankrupt, but even if a country experiences strong relative declines in its productivity, it cannot go bankrupt.

As a result, assuming that the competitiveness of one sector or firm reflects the competitiveness of the whole economy is not realistic. Yet, as the standard international economics theory indicates, a country always has a comparative advantage in some sectors, regardless of the productivity levels of the other countries.

Nevertheless, if we want to interpret the relationship between an economy and a firm, we should make the correct definition of "competitiveness". For a single firm, profits are a good indicator of competitiveness. However, an economy, which generates high factor incomes and high profits, is surely much better and competitive than an economy which depends on low factor incomes in order to generate high profits. That is, in order to measure competitiveness, factor incomes should also be considered. The sum of the factor incomes and profits is called "net value added" or "aggregate income". As a result, the level of per capita income or

the growth rate of per capita income is a good measure of competitiveness for an economy.

Although the competitiveness approach is vulnerable, many balance of payment theories depend on this approach. These theories are interested in the supply and demand in the international markets.

2.2. **Keynesian Balance of Payments Models**

The Keynesian approach to balance of payments was developed basically based on the work of John M. Keynes in the twentieth century. The most well known theories are elasticities theory and absorption theory. These two theories are explained in the following pages.

The relationship between demand and current account balance is usually analyzed in simple multiplier models. The main focus of attention is given on the impact of fiscal and monetary policies. The results vary with respect to the underlying assumptions.

In a system of fixed exchange rates and immobile capital, an expansionary fiscal or monetary policy leads to a deficit on the current account. If the assumption of immobile capital or fixed exchange rate is dropped, the effects of an expansionary policy are different as shown by Mundell.

A general problem with the Keynesian balance of payments models is that, only short-run phenomena are analyzed.

2.3. **Monetary Approach to Balance of Payments**

The monetary approach to balance of payments emanates from the David Hume price-specie-flow mechanism which was launched as a counter argument to the mercantilist belief that a country can achieve a balance of payments surplus by import substituting and export promoting policies.

This approach is based on the assumption of a small open economy with a fixed foreign exchange regime and a stable money demand function. It also assumes that output, domestic prices and interest rates are exogenously determined.

Monetary approach to balance of payments became popular in 1970's. It emphasizes the monetary aspects of balance of payments. According to the monetary approach, money market disequilibrium is seen as a crucial factor provoking balance of payments disequilibrium. If money demand exceeds money supply, the excess demand would be satisfied by inflows of money from abroad.

The monetary approach to balance of payments can be applied equally to fixed and floating exchange rates although the adjustment process for each system is different. A country with a fixed exchange rate regime loses its authority on monetary policy and a monetary expansion leads to a current account deficit. On the other hand, a country with a floating exchange rate regime has a direct control on monetary policy but a monetary expansion leads to a surplus.[14]

Monetary approach to balance of payments regards money as a stock, and argues that money stock can be changed through international reserve flows. It states that a fixed exchange rate system could work without having to resort for devaluation,

---

[14] Pilbeam, K. (1992), International Finance, Mc Millan, London.

provided a country has a sound monetary policy; thus devaluation will only occur as a result of failure of monetary policy.[15]

According to the monetary approach, the balance on current account depends on the supply of and demand for money. If there is excess supply of money, it will flow abroad in exchange for goods and services as well as securities. If there is excess demand for money, there will be capital outflow thus the current account balance will improve.

The monetary approach is criticized for ignoring other parts of international trade in determining balance of payments.

2.4. Exchange Rate and Competitiveness

Exchange rate is mostly regarded as an exogenous variable which influences the ability to sell of local firms. It is regarded as exogenous because, it is assumed that the exchange rate is determined in international financial markets. It is pointed out that the volume of transactions in the foreign exchange market is about thirty or forty times larger than the volume of the transactions booked in current account. As a result, exchange rate is independent of international trade.

2.4.1. Which Exchange Rate?

Since there are many exchange rate concepts, we must decide which one to use in order to measure the relationship between competitiveness and foreign exchange.

---

[15] Du Plessis, SPJ, BW Smit & CL McCarthy. 1998. International economics (Second edition). Johannesburg: Heinemann.

2.4.1.1. **Nominal vs. Real Exchange Rate**

If the nominal exchange rate changes are due to price level changes in different countries, they do not affect competitive positions. That is, as long as the changes reflect cost and price differences, they are beneficial. But usually changes in nominal exchange rates are greater than the changes in cost and price differentials. As a result, because the primary focus is on relative prices, an analysis of foreign exchange and current account should be based on real exchange rate rather than the nominal.

2.4.1.2. **Bilateral vs. Effective Exchange Rates**

Because a currency may depreciate against some currencies and may appreciate against some others over a time period; a weighted average of exchange rates between the domestic currency and the nation's most important trade partners with weight given by the relative importance of the nation's trade with each of the trade partners is called "effective exchange rate". If we are dealing with the entire economy, we usually have a well diversified foreign trade with various foreign countries and various currencies, so only the effective exchange rate is important from the standpoint of aggregate exports and imports.[16]

2.4.1.3. **Hedging and Appropriate Unit of Time**

Choosing the best suited exchange rate concept involves the decision of the right time horizon. Many export and import transactions are extended over several months. That's why the short-time fluctuations in the foreign exchange may be

---

[16] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 9*

overestimated. Even if the time period of an economic transaction is short, the agents would most probably use futures, forward and options market to hedge themselves against these short-term fluctuations. These markets are highly liquid and transaction costs are very low especially for periods less than 12 months. As a result, short term foreign exchange bilateral foreign exchange rate fluctuations do not have considerable effects on foreign trade. What matters is the long-term real effective exchange rate. The volatility of this real effective exchange rate is obviously lower than the volatility of the nominal bilateral exchange rates.

2.4.2. **Volatile Fundamentals**

The fact that exchange rates have not been stable since the end of Bretton Woods system, does not necessarily mean that flexible exchange rate systems does not work properly. Volatility in the exchange rates may be the result of the volatility in the fundamentals. (The following factors can be considered to be fundamentals: *the structure and the level of demand and supply, the propensity to save and invest, money supply, money demand, government interventions, public deficits, inflation, technical progress etc...*)

Purchasing Power Parity is the most widely used concept, to distinguish excessive exchange rate changes. The theory of Purchasing Power Parity suggests that, the exchange rate between currencies of two countries should be equal to the ratio of the countries price levels.[17]

Let P_A be the price of the standard commodity basket in country A and P_B the price of the standard commodity basket in country B, both of which are denominated in

---

[17] Eun, Cheol S. and Resnick, Bruce G 2001. *International Financial Management*

their local currencies. The PPP suggest that, the exchange rate between country A's currency and country B's currency should be equal to

$S = P_A/P_B$ **Equation 3**

where, S is the price of country B's currency in terms of country A's currency. Equation 1 can be rearranged as

$\mathbf{P_A = S \times P_B}$ **Equation 4**

Which means that the price of commodity basket in country A in terms of country A's currency, must be the same as the price of the commodity basket in country B. That is, the price of a standard commodity basket must be the same across the countries when measured in a common currency.

The relationship in Equation 2 is named as *absolute PPP*. The relative version is as follows

$$e = (\textstyle\prod_A - \prod_B)/(1 + \prod_B) \approx \prod_A - \prod_B \quad \textbf{Equation 5}$$

where e is the rate of change in the exchange rate and $\prod_A$ and $\prod_B$ are the inflation rates of the countries.

It should be noted that, even if absolute PPP does not hold, relative PPP may still hold.

The well-known way of defining the equilibrium exchange rate is the *Big Mac Index* developed by *The Economist*. The *Big Mac Index* has devised in 1986, as a benchmark to evaluate whether the currencies are their equilibrium level.

The Economist's Big Mac index is based on one of the oldest concepts in international economics: the theory of purchasing-power parity (PPP), which argues that in the long run, exchange rates should move towards levels that would equalize the prices of an identical basket of goods and services in any two countries.[18] The basket used for the calculation of the *Big Mac Index* consists of a McDonald's Big Mac hamburger, produced in 120 countries. The *Big Mac* PPP implies the exchange rate which makes the *Big Mac* cost the same in USA as elsewhere. The comparison of these rates, with the actual rates is an indicator for the overvaluation or the undervaluation of the currencies.

Since hamburgers are non-traded and prices may vary across countries because of differences in taxes, profit margins or labor inputs, the *Big Mac Index* is not a good indicator of overvaluation or undervaluation. It only gives a rough idea about the correct equilibrium level of exchange rates.

Whether PPP holds or not is a remarkable question for international trade. If PPP holds, that is, the inflation differentials between countries are offset by exchange rate changes, the competitive positions of the countries will not be altered. However, if PPP does not hold, changes in nominal exchange rates would result in changes in real exchange rates, which would definitely affect current account balances of the countries.

The real exchange rate can be defined as follows:

$$q = \frac{(1+\prod_A)}{(1+\prod_B)(1+e)} \textbf{ Equation 6}$$

where, q is real exchange rate. If PPP holds, q will be equal to 1.

For the above formula, if country A's currency, depreciates more than it is warranted by PPP with respect to country B's currency, the competitiveness of country A in the world export markets will strengthen. Thus, country A's current account balance will improve.

To sum up, if

q = 1: current account balance of the domestic country is unaffected.

q < 1: current account balance of the domestic country improves.

q >1: current account balance of the domestic country deteriorates.

It is clear that, the law of one price applied to a standard commodity basket will hold only if the prices of the commodities are equalized across countries and the composition of the basket is the same across countries.

The applicability of the PPP theory is questionable because it assumes constant real exchange rates. Based on the PPP, every change of the real exchange rate would have to be interpreted as a malfunctioning of the exchange rate system. Such an interpretation hardly makes sense. In the medium or long run fundamental changes make changes of the real exchange rate necessary. [19]

---

[19] Eun, Cheol S. and Resnick, Bruce G 2001. *International Financial Management* p:110

Machlup (1980) argues that, PPP should be used as a rule of thumb which is most useful when inflation differentials are bigger than a few percentage points.[20]

The theory of PPP has been tested many times and generally yielded negative results.

Richardson (1978) reported that he was unable to detect commodity arbitrage between United States and Canada. His findings imply that, *"the presence of commodity arbitrage could be rejected with 95 percent confidence for at least 13 out of 22 commodity groups."* This result means, if commodity arbitrage is imperfect even between two neighboring countries, which have relatively few trade restrictions, PPP is not likely to hold for other pair of countries.[21]

Kravis and Lipsey tested the relationship between inflation and exchange rates and found that price levels can move apart without rapid correction via arbitrage, thus rejecting the law of one price. [22]

Adler and Lehman also reported that, deviations from PPP follow a random walk, without any signal towards its original path. In other words, deviations from PPP do not exhibit a tendency to revert to PPP. [23]

Frenkel reported that, PPP does not work properly in explaining the behavior of exchange rates between US Dollar and major European currencies; but it resembles a better performance between the pairs of European currencies which belong to so called European Common Market. He found that relative price levels are only one

---

[20] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 14*
[21] Eun, Cheol S. and Resnick, Bruce G 2001. *International Financial Management p:* 111
[22] Kravis and Lipsey 1978
[23] Adler and Lehman 1983

of the many potential factors influencing exchange rates. So, if PPP theory were valid, relative price levels should be sufficient in explaining the behavior of exchange rates. [24]

Even if PPP may not hold in reality, it can still be used as a benchmark for deciding whether a currency is undervalued or overvalued.

2.4.3. **Inherent Instability of Exchange Rate Changes**

Even if the exchange rate variability has been to a large extent due to real and monetary shocks, the possibility exists that, part of the variability is caused by the inherent inflexibility of the exchange rates. This is at least the result of several models which try to explain why there may be excess variability in flexible exchange rate systems.[25]

2.4.3.1. **The Elasticity Approach**

A country's current account balance over any time period is the increase in resident's claims on foreign incomes or outputs, less the increase in similar foreign owned claims on home income or output. Thus, in theory, the current account includes not only trade balance (X – M) but also net capital gains on existing foreign assets.

A focus on the current account as the net trade balance, led some economists to view international prices as its central determinant. Thus, was born the elasticities

---

[24] Frankel 1981

[25] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 16*

approach to the current account balance where price elasticities of demand and supply determine the international capital flows. [26]

The elasticity approach emphasizes the significance of relative price for international adjustment.[27] This approach tries to derive the conditions which ensure the "normal reaction" of the balance on current account in case of exchange rate changes. These conditions are Marshall-Lerner condition and more precise Robinson condition. Earlier balance of payments theories have made use of this approach. This approach is based on a partial equilibrium model. In this model, foreign exchange rate changes are not explained, they are simply assumed. For instance, it is not clear why a current account deficit should exist for a certain period until the exchange rate finally depreciates. After all, if there is a clear cut relationship between the current account and the exchange rate, one should expect that the foreign exchange rate depreciates as soon as current account falls into deficit, thus keeping the balance close to zero. If this does not happen, it has to be explained economically.[28] Repercussions on other variables than exports and imports are often neglected. Therefore, the elasticities approach is hardly suited to give a general explanation of the interaction between the foreign exchange rate and current account balance.

The J-curve effect is based on the proposition that exports and imports which were agreed upon in the past will not be altered by foreign exchange rate changes. Thus, if international trade is mostly invoiced in the currency of the exporter, a trade balance deficit will be increasing in the short run right after depreciation. Only in

---

[26] Obstfeld and Rogoff (1994)
[27] Machlup(1939/40), Robinson 1949)
[28] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 20*

the longer run, as exports and imports adjust, will the deficit be reduced. This would imply that, unless there is stabilizing capital flows, exchange rates would be highly unstable at least in the short run.[29]

Although the assumption of short run inelastic imports and exports seems to be realistic, it should be noted that, for the determination of the spot exchange rate, neither the exports which are crossing the customs, nor the payments which are currently made for the imports are important. The foreign exchange rate is determined by the current purchases and sales of foreign exchange rate. These sales and purchases may be made before the delivery and payment. For example, an importer who receives foreign goods today, and immediately pay for them may have bought the required amount of foreign exchange half a year or a year ago. Similarly, an export transaction which involves payment in the future may lead to a foreign exchange purchase today, in order to bear the foreign exchange risk. That is, one necessary condition for the validity of the J-curve effect is that foreign exporters do not hedge.

2.4.3.2. Overshooting

In the overshooting model, a situation is described in which prices in financial markets adjust faster than prices in goods markets. That is, a change in monetary aggregates causes an overshooting or undershooting of exchange rate from its long run equilibrium level. In the short run there can be deviations, but in the long run purchasing power parity is fulfilled.

---

[29] McKinnon 1986, Ohr 1985, Kruger 1983 p 40

Dornbusch's over shooting model is the best known approach to explain excess volatility. In this model, deviations of the exchange rate from its long run equilibrium are equal to the interest rate differentials.

According to the Homburg, interest rate differentials are much smaller than real exchange rate changes, that is, the model can only explain a small part of the volatility in the exchange rates. For example, the real appreciation of the US$ with respect to D-Mark was 29.1% in 1981 and 13.5% in 1984. At the same time, interest rate differentials between two countries were 1.9% and 3.4% respectively. Thus, according to Homburg, the Dornbusch model can not explain volatility, especially when there is remarkable real appreciation of the currencies.

Also, according to Ludiger (1989) it is not clear why economic agents adjust instantaneously in the foreign exchange markets, but not in the capital markets. While expected inflation and exchange rate changes influence the spot exchange rate, they do not affect the interest rate. Hence, the Fisher effect does not apply in the Dornbusch model. If expected inflation would be immediately priced into interest rates, there would be no overshooting.

2.4.3.3. **The Asset Market Approach**

In asset market models, the exchange rate changes are treated just like any other asset price. According to the model, foreign exchange rate is determined by expectations over fundamentals as in any other organized asset markets. According to this approach, if markets are efficient, all existing knowledge about present and future economic conditions should be reflected in the current asset price. If new information affects the expected relative return of assets denominated in different

currencies, investors will rearrange their portfolios in favor of those assets whose relative return improved, which in turn leads to an exchange rate change.

This hypothesis could not find any support. These kinds of studies are difficult to conduct and interpret because it is hard to know which news is new, which news is incorrect and which news is anticipated.

In asset market models, short term exchange rate development is explained independently of goods and capital flows, that is, according to asset market approach, exports and imports have nothing to influence exchange rate. This has been criticized by Tobin "A model whose solution generates flows but completely ignores their consequences may be suspected of missing phenomena important, even in a relatively short run…"[30]

According to the asset market approach exchange rates can be explained without relating to the fundamentals. But one should keep in mind that, expectations relate to the fundamentals. Explaining exchange rates without regard of fundamentals is possible only in the short run analysis.

[30] Tobin 1982 p:188

CHAPTER III

3. THE INTERTEMPORAL APPROACH

The intertemporal approach, views the current account balance as the outcome of forward looking dynamic saving and investment decisions. [31]

After the current account imbalances resulting from the oil crises of 1973 – 1974 and 1979 – 1980, intertemporal approach became an alternative way to explain current account. Neither classical monetary, nor the Keynesian models had offered clear explanations to the current account imbalances at that times.

Intertemporal analyses of the current account balance became popular in the early 1980's. This new focus in open economy macroeconomics resulted both from theoretical advances in other parts of the economics and from economic events that existing open economy models seemed ill equipped to examine.[32]

Lucas's critique of the econometric policy was the starting point of the intertemporal approach. He suggested that open economy models might be more reliable if they depend on optimization problems of households rather than econometric specifications.[33]

The intertemporal approach, achieves a synthesis of the absorption and elasticities view, by accounting for the macroeconomic determinants of relative prices and by analyzing the impact of current and future prices on saving and investment.

---

[31] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 21*
[32] Obstefeld and Rogoff (1994)
[33] Lucas, R. E., (1976)

In a closed economy, national domestic savings are equal to investments and current account balance is always zero. But in an open economy, since capital is internationally mobile, current account imbalances are inevitable according to the intertemporal approach. An empirical finding that savings affect investments would be strong evidence against intertemporal approach.[34]

In this sense, Feldstein and Horioka argued that in the very long run capital mobility is limited and that's why there is a strong relationship between savings and investments. For a sample of 16 OECD countries over 1960 – 1974 period they found that,

$$(I/Y)_j = \underset{(0.018)}{0.035} + \underset{(0.074)}{0.887}(S/Y)_j + u_j \quad \text{Equation 7}$$
$$R^2 = 0.81$$

where $(I/Y)_j$ is gross domestic investment rate average for the country "j", $(S/Y)_j$ is gross national saving rate average for the country "j". The numbers in parenthesis are the probability values.[35]

Feldstein and Bacchetta reported similar results for a sample of 23 OECD countries for 1974 -1986. The estimation results leaving out Luxembourg, which is an outlier and developing Turkey is as follows: [36]

$$(I/Y)_j = \underset{(0.020)}{0.088} + \underset{(0.094)}{0.622}(S/Y)_j + u_j \quad \textbf{Equation 8}$$
$$R^2 = 0.69$$

---

[34] Obstfeld and Rogoff (1994)
[35] Feldstein and Horoika (1980)
[36] Feldstein and Bacchetta (1991)

Feldstein et al. argued that if the capital were really internationally mobile, the above coefficients would be much smaller because domestic savings would be invested abroad to maximize interest revenue. That is, according to Feldstein et al., the intertemporal approach is not effective in explaining current account balance.

However, Obstfeld and Rogoff argued that Feldstein et al.'s findings basing on cross-sectional analysis provided no basis at all for dismissing the basic premises of the intertemporal approach. They argued that:[37]

- If the capital is truly immobile and the intertemporal approach is irrelevant, the time series relationship between savings and investments would also be close to one. But the time series and cross-sectional aspects of saving – investment relationship are quiet distinct.

- It is hard to see how capital could be truly mobile in the short run but not in the long run. Long run is the succession of short runs.

- Even post 1973, governments have sometimes tried to adjust monetary and fiscal policies to avoid large current account deficits, thus there is an evidence of current account targeting

- It is plausible that, in countries with higher saving rates, the cost of capital will be lower and investment is higher. Also, investments are responsive to higher retained earnings (corporate savings). So we can clearly say that, the relationship between corporate savings and investment need not have strong implications for the relationship between total savings and investment.

---

[37] Obstfeld and Rogoff (1994)

Taylor revisits the Feldstein – Horoika equation controlling for

- domestic relative prices

- age structure of the population

- Interaction of growth rate of domestic production with the age structure of the population.

He found that, for a number of country samples, the cross-sectional saving and investment association disappears. [38]

An important and powerful implication of intertemporal models is that, change in national savings should be fully reflected in changes in current account balance.[39]

Ventura constructed a model to test the relationship between current account and savings. For a sample of 21 industrial countries and the period of 1966 – 1997 he ran the following regression:

$$CA_{ct} = \alpha + \beta S_{ct} + u_{ct}$$

where the subscripts c and t denote country c and year t, and u_{ct} is a disturbance or error term. The estimate of β obtained through this procedure should be interpreted as follows: "Assume that in country c and year t saving is one percent higher than the sample average, then we should expect that in that same country and year the current account is β times higher than the sample average." Finding an estimate of β close to one would be encouraging for the theory, since the latter predicts that

---

[38] Taylor, (1993)
[39] Obstfeld and Rogoff 1994

changes in saving should lead to one-to-one changes in the current account.[40] He found an β estimate of 0.214 which is not a supporting coefficient for the intertemporal approach.

He argued that, if changes in savings and changes in the rate of time preference are not controlled, the estimated coefficient is biased towards zero.

Ventura offered a new intertemporal model to converge the theory with reality. In his model, he argued that, the individual portfolio decisions of the individuals include both risk and return. Changes in savings will not be directly translated into current account balance. Investors invest part of their portfolios abroad, depending on their risk and return patterns, so only a proportion of the additional savings will be invested abroad. Also, he argued that when short run adjustment costs in investment are added to the analysis, the intertemporal model traces reality.[41]

Also, to explain the empirical failure of intertemporal approach, Nason and Rogers offered some assumptions for the disperancies between theory and reality. These assumptions are, "non-separable preferences", "less than perfect international capital mobility", "fiscal shocks" and "changing interest rates".[42]

Hercowitz worked on Israeli data for 1950 – 1981 period. He presents some support for the intertemporal model but also reports that the model exaggerates the response of current account to output fluctuations.[43]

---

[40] Ventura 2002
[41] Ventura 2003
[42] Nason and Rogers (2002)
[43] Hercowitz, (1986)

3.1. **The Individual Intertemporal Calculus**

An alternative approach to the explanation of current account balances is the intertemporal approach which is based to the theory of intertemporal utility maximization.[44] According to this approach, a trade balance depends on the individual decisions whether to consume today or consume tomorrow.

Each individual can use his periodical income either for present consumption or he can spread consumption over several periods. An individual may consume part of his present income and saves the remaining part. Savings can be used in two ways, the individual can invest in his own household or in his firm or he can lend it to other households or firms. Because the existence of lenders requires borrowers, an individual can consume or invest more than his periodical income. In this case, the consumer can spend less than his future income on consumption because he has to pay off the loan in future periods. The saving decisions are taken according to marginality principle, that is, if the marginal utility of consumption tomorrow exceeds marginal utility of consumption today, the individual will save. The investment decisions of these savings are also taken with the same logic. If the market interest rate is higher at home than the market interest rate abroad, the savings will be invested at home and vice versa. Instead, the individual can also choose to borrow, depending on the interest rate and his individual discount rate.

---

[44] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p:24*

If the consumer chooses to borrow, his consumption will be greater than his income. His decision whether to be a debtor or creditor depends on the interest rate and his individual discount rate. So we can say that[45]

$$netB = f(r_i, r) \text{ \textbf{Equation 9}}$$

where, $netB$ is net borrowing, r_i is individual discount rate and r is market interest rate.

The individual discount rate is determined by the marginal productivity of capital and the marginal rate of substitution between consumption today and consumption tomorrow. So:

$$r_i = f(MP_K, \partial C_1 / \partial C_0) \text{ \textbf{Equation 10}}$$

where, MP_K is marginal productivity of capital, ∂C_0 and ∂C_1 are consumption at time 0 and 1 respectively.

Time preference is a function of expected permanent income, age and wealth. So:

$$\partial C_1 / \partial C_0 = f(Y^P, age, w) \text{ \textbf{Equation 11}}$$

where, Y^P is permanent income and w is wealth.

As a result, the individual discount rate can be interpreted as

$$r_i = f(MP_K, Y^P, age, w) \text{ \textbf{Equation 12}}$$

---

[45] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p:24*

The equilibrium condition is:

$$\partial C_1 / \partial C_0 = MP_K = r_i = r \textbf{ Equation 13}$$

which states that, in equilibrium marginal productivity of capital should be equal to individual discount rate in both have to be equal to the market interest rate. If the individual discount rate is below the market interest rate, the individual will increase saving and will maximize his utility by additional lending and vice versa.

Economic transactions between an individual and the rest of the world can be expressed in an individual *"balance of payments"*. Borrowing and lending is visible in *"capital account"* and purchase and sales of goods are displayed in *"current account"*.

A capital transfer results as an additional purchasing power for the borrower so he can spend more than his income. Consequently, the lender has to spend less than his income. So we can surely say that, from an individual perspective, current account surplus or deficit and capital account surplus or deficit are planned simultaneously. If an exogenous factor changes the individual discount rate or market interest rate, current and capital accounts will also change.

For example, if a new good is introduced to the market, which an individual is willing to consume, his current account balance can be affected in many ways. If the individual decreases his total expenditure on other goods to consume the new good his current account balance will not be affected. If he borrows more in order to consume the good his current account balance will definitely detoriate. And finally, if the individual decides to save more in order to consume the good in the future, his

current account balance will improve. If the introduction of a new good does not affect the individual discount rate or the market interest rate, i.e. if the individual is not willing to consume the good, his current account balance will remain the same.[46]

3.2. Aggregating Individual Balances to the National Level

Similar to the individual discount rate, the market rate of a country depends on human capital, capital, income, wealth and age structure of the population. The marginal productivity of capital and savings of a country is mainly determined by institutional and political factors. The discount rate of a country can be written as

$$r_c = f(hc, c, Y^P, age, w) \quad \textbf{Equation 14}$$

where, r_c is discount rate of the country, hc is human capital, c is capital, and *age* is age structure of the population.

The borrowing and lending decisions of a country depends on country's discount rate and world market interest rate. If country's discount rate is lower than the world market interest rate, the country becomes a net lender. The country's balance on current and capital accounts can be expressed as follows

$$netB = f(r_c, r_w) = (M - X) = (C_{IM} - C_{EX}) \quad \textbf{Equation 15}$$

where r_c is discount rate of the country, M is imports, X is exports, C_{IM} is capital import and C_{EX} is capital export.

---

[46] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p:24*

An individual's borrowing and lending decisions are taken simultaneously. Thus, from the standpoint of an individual, net capital imports/exports and net goods imports/exports are equal both ex post and ex ante. Also, prices are constant since supply of goods is infinitely elastic for an individual. On the other hand, from a macroeconomic perspective, although the ex posts equality between current account and capital account holds; ex ante capital import/export and good import/export do not have to coincide. A country may borrow more, without any increase in demand for imports. This kind of situation causes disequilibrium in the foreign exchange market.[47]

3.3. **Absorption Approach**

As intermediate macroeconomics text demonstrates, current account balance is equal to national savings less domestic investment. This is known as absorption approach which depends on macroeconomic factors determining international borrowing and lending decisions.[48]

Chinn and Prasad reported that current account balances are positively correlated with government budget balances and initial stocks of net foreign assets. They also argued that, among developing countries, measures of financial deepening are positively related with current account balance while openness to international trade is negatively correlated.[49]

A current account balance is usually based on a well known national accounting identity.

---

[47] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 30* 30
[48] Alexander, 1952
[49] Chinn and Prasad (2000)

$Y = C + I + G + (X - M)$ **Equation 16**

where Y is national income, C is consumption, I is investment, G is government spending, X is exports and M is imports. With a supply side model, we can evaluate the national accounting identity according to *"Say's Law"*. Say's Law implies that, "**supply creates demand**." This means that "overproduction" in a free economy is actually impossible.[50] Aggregate demand and aggregate supply are equal not only ex ante but also ex post and both are equal to long run aggregate supply, i.e. full employment national income. That is,

$Y^* = C + I + G + (X - M) = AD$ **Equation 17**

where, Y^* is full employment national income and AD is aggregate demand. If we rearrange the equation 13, we get

$Y^* + (M - X) = C + I + G$ **Equation 18**

We can substitute $(M - X)$ with $(C_{IM} - C_{EX})$ from equation 11. Thus we get

$Y^* + (C_{IM} - C_{EX}) = C + I + G$ **Equation 19**

Equation 15 states that, any level of spending above full employment level should be financed by borrowing, and any level of spending below full employment level is due to lending.

---

[50] http://www.friesian.com/sayslaw.htm(27.06.2006)

We can conclude that in a world which Say's Law holds, current account deficits are the results of excess investment and/or government spending. We can show this phenomenon mathematically:

$$Y^* = C + S + T = C + I + G + (X - M) \Rightarrow (S - I) + (T - G) = (X - M) \quad \textbf{Equation 20}$$

where, S is savings and T is taxes.

When we introduce tradable and non-tradable goods into the model, we get

$$Y + (M - X) = (C_T + C_N) + (G_T + G_N) + (I_T + I_N) \quad \textbf{Equation 21}$$

where the subscripts T and N stand for tradable and non-tradable respectively.

With the introduction of tradable and non-tradable goods into the model, a new problem arises. We can clearly state that, the goods whose demand has decreased in the lending country, do not have to be the same goods whose demand has increased in the borrowing country. The changes in the demand structures of both countries, affects both tradable and non-tradable goods, thus the exchange rate and the prices of the goods will change. The magnitude of the exchange rate change will depend on

- The marginal propensity to consume of tradable goods
- The flexibility of prices
- The price elasticites of supply and demand[51]

---

[51] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 31*

We can surely say that a net capital inflow increases absorption i.e. aggregate demand. An increase in absorption increases the demand for tradable and non-tradable goods unless they are not inferior goods. Since the tradable and non-tradable goods represent a wide basket of goods, we can safely say that they are not inferior. So it is unlikely that a net capital inflow decreases demand for tradable and non-tradable.

3.4. **Current Account and Marginal Productivity of Capital**

One of the factors determining a country's borrowing and lending decisions is marginal productivity of capital. If the marginal productivity of capital is higher in a country, there will be net capital inflows.

Glick and Rogoff modeled the joint dynamics of investment and current account in response to productivity shocks. They showed that, for a sample of industrial countries, country specific shocks rather than global shocks are important for current account fluctuations.[52]

The adjustment process of marginal productivity of capital towards current account depends on the exchange rate regime.

3.4.1. **The Adjustment Process Under Flexible Exchange Rates**

Under a flexible exchange rate regime, if the marginal productivity of capital increases in country A, there will be net capital inflows from the rest of the world because higher marginal productivity of capital implies higher rates of return in country A relative to the rest of the world. A net capital inflow will increase

---

[52] Glick and Rogoff (1995)

absorption, and the demand for tradable and non- tradable goods will increase in the borrowing country. On the other hand, a net capital outflow will reduce absorption in rest of the world so the demand for tradable and non-tradable will decrease.

The effect of net capital inflow on the foreign exchange market will be in two ways. The demand for the country A's currency will increase because of the capital inflow. On the other hand, since part or all of the net capital inflow will be spent on imports, supply of country A's currency will also increase.

If the marginal propensity to import of country A is equal to one, the magnitudes of the increases in the demand for and supply of country A's currency will be equal. Thus, exchange rate will not change in such a situation. The increase in the demand for country A's currency will be met by the increasing supply of country A's currency for imports.

If the marginal propensity to import is lower than one, which is a more realistic case, the increased demand for imports in country A will be smaller than net capital imports. That is, the increase in demand for country A's currency will be higher than the increase in supply so country A's currency will appreciate.

At the same time, since the demand for non-tradable in country A increases, their price also increases. The demand for non-tradables in rest of the world decreases so their price in rest of the world also decreases. With a precise definition of foreign exchange rate this situation is a real appreciation.

Under the assumption that the prices of the tradable will be equal all around the world, the real exchange rate defined on the basis of tradable and non-tradable goods distinction can be mathematically represented as:

$$e_r = \left(\frac{P_T}{P_N}\right)^A / \left(\frac{P_T^*}{P_N^*}\right)^{A^*}$$ **Equation 22**

where e_r is real exchange rate, P_T is price of tradable, P_N is price of non- tradable, A is share of non-tradable in % of GDP and $*$ stands for foreign variables. In this definition, the decline of e_r indicates the real appreciation of the domestic currency.

Since P_N is rising and P_N^* is decreasing e_r is decreasing which implies a real appreciation. The magnitude of the appreciation depends on the income and price elasticites of country A and rest of the world for tradable goods.

This definition takes the relative price of the tradable and non-tradable in the country as an indicator of the country's competitiveness level in the foreign trade. The rationale behind this definition is that the cost differentials between the countries are closely related with the relative price structures in these economies.

Economists often claim that a real appreciation of exchange rate weakens the competitive positions of the exporters and causes current account deficits. But according to the above model, the reason for the deterioration of the competitive positions of the exporters is not the exchange rate appreciation. Because as we have pointed out, the higher the appreciation the lower the marginal propensity to import in the home country. Since the marginal propensity to import decreases with the increasing competitiveness of local firms, the real appreciation is the result of the competitiveness rather than a cause. [53]

---

[53] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p: 31*

As a result we can say that, with a net capital inflow, a country spends more than its income which becomes visible as a current account deficit.

In the long run, however, since the price of non-tradable increases in country A, the resources of the country will be diverted to the non-tradable sector from the tradable sector. With the increased production of non-tradable and decreased production of tradable, the price of non-tradable will decrease and the price of tradable will increase. Thus, real appreciation will slow down. Also, since the elasticity of demand is higher in the long run, the demand for non-tradable will decrease and the exchange rate will eventually depreciate.

So, the currency of a capital importer country will initially appreciate and then depreciate. The reason for this is the fact that supply and demand needs some time for the adjustment process.

3.4.2. The Adjustment Process Under Fixed Exchange Rate System

In a fixed exchange rate system, nominal exchange rate is permanently fixed so nominal exchange rate changes are not part of the adjustment process. But there are still real exchange rate changes because fixing nominal exchange rate is not sufficient to fix the real exchange rate. Under a fixed exchange rate system, central banks intervene the foreign exchange rate to defend the nominal exchange rate by using central bank reserves which in turn increases money supply.

Under a fixed exchanger rate system we can modify the Equation 15 as

$$Y^* + (C_{IM} - C_{EX}) = C + I + G + \Delta R \quad \textbf{Equation 23}$$

where ΔR is change in foreign reserves.

If we assume that capital and current accounts are balanced initially, a net capital inflow to country A results in an increased demand for country A's currency. If the marginal propensity to import is less than one, in other words, if the capital importers spend part or all of the capital import on non-tradable goods, the increase in the supply of country A's currency will be less than the increase in its demand. So, there will be an excess demand for country A's currency. In this case, central bank intervenes the foreign exchange market and purchases foreign exchange to absorb the excess demand. As a result, current account deficit will be smaller than the capital imports, the difference being the change in foreign reserves as Equation 19 shows.

The adjustment of capital account to current account is brought by the real appreciation under a fixed exchange rate system. Since nominal exchange rate is fixed, a real appreciation occurs with the increasing prices of the non-tradable. The increase in the price of non-tradable is the result of increasing money supply.

By fixing the nominal exchange rate the competitiveness of tradable sector in the capital importing country cannot be preserved. Under flexible exchange rates, competitiveness is eroded by a nominal appreciation, whereas under fixed exchange rate systems, it is eroded by the increased competitiveness of the non-tradable sector which bids factor prices up. In both cases, the non-tradable sector grows at the cost of tradable sector.[54]

---

[54] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p:57*

CHAPTER IV

4. AMPIRICAL TEST OF INTERTEMPORAL APPROACH

As mentioned in the previous section, the intertemporal approach to the current account balance is an alternative approach. The intertemporal approach aims to explain the current account balance by using individual utility maximization techniques.

According to this approach, a trade balance results from the individual decision whether to consume or save. An individual can use his periodical income either for present consumption or he can spread consumption over several periods.[55] Unless the marginal utility of saving exceeds the marginal utility of consumption, the consumer will save. The savings will be invested abroad, which is a net capital outflow, if the market interest rate in the home country is lower than the world market interest rate. Otherwise, the consumer will borrow, which is a net capital inflow. That is, borrowing and lending decisions of an individual is a function of individual discount rate and market interest rate.

The individual discount rate of a consumer can be expressed as

$$r_i = f(MP_K, Y^P, age, w) \quad \textbf{Equation 24}$$

where, r_i is individual discount rate, MP_K is marginal productivity of capital, Y^P is permanent income and w is wealth and age is age of the individual.

---

[55] [55] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p:91*

The equilibrium condition is:

$$\partial C_1/\partial C_0 = MP_K = r_i = r \quad \textbf{Equation 25}$$

where r is market interest rate.

Discount rates measure an individual's willingness to trade current consumption for future consumption through saving; higher discount rates imply lower willingness to delay consumption today for consumption tomorrow.[56]

As the discount rate of an individual, the market discount rate of a country can be explained by human capital, capital, income, wealth and age structure of the population. That is

$$r_c = f(hc, c, Y^P, age, w) \quad \textbf{Equation 26}$$

where r_c is discount rate of the country, hc is human capital, c is capital, and *age* is age structure of the population.

According to this model, if a country is a capital abundant country, the marginal productivity of capital will be low compared to the rest of the world so the country will face net capital outflows, thus a current account surplus.

Since the term *"capital"* includes human capital in the broadest sense, increases in the quality of human capital will generate the same results.

The age structure of the population plays a crucial role in determining the discount rate of a country. According to the Modigliani's life cycle model, the higher the

---

[56] Borghans, Lex and Golsteyn 2005

share of the middle aged people in a country, the higher the savings, thus the higher the current account balance.

Lastly, according to the intertemporal approach we expect the level of savings to increase as income increases. An increase income, decreases the marginal utility of additional income so individual discount rate decreases. So the individual will be willing to save more, which will in turn improve current account balance.

The empirical evidence on savings suggests that while low-income and poor families can and do save, lower income families are less likely to save and report lower levels of savings than do higher income families (Kennickell et al 2000).[57]

In order to evaluate whether the intertemporal approach is an effective way to explain current account balance, I have carried on an empirical analysis.

In this analysis, I have used the data for *"current account balance"," gross domestic product", "gross fixed capital formation", "the percentage of middle aged people (from 40 to 65 year old) in the total population",* and the *" combined gross enrollment ratio for primary, secondary and tertiary schools"* for 101 countries for the year 2003.

2003 data is used because the latest available data for combined gross enrollment ratio for primary, secondary and tertiary schools was available only for 2003. For the convenience of the results, other variables are also gathered for 2003. I have conducted the research only for 101 countries because, I wasn't able to get gross enrollment rate and the share of middle aged people in the population in the total population for all of the countries.

---

[57] Borghans, Lex and Golsteyn 2005

For the econometric research, I have used the combined gross enrollment ratio for primary, secondary and tertiary schools as a proxy for the human capital. I have gathered the data from *"Human Development Report 2005"*.

The Human Development Report is prepared by the United Nations Development Program (UNDP). The report is commissioned by a selected team of leading scholars, development practitioners and members of Human Development Report Office of UNDP.[58] Enrollment of primary, secondary and tertiary students of all ages expressed as a percentage of the primary, secondary and tertiary school-age population. The gross primary enrollment ratio describes the capacity of a school system in relation to the size of the official school-age population. For example, a ratio of 100 percent indicates that the number of children actually enrolled, including those outside the official age range, is equivalent to the size of the official primary school-age population. It does not mean that all children of official primary school-age are actually enrolled. If the ratio were so misinterpreted, it would overstate the actual enrollment picture in those countries in which a sizable proportion of students are younger or older than the official age owing to early or delayed entry or to repetition. The differences in national systems of education and duration of schooling should be borne in mind when comparing the ratios. "Gross" enrollment includes students of all ages, in other words students whose age exceeds the officially set age group for that class (e.g. repeaters). "Net" enrollment includes only children of the official school age for that class, as defined by the national education system. [59] Ratios greater than 100 can occur when there is a high number

---

[58] http://hdr.undp.org/aboutus/ (04/08/2006)
[59] http://qesdb.usaid.gov/(04/08/2006)

of over aged students in that level. A high (greater than 100) gross enrollment ratio can be indicative of inefficiencies in the educational system.

An increase in gross enrollment ratio is in indicator of an increase in the quality of human capital. Increases in human capital would increase the marginal productivity of labor in the country. As I have previously mentioned, increases in the labor productivity, improves the competitive position of the country in world export markets relative to other countries. Thus, we can surely say that, increases in gross enrollment ratio, improves current account balance. That's why, the expected sign of gross enrollment ratio in explaining the current account balance is positive. Also, increases in marginal productivity of labor leads to higher wages for the workers. As the workers' income increases, they will be able to save more and consequently the aggregate savings of the country will increase. As a result, the country will be able to lend abroad which means a net capital outflow thus an improvement in the current account.

Another independent variable gross domestic product is used as a proxy for income. The gross domestic product data is taken from the World Bank's *"World Development Indicators"* database. The expected sign for this variable in explaining the current account balance is positive. As income increases, countries save more, which in turn improves current account balance as I have previously mentioned.

The share of middle aged people in the total population is also included to the model, because according to the intertemporal approach the age structure of the population has a crucial role in determining the discount rate of a country. The data for the population is taken from the *"United Nations Statistics Division Demographic Yearbook 2003"*. Since, the census of populations are not conducted

in the same years for all countries, I have used the data for the latest available years. The latest available year for the countries' population is between 1994 and 2003. The latest available year for most of the countries was 2003, but some of them were for 2002 and 1996. Since, the percentage of middle aged people (40-64) in the total population is calculated, using different year's population data for different countries do not significantly affect the adequacy of results. The differences between the years of population censuses is less than ten years, which is a short time period for the age structure of the population to change. In other words, the share of middle aged people in the total population can not significantly change in ten years. The logic behind this assumption is simple, since some people who were between 31-40 years old in 1994, will surely be in the 40-64 interval in 2003; but people who were in 55-64 interval in 1994, will have already been left the interval in 2003 so the net change in the percentage of middle aged people will be limited in the short run.

According to the Modigliani's life-cycle model, each individual has a lifetime utility function which he tries to maximize given his budget constraint. His budget consists of his heritage from his parents and the net present value of all his future income minus his planned bequest to the following generation. If the planned periodical income exactly matches the planned periodical consumption, the individual neither borrows nor lends. But according to the life-cycle hypothesis, the periodical income of individuals exceeds their periodical consumption in the beginning and late years of their life, whereas their periodical income exceeds periodical consumption in their middle ages. So, people are likely to borrow more

in their young ages, then save to pay back their credit and create wealth in their middle ages and again dissave after retirement.[60]

If we apply this idea to the whole economy, as the share of middle aged people increases, the level of savings also increases. An increase in savings causes the interest rates in the home country to fall, which in turn causes a net capital outflow. Thus, the expected sign of this variable in explaining current account balance is positive.

The variable, gross fixed capital formation is used as a proxy for both wealth and capital. According to the intertemporal approach, the determinants of individual discount rate contain wealth and capital.

The *"stages of development"* hypothesis for the balance of payments suggest that, as a country moves from a low to intermediate stage of development, they typically import capital and run current account deficits. Overtime, as they reach an advanced stage of development, countries run current account surpluses in order to pay off accumulated external liabilities and also to export capital to less advanced economies. [61]

GFCF consists of the value of both new and existing (i.e. used or second hand) fixed assets acquired less the value of any existing assets sold to another enterprise for use in production or sold as scrap. Imports of second hand machinery and equipment can be a major component of GFCF in certain countries and there is

---

[60] Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surpluses Matter? p:92*
[61] Chinn and Prasad 2000

extensive international trade in used assets such as road vehicles, ships and aircraft. Gross fixed capital formation, consists of:

- Acquisitions *less* disposals of new or second-hand tangible fixed assets in the form of:
  - Machinery and equipment
  - Dwellings;
  - Other buildings and structures;
  - Cultivated assets (trees and livestock that are used repeatedly, or continuously, over long periods of time to produce goods such as rubber, fruit, milk, wool, etc.)

  - Major improvements to existing fixed or natural assets, including land.

  - Acquisitions less disposals of intangible fixed assets (e.g., computer software)

Fixed assets are goods that are used repeatedly, or continuously, for at least a year in the process of producing other goods or services. Notice that dwellings are treated as fixed assets that are used, together with other inputs, to produce housing services for renting or own use. Owner occupiers do not consume the dwellings as such but rather the housing services produced by the dwellings.[62]

In a closed economy, the value of the stock of physical capital is equal to wealth. In an open economy, however they may diverge. But still, even in an open economy, it is a good measure of wealth. According to the intertemporal approach, increases in wealth results in increases in savings.

---

[62] http://siteresources.worldbank.org/ICPINT/Resources/ch9.doc (06/08/06)

Also, the variable gross fixed capital formation is a good proxy for marginal productivity of capital. The intertemporal approach states that, if a country is capital abundant relative to other countries, the marginal productivity of capital will be low in that country which causes a net capital outflows to the rest of the world where marginal productivity of capital is higher.

That is, we can clearly say that, the expected sign of gross fixed capital formation in explaining the current account balance is positive.

The econometric analysis is calculated by using E-views 3.0. I have used the ordinary least squares method for the estimation. Ordinary least squares is a mathematical optimization technique which, when given a series of measured data, attempts to find a function which closely approximates the data (a "best fit"). It attempts to minimize the sum of the squares of the ordinate differences (called residuals) between points generated by the function and corresponding points in the data. An implicit requirement for the least squares method to work is that errors in each measurement be randomly distributed. The Gauss-Markov theorem proves that least square estimators are unbiased and that the sample data do not have to comply with, for instance, a normal distribution. The resulting estimation output table is as follows:

Table 1 OLS Results for the Determinants of Current Account

Dependent Variable: CURRENT ACCOUNT				
Included observations: 101				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1148483752	9400996497	-0.122	0.903
ENROLLMENT	335011776	131122719	2.554	0.012
GDP	-0.146	0.047	-3.059	0.002
GFCF	0.588	0.256	2.293	0.024
MIDDLEAGE	-754318655	415192039	-1.816	0.072
R-squared	0.748	F-statistic		71.567
Adjusted R-squared	0.738	Prob(F-statistic)		0.000
Durbin-Watson stat	2.931			

In the above table, the dependent variable *"CURRENT ACCOUNT"* stands for the current account balance in year 2003 in terms of American dollars. *"C"* is intercept term, *"GDP"* is gross domestic product in year 2003 in terms of American dollars, *"CAPITAL FORMATION"* is the gross fixed capital formation in year 2003 in terms of American dollars, *"ENROLLMENT"* is the gross enrollment ratio for the primary, secondary and the tertiary schools and finally *"MIDDLEAGE"* is the percentage of middle aged (40-64) people in the total population.

The *"Coefficient"* column shows the estimated coefficients of the independent variables. For the linear econometric models as I have used in this study, the coefficients show the marginal contributions of each independent variable to the prediction of the dependent variable assuming all other variables fixed.

The next column *"Std. Error"* is the estimated standard errors of the coefficient estimates. The standard errors measure the statistical reliability of the coefficient estimates—the larger the standard errors, the more statistical noise in the estimates.

The third column *"t-Statistic"* is the ratio of an estimated coefficient to its standard error. With the t- statistics value, hypothesis with respect to a particular value of an independent variable can be tested. If we write a sample regression function as:

$$Y_i = \alpha + \beta_i X_i + u_i$$

where Y_i is dependent variable, α is intercept term, β_i is the coefficient of the independent variable, X_i is independent variable and u_i is disturbance term.

The most common null hypothesis in econometric models is that:

$$H_0 : \beta_i = 0$$

With this null hypothesis, the significance of the influence of the independent variable β_i on the dependent variable is tested.

The signs of the parameters for most of the variables in a model for cross-sectional data cannot be known. The null hypothesis that the influence of the independent variable on the dependent variable is absent, and the alternative hypothesis is that the independent variable exists can be either positive or negative. In such a case, a one tailed t test is obvious. If the t-statistics value exceeds the critical value from the t-table for the given significance level, the null hypothesis is rejected.

The last column *"Prob."* shows the probability of drawing a t-statistic as extreme as the one actually observed. This probability is also known as the "p-value" or "marginal significance level". It is the lowest significance level at which a null hypothesis can be rejected.[63] With this value, one can reject or accept the null hypothesis that the true coefficient is zero against a two sided alternative that it differs from zero. For example, if the test is performed at %5 significance level, a "Prob." value lower than 0.05 is taken as evidence to reject the null hypothesis of zero coefficient

According to the estimation results, all the independent variables are statistically significant at % 5 significance level except the "middleage". However, the probability value for this variable is 0.0724which means that we can reject the null hypothesis that the independent variable "middleage" is in fact zero, even at % 8 significance level. That is, the probability that rejecting the null hypothesis when it is in fact true is only % 8 which is an acceptable level in social sciences.

For the OLS method, the assumptions made about the independent variables and the error terms are extremely critical for the valid interpretation of the results. One of the assumptions of the OLS is *"homoskedasticity"* which means that the variance of the error terms for each independent variable (that is the conditional variances of the error terms) is some positive constant number equal to σ^2. If the conditional variance of the dependent variable varies with each independent variable, this situation is known as *"heteroskedasticity"*.

The heteroskedasticity problem does not result in biased parameter estimates. However, OLS estimators are no longer *"Best, Linear, Unbiased Estimators"*

---

[63] Gujarati, Damodar N. 1995. *Basic Econometrics p:*132

(BLUE). That is, among all the unbiased estimators, OLS does not provide the estimate with the smallest variance. Depending on the nature of the heteroskedasticity, significance tests may be too high or too low. In addition, the standard errors are biased when heteroskedasticity is present which in turn leads to a bias in test statistics and confidence intervals.[64] That is, insisting on usual testing procedures in spite of heteroskedasticity may be misleading.

The problem of heteroskedasticity is likely to be more common in cross sectional data. In order to test for heteroskedasticity, econometricians have developed many techniques. Most of these techniques are based on residuals ($\hat{u}_i$), not the disturbances (u_i). A residual is the difference between the actual Y_i output value and the Y_i output value predicted by the regression equation whereas disturbances are the deviations of an individual Y_i around its expected value. Conceptually, $\hat{u}_i$ is analogous to u_i and can be regarded as an estimate of u_i.[65] $\hat{u}_i$ is a good estimator of u_i if the sample size is fairly large.

In order to test for heteroskedasticity, I have used *"White's Test"*. The White's Test is relevant for the analyses of cross-sectional data. The null and alternative hypotheses for the White's Test are as follows:

H_0 = the variance of the disturbance term is constant (homoskedasticity)

H_1 = the variances of the disturbance term is heteroskedastic.

---

[64] http://www.nd.edu/~rwilliam/stats2/l23.pdf (10/08/2006)
[65] Gujarati, Damodar N. 1995. *Basic Econometrics p:135*

During the testing procedure, the parameters of the specified model are estimated with the OLS method and the residuals $\hat{u}_i$'s are computed. For the test, one of the following regressions is calculated with OLS:

$$\hat{u}_i = \alpha + \beta_1 X_i + \beta_2 X_i^2 + \beta_3 Z_i + \beta_4 Z_i^2 + v_{t1}$$ **Equation 27**

$$\hat{u}_i^2 = \alpha + \beta_1 X_i + \beta_2 X_i^2 + \beta_3 Z_i + \beta_4 Z_i^2 + \beta_5 X_i Z_i + v_{t2}$$ **Equation 28**

the Equation 29 is calculated without cross terms whereas Equation 30 is calculated with cross terms.[66] The null hypothesis is tested with the statistic nR^2 where n is sample size and R^2 is the goodness of fit which I will explain in detail in the following parts. Both n and R^2 is from the equations 27 or 28. If the statistic nR^2 is greater than the χ^2 value from the χ^2 table for the given significance level and degrees of freedom we can reject the null hypothesis that the variance of the disturbances are constant, which means the OLS estimation suffers from heteroskedasticity.

White's Test with cross terms for my analysis is given below:

Table 2 White's Test Results

White Heteroskedasticity Test:			
F-statistic	47.59742	Probability	0.000000
Obs*R-squared	89.45505	Probability	0.000000

The results show that the analysis suffers from heteroskedasticity problem. In order to get rid of heteroskedasticity I have used *"White Heteroskedasticity Consistent*

---

[66] Thomas, R.L. 1997, *Modern Econometrics. An Introduction p:144*

Standard Errors and Covariance". Using this option of the EViews, does not change the point estimates of the parameters, only the estimated standard errors. White's heteroskedasticity-corrected Standard errors can be larger or smaller than the uncorrected standard errors.

According to the intertemporal approach the expected signs for all these four variables are positive. When we look at the estimation output at a glance, we can at first sight say that "GDP" and "MIDDLEAGE" do not have the correct signs. The resulting equation from these estimates is as follows:

CA = -1148483753 + 335011776*ENROLLMENT - 0.146*GDP + 0.588*GFCF - 754318655*MIDDLEAGE

The expected sign for the variable "GDP" is positive because according to the intertemporal approach, increases in income causes the discount rate of an individual to fall, which increases savings. An increase in savings is expected to increase current account balance. However, according to the estimation results, a one dollar increase in "GDP", causes a 0.146 dollars decrease in current account balance on the average.

The reason for the independent variable "GDP" has a negative sign might be explained by the concept of *"Marginal Propensity to Import"* (MPI). We can define the "MPI" as the increase in imports due to a one dollar increase in income.

From a Keynesian standpoint, we can clearly say that as income increases savings also increases. The increase in savings due to a one dollar increase in income is called *"Marginal Propensity to Save"* (MPS).

In this analysis, we expected the current account to increase as income increases depending on the link between current account and savings. As savings increases, the country will lend more abroad, thus create a capital outflow which increases current account balance.

From these explanations we can say that the independent variable "GDP" has two conflicting effects on the current account balance; one negative effect through MPI channel, and a positive effect through MPS channel. The net effect on current account balance is determined by the magnitudes of these two effects. If the negative effect of the MPI is greater than the positive effect of MPS in absolute terms, the net effect on current account balance will be negative and vice versa.

In short, in our case, the reason for the negative sign of the independent variable "GDP" might be the phenomenon that MPI is greater than MPS.

Also, the independent variable "middleage" does not have the correct sign according to the intertemporal approach. According to the Modigliani's life-cycle-hypothesis, which is based on intertemporal utility maximization, as the share of the middle aged people increases in an economy, savings increases which increases current account balance. But according to the estimation results, a one percent increase in the share of middle aged people (40-64) in the total population decreases current account balance by 754318655 dollars.

According to the neo-classical thinking, the level of savings is determined by the interest rate, given a discount rate. A rising real interest rate causes savings to increase. From the Keynesian point of view, the reason for an individual to save is different. According to the Keynesian economists, the higher the income the higher

the level of savings. Keynesian approach states that, an increase in domestic income worsens current account balance because increases in income increases absorption and imports. Another approach, life-cycle-hypothesis suggests that, the higher the middle aged people in a country, the higher the savings in an economy as whole. More savings will result in higher supply of capital and thus domestic interest rates will fall. So, a net capital outflow will take place generating a detoriation in current account balance.[67]

As our estimation results for the independent variable "middleage" shows, the life-cycle hypothesis does not hold. One reason for this might be again the MPI. That is, as the life-cycle hypothesis suggests, people's income increases at their middle ages and they save more, but as their income increases they import more too. As I have just explained, if the MPI is higher than MPS, the net effect of the share of the middle aged people in the total population on the current account balance will be negative.

Another reason for the negative sign of this independent variable can be explained by using the individual discount rate concept. It is often claimed that individuals, in general, are not able to care adequately for their old age protection. Instead they are said to overemphasize present consumption at the expense of future consumption.[68]

Another reason for the inconvenience of the results with the life-cycle hypothesis might be the social security systems in most of the countries. These kind of either state-run or private social security systems contain protection for old age, which

---

[67] kitap 9192
[68] same

might lead the middle aged people not to save for their older ages. Therefore, the social security system of a country determines the national level of savings.

In a similar analysis, Chinn and Prasad reported that, higher dependency ratios (size of the dependent population, relative to the working age population) are negatively associated with current account balance.[69]

The third variable "GFCF" has the correct sign empowered by the theory. The intertemporal approach suggests that, one of the determinants of the individual discount rate is capital and wealth.

If a country is capital abundant, the marginal productivity of capital will be low in that country according to the law of diminishing returns. A low marginal productivity of capital will lead to low interest rates which cause a net capital outflow, thus a decrease in the current account balance.

Also, the wealth of a country can be measured by "GFCF". As wealth increases, the level of savings increases.

According to the estimation results, a one dollar increase in "GFCF", increases CA balance by 0.588 dollars.

The last variable "enrollment" also has the correct sign. I have included this independent variable to the model as a proxy for human capital. As enrollment rate increases, the quality of human capital also increases which leads to an increase in the marginal productivity of labor. Increases in the marginal productivity of labor improve the competitive position of the country in world export markets. According

---

[69] Chinn and Prasad 2000

to the estimation results, a one percent increase in the enrollment rate, causes a 335011776 dollars increase in current account balance.

The coefficient labeled "R-squared" (R^2) is called the coefficient of determination. It is used to consider how well the sample regression line fits the data. The R^2 is a non-negative number and it lies between 0 and 1. An R^2 of 1 means a perfect fit. The well-known shortcoming of R^2 is that, it always increases as the number of independent variables increases. So the coefficient "Adjusted R-squared" (Adjusted R^2) is a better measure for the goodness of fit, because the Adjusted R^2 increases less than the R^2 as the number of independent variables increases.

According to the estimation results the value of Adjusted R^2 is 0.738 which implies that, almost % 74 of the variability in the current account balance can be explained by the variability in the independent variables. % 74 is a very high goodness of fit for a cross-sectional analysis.

The column labeled "F-Statistics" tests the hypothesis that all of the slope coefficients (excluding the constant, or intercept) in a regression are zero. The p-value given just below the F-statistic, denoted Prob(F-statistic), is the marginal significance level of the F-test. If the p-value is less than the significance level you are testing, say .05, you reject the null hypothesis that all slope coefficients are equal to zero. For our analysis, the p-value is essentially zero, so we reject the null hypothesis that all of the regression coefficients are zero. The F-test is a joint test so that even if all the t-statistics are insignificant, the F-statistic can be highly significant.

In general we can conclude that although the independent variables "GDP" and "MIDDLEAGE" do not have the expected sign, we have a very good "goodness of fit", that is our independent variables can explain the current account balance successfully.

The reason for the variables "GDP" and "MIDDLEAGE" do not carry the expected sign might have some interesting implications. As I have mentioned before, the intertemporal approach to balance of payments mainly depends on individual saving and investment decisions.

The independent variables used in this analysis are in fact the determinants of the discount rate of a country which is directly related with savings. These four independent variables might have the correct signs and higher R^2 values when explaining the domestic savings of a country. In other words, these four independent variables may be good at explaining savings but the link between current account balance and savings might be problematic.

In order to test this empirically, I have regressed the *"Gross Domestic Savings"* on the same independent variables by using OLS technique. I have obtained the data from World Bank's *"World Development Indicators"* database for the year 2003 for the same 101 countries.

The expected sign of gross enrollment ratio in explaining the gross domestic savings is positive As enrollment rate increases, the quality of human capital also increases which leads to an increase in the marginal productivity of labor. Increases in marginal productivity of labor leads to higher wages for the workers. As the

workers' income increases, they will be able to save more and consequently the aggregate savings of the country will increase.

Another independent variable gross domestic product is used as a proxy for income. From a Keynesian standpoint as income increases, countries save more. So the expected sign of this independent variable in explaining savings is positive.

The expected sign for the variable gross fixed capital formation is also positive. Since it is a proxy for wealth, increases in wealth increases savings.

And finally the expected sign for the variable middleage is also positive according to the life-cycle-hypothesis.

The resulting estimation output table is as follows:

Table 3 OLS Results for the Determinants of Gross Domestic Savings

Dependent Variable: SAVING				
Included observations: 101				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1312848256.38	8187040634.45	-0.160	0.872
ENROLLMENT	414969168.2	126843844.381	3.271	0.001
GDP	-0.123	0.035	-3.449	0.000
GFCF	1.466	0.181	8.102	0.000
MIDDLEAGE	-909883484.226	459915744.524	-1.978	0.050
R-squared	0.981	F-statistic		1285.907
Adjusted R-squared	0.980	Prob(F-statistic)		0.000
Durbin-Watson stat	2.014			

In the above table, the dependent variable *"SAVING"* stands for the current account balance in year 2003 in terms of American dollars. *"C"* is intercept term, *"GDP"* is gross domestic product in year 2003 in terms of American dollars, *"CAPITAL FORMATION"* is the gross fixed capital formation in year 2003 in terms of American dollars, *"ENROLLMENT"* is the gross enrollment ratio for the primary, secondary and the tertiary schools and finally *"MIDDLEAGE"* is the percentage of middle aged (40-64) people in the total population.

According to the estimation results, all the independent variables are statistically significant at % 5 significance level. That is, we can reject the null hypothesis that the true coefficient is zero against a two sided alternative that it differs from zero for all the independent variables. In other words, the probability that rejecting the null hypothesis that the true coefficient is zero when it is in fact differs from zero is only % 5 which is an acceptable level in social sciences.

In order to test for heteroskedasticity, I have used *"White's Test"*. The White's Test is relevant for the analyses of cross-sectional data. The test results are given below:

Table 4 White's Test Results for Heteroskedasticity

White Heteroskedasticity Test:			
F-statistic	27.14626	Probability	0.000000
Obs*R-squared	82.36242	Probability	0.000000

The results show that the analysis suffers from heteroskedasticity problem. In order to get rid of heteroskedasticity I have used *"White Heteroskedasticity Consistent Standard Errors and Covariance"*. Using this option of the EViews, does not change the point estimates of the parameters, only the estimated standard errors.

White's heteroskedasticity-corrected Standard errors can be larger or smaller than the uncorrected standard errors.

According to the above estimation results, we can at first sight say that the independent variables "GDP" and "MIDDLEAGE" do not have the expected signs. The resulting equation from these estimates is as follows:

SAV = - 1312848256 + 414969168.2*ENROLLMENT - 0.123*GDP + 1.466*GFCF - 909883484.2*MIDDLEAGE

Interestingly, the independent variable "GDP" is negatively correlated with savings. According to the estimation results, a one dollar increase in GDP, causes a 0.123 dollars decrease in the savings on the average.

The above result suggests that, the Keynesian view that savings are positively related with income is not valid at least at the country level and for the year 2003.

The dependent variable gross domestic savings equals gross domestic product minus total consumption, or gross domestic investment plus the trade balance. Total consumption is equal to total private consumption plus government purchases. Mathematically we can show that from Equation 14:

$$GDP = C + I + G + (X - M)$$ **Equation 31**

and $S = GDP - (C + G)$ **Equation 32**

where S is savings. By combining Equation 14 and 32 we can write

$$S = I + (X - M)$$ **Equation 33**

From Equation 33 we can explain the negative sign of the dependent variable "GDP". As the economic theory suggests, GDP has nothing to do with investment and exports. Theoretically, the investments in an economy are determined by the interest rate and the exports are determined by the exchange rate. But as I have previously mentioned, an increase in income causes an increase in imports. From Equation 33, we see that increases in imports causes a depletion in savings. So the negative sign of the variable GDP may be due to the induced imports.

Also the life-cycle-hypothesis of Modigliani is not empirically correct for this dataset. According to the life-cycle-hypothesis, as the share of the middle-aged people increases in a country, the savings also increases. But according to the estimation results a one percent increase in the share of middle aged people (40-64) causes a 909883484 million decrease in the gross domestic savings.

The negative sign of this variable may also be due to induced imports. The middle aged people have higher income so they tend to import more, which detoriates savings.

The negative sign of the independent variable "GDP" shows that Keynesian approach to savings is not empirically correct. Also, the negative sign of the independent variable "MIDDLEAGE" shows that life-cycle-approach is not valid in explaining savings. So we can a priori conclude that the classical approach to savings, that is, savings are determined by the interest rate, might be correct although I haven't tested for it.

The wealth of a country can be measured by "GFCF". As wealth increases, the level of savings increases.

According to the estimation results, a one dollar increase in "Gross Fixed Capital Formation" increases savings by 1.466 dollars.

The last independent variable is the "ENROLLMENT". A one percent increase in enrollment rate, increases savings by 414969168 dollars.

According to the estimation results the value of Adjusted R^2 is 0.98 which implies that, almost % 98 of the variability in the gross domestic savings can be explained by the variability in these four independent variables. It is a very high goodness of fit for a cross-sectional analysis.

The results of these two analyses are summarized in the below table:

Table 5 Summary of the OLS Results for the Determinants of Current Account

		DEPENDENT VARIABLES			
		Current Account Balance		Gross Domestic Savings	
		Coefficient	Prob.	Coefficient	Prob.
INDEPENDENT VARIABLES	GDP	-0.146	0.002	-0.123	0.000
	GFCF	0.588	0.024	1.466	0.000
	MIDDLEAGE	-754318655	0.072	-909883484	0.050
	ENROLLMENT	335011776	0.012	414969168	0.001
	C	-1148483752	0.903	-1312848256	0.872
	Adjusted R^2	0.738		0.980	

An interesting finding resulting from these two econometric analyses is that the independent variables have the same signs in explaining both of the dependent variables. The Adjusted R^2 value is higher for the second regression, in which the independent variables try to explain gross domestic savings. It means that, the independent variables used in these analyses are better at explaining gross domestic savings than the current account balance.

At this point, a priori, one could think that there is a direct relationship between current account balance and gross domestic savings.

An important and powerful implication of intertemporal models is that, change in national savings should be fully reflected in changes in current account balance.[70]

However, this prediction of the theory is systematically rejected by the data. Typical analogy that have regressed the current account on savings have found a coefficient of 0.025, which is far below the hypothesized value of one.[71]

In order to test this hypothesis for my own data set, I have regressed the current account balance on gross domestic savings. The estimation output is given in the below table.

Table 6 OLS Results for the Current Account Regressed Against Gross Domestic Savings

Dependent Variable: CURRENT ACCOUNT				
Method: Least Squares				
Included observations: 101				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7966459230	5157083807	1.544	0.125
SAV	-0.136	0.137	-0.996	0.321
R-squared	0.247	Prob(F-statistic)		0,000
Adjusted R-squared	0.239			
Durbin-Watson stat	2.04			

---

[70] Obstfeld and Rogoff
[71] Ogaki, Ostry and Reinhard (1995)

In order to test for heteroskedasticity, I have used *"White's Test"*. The White's Test is relevant for the analyses of cross-sectional data. The test results are given below:

Table 7 White's Test Results for the Heteroskedasticity

White Heteroskedasticity Test:			
F-statistic	2281.539	Probability	0.000000
Obs*R-squared	98.87646	Probability	0.000000

The results show that the analysis suffers from heteroskedasticity problem. In order to get rid of heteroskedasticity I have used *"White Heteroskedasticity Consistent Standard Errors and Covariance"*. Using this option of the EViews, does not change the point estimates of the parameters, only the estimated standard errors. White's heteroskedasticity-corrected Standard errors can be larger or smaller than the uncorrected standard errors.

As seen from the estimation results, the probability value of the independent variable gross domestic savings is extremely high. That is we can conclude that, there is no relationship between gross domestic savings and current account balance. The independent variable gross domestic savings is not statistically different from zero in explaining the current account balance.

As a result, we can say that the intertemporal approach is effective in explaining the current account balance. But this effectiveness is not through the way which the intertemporal approach argues. In this study, we tried to explain the current account balance through the determinants of individual discount rate.

The theory argued that, the factors underlying the individual discount rate determines saving and consumption decisions. The savings in turn determine the current account balance through capital inflows and outflows. But as the Table 6 shows, there is no statistically significant relationship between savings and current account. The reason for this insignificant relationship may be manifold.

First of all the link between current account and savings is not always practically valid.

Theoretically, if financial markets are perfectly competitive and capital is internationally mobile, an increase in savings leads to a decrease in the interest rates of the home country which causes a net capital outflow. Thus, the capital account detoriates and the current account improves.

The link between savings and capital account is determined by several factors other than domestic and world interest rates, like political, institutional, regional, etc…factors. For example, in mainly developing and least developed countries, because of imperfect capital and money markets and weak banking system, savings cannot be diverted to money capital markets.

Even if the savings are diverted to capital markets, this does not necessarily mean that they will be invested abroad causing a net capital outflow. Whether to invest at home or abroad is determined by the market interest rate and the world interest rate. If the market interest rate is higher than the world interest rate, there wouldn't be any capital inflow.

Additionally, if the world interest rate is higher than the domestic interest rate, risk averse investors would still not be eager to invest abroad if they find investing abroad risky.

CONCLUSION

The current account is an important fundamental barometer because it is an indicator of a country's economic performance. The deficits provide a signal of disequilibrium, calling for devaluation and/or tighter macroeconomic policies. Large external imbalances are often assumed to play an important role in the financial crises.

Current account deficits influence and are influenced by other macroeconomic fundamentals like GDP, employment, interest rates etc…It is an indicator of pressure on a country's currency.

Because of the vital position of the current account on a country's macroeconomic performance, economists tried to understand the factors underlying a country's current account balance. Theoretically there are two approaches aiming to explain the determinants of current account balances: competitiveness approach and intertemporal approach.

According to the competitiveness approach, the competitiveness of an economy as a whole results in a current account surplus whereas the low competitiveness is a cause for current account deficits.

The intertemporal approach, views the current account balance as the outcome of forward looking dynamic saving and investment decisions. [72]

The past decade has seen a strong increase in theoretical and empirical work on the determinants and dynamics of the current account. Much of the rise of this literature

---

[72] Chinn and Prasad 2000

has come from the conceptual progress made in open economy macroeconomics, and in particular on the intertemporal approach to the current account that was initially proposed by Sachs (1981) and thoroughly extended by Obstfeld and Rogoff (1995, 1996).

This thesis consists of four chapters. The first section gives brief information about the balance of payments, balance of payments accounting and the historical evaluation of the approaches to balance of payments. Understanding the basic concepts of balance of payments is crucial for evaluating the current account balance. The first section of chapter one clarifies the concept of current account and its sub-categories.

The second chapter presents a theoretical frame work for the competitive approach, which is critical for understanding the link between international competitiveness and current account balance. The first section clarifies the "ability to sell" concept and deals not only with the link between competitiveness and ability to sell but also with the link between competitiveness and the current account balance. The second section deals with the basic features of the Keynesian balance of payments model, whereas the third section deals with the Monetary approach. The fourth section is devoted to the exchange rate and competitiveness relations. Purchasing power parity, elasticites approach, the J-curve effect, asset market approach are some of the topics analyzed in this section.

The third chapter is about the intertemporal approach to current account balance. It explains the historical evaluation of intertemporal approach and the pros and cons about the power of the approach to explain the current account balance. The first section deals with the individual intertemporal utility maximization calculus and the

second section is about the aggregating the individual balances to the national level. The third section explains the absorption approach. The fourth section clarifies the adjustment process of current account to capital inflows and outflows under fixed and flexible exchange rate regimes.

The fourth section is an econometric analysis about the intertemporal approach. In this analysis, I have used the data for *"current account balance"," gross domestic product", "gross fixed capital formation", "the percentage of middle aged people (from 40 to 65 year old) in the total population",* and the *" combined gross enrollment ratio for primary, secondary and tertiary schools"* for 101 countries for the year 2003. The data is gathered from *"Human Development Report 2005", "World Development Indicators"* and the *"United Nations Statistics Division Demographic Yearbook 2003".* .

In the first analysis, the current account balance is regressed against the *","gross domestic product", "gross fixed capital formation", "the percentage of middle aged people (from 40 to 65 year old) in the total population",* and the *" combined gross enrollment ratio for primary, secondary and tertiary schools"* by using OLS technique.

According to the estimation results, a one dollar increase in "GDP", causes a 0.146 dollars decrease in current account balance on the average, a one percent increase in the share of middle aged people (40-64) in the total population decreases current account balance by 754318655 dollars, a one dollar increase in "GFCF", increases CA balance by 0.588 dollars and a one percent increase in the enrollment rate, causes a 335011776 dollars increase in current account balance. The R^2 value is 0,74.

In general we can conclude that although the independent variables "GDP" and "MIDDLEAGE" do not have the expected sign, we have a very good "goodness of fit", that is our independent variables can explain the current account balance successfully.

The independent variables used in this analysis are in fact the determinants of the discount rate of a country which is directly related with savings. To see whether they are better at explaining savings than current account, the *"gross domestic savings"* is regressed against the same independent variables by using OLS technique. The data for gross domestic savings is taken from World Bank's *"World Development Indicators"* database for the year 2003 for the same 101 countries.

According to the estimation results, a one dollar increase in GDP, causes a 0.123 dollars decrease in the savings on the average, a one percent increase in the share of middle aged people (40-64) causes a 909883484 million decrease in the gross domestic savings, a one dollar increase in "Gross Fixed Capital Formation" increases savings by 1.466 dollars and a one percent increase in enrollment rate, increases savings by 414969168 dollars. According to the estimation results the value of Adjusted R^2 is 0.98.

An interesting finding resulting from these two econometric analyses is that the independent variables have the same signs in explaining both of the dependent variables. The Adjusted R^2 value is higher for the second regression, in which the independent variables try to explain gross domestic savings. It means that, the independent variables used in these analyses are better at explaining gross domestic savings than the current account balance.

From these analyses, we can say that increases in GDP are accompanied by a detorioration in current account balance. That is, depletion in current account balance is almost evitable in case of a growth. This phenomenon is the result of induced imports through increased income.

Also, as the share of middle aged people in the total population increases, current account balance decreases. As the life-cycle hypothesis suggest, people tend to save more in their middle ages since their income increases. But our findings showed that, this is not the case. The share of middle aged people in the total population has a negative effect on savings, which is also the result of induced imports. The social security systems of the countries might also have a crucial role in determining the saving behaviors of the individuals.

The increase in gross fixed capital formation has a positive effect on both current account balance and savings. The increases in gross fixed capital formation should also be considered as an increase in the industrialization of the countries. So we can say that, countries should try to increase their capital formation.

The interesting finding of this study is the link between current account balance and the gross enrollment rate. The increases in gross enrollment rate have a positive effect on current account balance. The increases in enrollment rate should be evaluated as an investment to human capital. The increases in the quality of human capital, increases the marginal productivity of labor and the competitive position of the country in world export markets. Thus, as enrollment rate increases, current account balance also increases.

The most important assumption of intertemporal approach is that there is a direct relationship between savings and current account.

In order to test this hypothesis for my own data set, I have regressed the current account balance on gross domestic savings. The independent variable gross domestic savings is not statistically different from zero in explaining the current account balance.

We can clearly conclude that, the independent variables *"gross fixed capital formation"*, *"the percentage of middle aged people (from 40 to 65 year old) in the total population",* and the *" combined gross enrollment ratio for primary, secondary and tertiary schools"* are effective in explaining current account balance and gross domestic savings. But the way it explains current account balance and gross domestic savings is not the way argued by the intertemporal approach.

The theory argued that, the factors underlying the individual discount rate determines saving and consumption decisions. The savings in turn determine the current account balance through capital inflows and outflows. But as the table … shows, there is no statistically significant relationship between savings and current account.

The might be several reasons for this result. Firs of all, the link between savings and current account is not always valid. If the domestic interest rate is higher than the world interest rate, there wouldn't be any link between savings and current account.

Also, several other factors like political, institutional, legal etc.. can determine the adjustment process of savings and current account balance.

This model is an isolated type of model from the real world implications. In the real world the concept of risk is very important in determining investment decisions. Even if the world interest rate is higher than the domestic interest rate, risk averse investors would still not be eager to invest abroad if they find investing abroad risky. Additionally, the transaction costs of investment should also be added to the analysis.

As a last word, these kind of simple cross sectional analyses are not sufficient to evaluate whether intertemporal approach is effective in explaining current account balance. More complicated panel-data analyses are required to evaluate the performances of various approaches to current account balance, which is far beyond the scope of a master thesis.

REFERENCES

Aguiar, Mark and Gopinath, Gita 2004. "Defaultable Debt, Interest Rates and The Current Account" *NBER Working Paper Series, Working Paper 10731, National Bureau of Economic Research, Cambridge*

Akbostancı, Elif and Tunç, Gül İpek 2002. "Turkish Twin Deficits: An Error Correction Model of Trade Balance", *METU ERC Working Papers in Economics 01/06.*

Anderson et.al. 2003, "The Influence of Personal Discount Rates on Savings and Debt: Preliminary Results from an Individual Development Account Program" Association of Public Policy and Management Annual Conference, Washington DC 2003

Balassa, B. 1964. "Competitiveness of American Manufacturing in World Markets" *Changing Patterns in Foreign Trade and Payments, New* York, Norton and Company.

Bergin, Paul R. 2004. "How Well Can the New Open Economy Macroeconomics Explain the Exchange Rate and Current Account?", *NBER Working Paper Series, Working Paper 10356, National Bureau of Economic Research, Cambridge*

Borghans, Lex and Golsteyn, Bart H.H. 2005. "Imagination, Time Discounting and Human Capital Investments"
http://www.roa.unimaas.nl/cv/Borghans/pdfp/Time%20Discounting.pdf

Bussiere, Matthieu, Fratzscher, Marcel and Müler, Gernot J. 2004. "Current Account Dynamics in OECD and EU Acceding Countries – An Intertemporal Approach" *European Central Bank Working Paper Series*

Calderon, Cesar, Chong, Alberto and Loayza Norman, 1999. "Determinants of Current Account Deficits in Developing Countries", *Central Bank of Chile Working Papers, Nu:51.*

Calvo, Guillermo A. 2005. "Crises in Emerging Market Economies, A Global Perspective", *NBER Working Paper Series, Working Paper 11305, National Bureau of Economic Research, Cambridge*

Chinn, Menize and Prasad, Eswar S. 2000. "Medium Term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration", *NBER Working Paper Series, Working Paper 7581, National Bureau of Economic Research, Cambridge*

Du Plessis, SPJ, BW Smit & CL McCarthy. 1998. *International economics* (Second edition). Johannesburg: Heinemann.

Dluhosch, Barbara, Freytag, Andreas and Krüger Malte 1996. *International Competitiveness and the Balance of Payments. Do Current and Deficits and Surplases Matter?* Cheltenham, UK, Edward Elgar

Edwards, Sabestian 2001. "Does the Current Account Matter?", *NBER's conference on "Crisis Prevention," Florida, January 2001*

Edwards, Sabestian 2004. "Thirty Years of Current Account Imbalances, Current Account Reversals and Sudden Stops", *NBER Working Paper Series, Working Paper 10276, National Bureau of Economic Research, Cambridge*

Edwards, Sabestian 2005. "Capital Controls, Sudden Stops and Current Account Reversals", *NBER Working Paper Series, Working Paper 11170, National Bureau of Economic Research, Cambridge*

Emil, Ferhat M. and Yılmaz, Hakan H. 2004 "Kamu Borcu Nasıl Oluştu? Bu Noktaya Nasıl Gelindi"
www.tesev.org.tr/etkinlik/KAMU_BORCU_DECEMBER_2004.pdf

Evgin, Tülay, 2000. "Dünden Bugüne Dış Borçlarımız", Turkish Treasury Survey and Reports, http://www.hazine.gov.tr/arastirma/dundenbugune.pdf

Eun, Cheol S. and Resnick, Bruce G 2001. *International Financial Management,* New York, McGraw-Hill, Inc.

Fleermuys, FN 2005. "The Balance of Payments as a Monetary Phenomenon: An Econometric Study Of Namibia" *Nambia Directorate of Environmental Affairs Resarch Discussion Papers No: 72"*

Gujarati, Damodar N. 1995. *Basic Econometrics, Third Edition,* New York, McGraw-Hill, Inc.

Kraay, Aart and Ventura, Jaume 2002. "Current Accounts in the Long and Short Run" *NBER Working Paper Series, Working Paper 9030, National Bureau of Economic Research, Cambridge*

Kutlar, Aziz and Şimşek, Muammer 2001. "Türkiye'de Bütçe Açıklarının Dış Ticaret Açıklarına Etkileri, Ekonometrik Bir Yaklaşım" *D.E.Ü.İ.İ.B.F Dergisi, Volume 16, Nr:1, p: 1-13*

Leonard, Greg and Stockman, Alan C. 2001. "Current Account and the Exchange Rates: A New Look at the Evidence" *NBER Working Paper Series, Working Paper 8361, National Bureau of Economic Research, Cambridge*

Letendre, Marc-Andre, 2001. "Semi-parametric Predictions of the Intertemporal Approach to the Current Account" *McMaster University, Department of Economics Working Paper Series 2002-01*

Milesi-Ferretti, Gian Maria and Razin, Asaf 1996. "Sustainability of Persistent Current Account Deficits", *NBER Working Paper Series, Working Paper 5467, National Bureau of Economic Research, Cambridge*

Milesi-Ferretti, Gian Maria and Razin, Asaf 1997. "Sharp Reductions in Current Account Deficits: An Empirical Analysis", *NBER Working Paper Series, Working Paper 6310, National Bureau of Economic Research, Cambridge*

Obstfeld, Maurice and Rogoff, Kenneth 1994, "The Intertemporal Approach to the Current Account" *NBER Working Paper Series, Working Paper 4893, National Bureau of Economic Research, Cambridge*

Pilbeam, K. (1992), *International Finance*, Mc Millan, London.

Pitchford, John 1995. *The Current Account and Foreign Debt,* London, Routledge

Salvatore, Dominick 1998. *International Economics, Sixth Edition ,* New York, Prentice- Hall.

Taylor, Alan M. 2002, "A Century of Current Account Dynamics" *NBER Working Paper Series, Working Paper 8927, National Bureau of Economic Research, Cambridge*

Thomas, R.L. 1997, *Modern Econometrics. An Introduction,* Harlow, Addison Wesley Longman Inc.

Utkulu, Utku, 2001, "Türkiye'de Dış Açıkların Belirleyicileri: Ekonometrik Bir İnceleme, *D.E.Ü.İ.İ.B.F Dergisi, Volume 16, Nr:2, p: 113-132*

Ventura, Jaume, "Towards a Theory of Current Accounts", *NBER Working Paper Series, Working Paper 8927, National Bureau of Economic Research, Cambridge*

Vogelvang, Ben 2005. *Econometrics. Theory and Applications with Eviews,* Harlow, Pearson Education Ltd.

Yücel, Fatih and Ata, Ahmet Yılmaz, 2003 "Eş-Bütünleşme ve Nedensellik Testleri Altında İkiz Açıklar Hipotezi: Türkiye Uygulaması, *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Dergisi, Volume: 12, Nr:12; Year:2003*